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Instructions to authors
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Introduction:
Periodontitis is a multi-factorial infectious disease of the supporting tissues of the teeth. Microbial dental plaque as the initiator of periodontal disease, however the manifestation and progression of periodontitis is influenced by wide variety of determinants and factors including subject characteristics social behavioral factors, systemic factors genetic factors, tooth factors, microbial composition of dental plaque and other emerging factors.

Clinically, patients suffer from gradual loss of tooth attachment in the alveolar bone leading to periodontal pockets, receding gums, loose teeth, and eventually tooth exfoliation. Gingival recession is defined clinically as exposure of the root surface by an apical shift in the position of the gingiva and may involve one or more tooth surfaces.

Causing factors include periodontal disease, mechanical action of aggressive tooth brushing, uncontrolled orthodontic movement, improper restoration, tooth malposition and frenum pull. Root exposure resulting from gingival recession leads to tooth sensitivity, root abrasion, chemical erosion, root caries and adverse esthetics. In many instances, cervical lesions involve both the crown and the exposed root causing the disappearance of the anatomic cemento-enamel junction.

Tooth wear (attrition, erosion and abrasion) is perceived internationally as a growing problem. The loss of tooth substance at the cemento-enamel junction because of causes other than dental caries has been identified as non-carious cervical lesions (NCCLs) or cervical wear. NCCLs can lead to hypersensitivity, plaque retention, pulpal involvement, root fracture and aesthetic problems.

Hence study was done to evaluate association of cervical wear with occlusal wear from clinical periodontal prospective in individuals with chronic periodontitis. Periodontal parameters like plaque index, gingival index, gingival recession and tooth mobility were assessed. The levels of cervical wear and occlusal wear were determined according to tooth wear index. Premolars were more likely to develop cervical wear than anterior teeth (incisors, canines) and molars. In conclusion, the significant association of cervical wear with the periodontal status suggested the role of abrasion and its possible combined action of erosion in the etiology of NCCLs.

Keywords: Non Carious Cervical Lesions, Tooth Wear Index, Periodontal Status,
progression of NCCLs. Abrasion is the physical tooth wear that may arise from excessive tooth brushing and abrasive contents in tooth pastes. Erosion is defined as the chemical tooth wear caused by acids, acting on plaque-free tooth surfaces, of intrinsic or extrinsic origin. Abfraction has been hypothetically described as the micro fracture and loss of tooth substance in the cervical region owing to stress induced flexure created by non-axial occlusal forces has also been considered to be involved in NCCLs. 

**Aims and objective of the study:**
To evaluate association of gingival recession and NCCLs in individuals with chronic periodontitis.

To evaluate association of cervical wear with occlusal wear from periodontal prospective.

**Materials and methods:**
This study was conducted on 20 subjects selected from department of Periodontics, A.B. Shetty Memorial Institute of Dental Sciences, Deralakatte Mangalore. The study was approved by institutional ethical committee, and an informed written consent was obtained. Subjects aged 30–60 years, presenting with multiple NCCLs were included in this cross-sectional retrospective study. Subjects with present or past history of gastro esophageal reflux disease, heartburn, frequent vomiting, xerostomia, bruxism or parafunctional habits (e.g. bruxomania) were excluded from this study. Subjects with minimum compliment of 20 natural teeth excluding third molars were included, those with artificial crowns or extensive occlusal fillings were excluded from the study. Subjects diagnosed with chronic generalised Periodontitis based on gingival index score of ≥1 and attachment loss of ≥3mm in more than 30% of the sites were included in the study. The teeth of which the level of cervical wear corresponded to Smith and Knight tooth wear index level 2 or more (defect depth more than 2 mm) were considered to have NCCLs in this study. The bucco-lingual depth of NCCLs was measured by means of a periodontal probe. No further classification of NCCLs was made with respect to their clinical appearances whether wedge-shaped or rounded.

**The screening examination included:**
The periodontal examination in subjects was carried out by using a Williams periodontal probe. To assess the severity of gingival inflammation, gingival index (LOE AND SILLNESS):1963, Gingival recession (GR) was determined by Millers Index for recession. The assessment of tooth mobility was determined according to Miller Tooth Mobility index 1938. PLAQUE INDEX (SILLNESS AND LOE): 1964. To assess the extent and severity of dental erosion, attrition, abrasion as well as any combination of these conditions- Tooth Wear Index - B.G.N. Smith and J.K. Knight in 1984. 

All measurements were carried out by the same examiner.

**Results:**
All subjects brushed twice a day, used manual toothbrush, out of 20 subjects 15(75%) were using horizontal brushing technique and 5 subjects (25%) were using circular brushing technique.

Total of 510 teeth of 20 subjects were clinically examined in the study of which 210 teeth exhibited NCCLs (41.1%) these teeth displayed signs of cervical and occlusal wear in varying degree no pulal exposure was observed .47.6% (100) of NCCLs were on right side of the jaw and 52.3%(110) were on left side of jaw. 42.15% (215) of teeth exhibited recession and 99% of teeth examined were firm and non-mobile. Significant association of NCCLs with gingival recession (Table 2). Premolars (5.7) were significantly more affected with cervical wear than incisors (1.6) and molars (3.15) (Table 3). The mean of teeth with both occlusal and cervical wear was (1.75) less compared to mean of teeth with only cervical wear (7.7) and only occlusal wear (0.8) inferring that cervical wear and occlusal wear are not associated with each other. (Table 4 and 5)

**Discussion:**
In the present study our findings demonstrated that premolars were more influenced with NCCLs. The teeth with more gingival recession and non-mobile teeth developed deeper NCCLs. The teeth with both cervical wear and occlusal wear was not significant.
**Table 1:** Tooth Wear Index - B.G.N. Smith and J.K. Knight in 1984

<table>
<thead>
<tr>
<th>Score</th>
<th>Surface</th>
<th>Criteria</th>
</tr>
</thead>
</table>
| 0     | O/I     | No loss of enamel surface characteristics.  
       | C       | No loss of contour. |
| 1     | O/I     | Loss of enamel surface characteristics.  
       | C       | Minimal loss of contour. |
| 2     | O/I     | Loss of enamel exposing dentine for less than one third of surface. Loss of enamel just exposing dentine.  
       | C       | Defect less than 1 mm deep. |
| 3     | O/I     | Loss of enamel exposing dentine for more than one third of surface. Loss of enamel and substantial loss of dentine.  
       | C       | Defect less than 1-2 mm deep |
       | C       | Defect more than 2 mm deep - pulp exposure - secondary dentine exposure. |

O: occlusal; I: incisal; C: cervical

**Table 2:** Spearman correlation between total no of teeth with tooth wear and no of teeth with recession and tooth wear

<table>
<thead>
<tr>
<th>Spearman’s rho</th>
<th>total no of teeth with tooth wear</th>
<th>Correlation Coefficient</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
<th>no of teeth with recession and tooth wear</th>
<th>Correlation Coefficient</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>total no of teeth with tooth wear</td>
<td></td>
<td>.864</td>
<td>20</td>
<td>no of teeth with recession and tooth wear</td>
<td></td>
<td>.000</td>
<td>20</td>
</tr>
</tbody>
</table>

**.** Correlation is significant at the 0.01 level (2-tailed).

**Table 3:** Number of teeth with mean tooth wear in anteriors, premolars and molars

<table>
<thead>
<tr>
<th></th>
<th>no of teeth with</th>
<th>no of teeth with</th>
<th>no of teeth with</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>tooth wear in ant teeth</td>
<td>wear in premolar teeth</td>
<td>toothwear in molars</td>
</tr>
<tr>
<td>N Valid</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Mean</td>
<td>1.60</td>
<td>5.70</td>
<td>3.15</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>1.818</td>
<td>1.689</td>
<td>2.183</td>
</tr>
</tbody>
</table>

**Table 4:** Mean of teeth with only occlusal wear, teeth with only cervical wear and teeth with both cervical wear and occlusal wear

<table>
<thead>
<tr>
<th></th>
<th>teeth with only</th>
<th>no of teeth with</th>
<th>total no of teeth with both</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>occlusal wear</td>
<td>cervical wear</td>
<td>cervical wear &amp; occlusal wear</td>
</tr>
<tr>
<td>N Valid</td>
<td>20</td>
<td>20</td>
<td>2020</td>
</tr>
<tr>
<td>Mean</td>
<td>.85</td>
<td>7.75</td>
<td>1.75</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>1.226</td>
<td>3.823</td>
<td>.910</td>
</tr>
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**Table 5:** Spearman correlation between total no of teeth with tooth wear and total no of teeth with both cervical wear and occlusal wear

<table>
<thead>
<tr>
<th>Spearman’s rho</th>
<th>total no of teeth with tooth wear</th>
<th>Correlation Coefficient</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
<th>total no of teeth with both cervical wear and occlusal wear</th>
<th>Correlation Coefficient</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>total no of teeth with tooth wear</td>
<td></td>
<td>.202</td>
<td>20</td>
<td>.392</td>
<td></td>
<td>.000</td>
<td>20</td>
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. Correlation is not significant at the 0.01 level (2-tailed)
It is preferred to brush 3 teeth initially would develop more cervical wear besides hardness of bristles and content of toothpaste, stiffness of filament would be the etiology of cervical wear. It’s been said that aggravation of abrasion at the tooth cervix is mainly because of combined action of abrasion and erosion, hence forceful brushing of tooth surface softened by acidic substances of intrinsic or extrinsic origin is an etiology of NCCLs. 

Gingival crevicular fluid is shown to be more acidic and may be erosive when in contact with teeth in cervical region. The food substances with pH of value less than 5.5 can become erosive and de mineralize the teeth.

Occlusal loading force applied to the teeth are transmitted through them to PDL supporting structure which may cushion and dissipate the resultant stress thus mobile teeth are less likely to develop stress concentration that can cause abfraction indicating correlation of cervical tooth surface lesion with tooth stability and PDL support.

Stress that concentrate to produce abfraction in teeth usually are transmitted by occlusal loading force. Occlusal interference, premature contacts, habits of bruxism and clenching all may act as stressors. Tooth contact during swallowing occurs 1500 times daily according to Shore these repetitive static and cyclic occlusal loads also could contribute to the formation of erosive, an abrasive or both the odontolytic effect may become highly significant. 

Conclusion:
Gingival recession leading to denudation of root surface which in turn could lead to abrasion and erosion, aggressive tooth brushing could be the possible, predisposing factor for NCCLs initiation and progression. NCCL can lead to hypersensitivity, plaque retention, pulpal involvement, root fracture and aesthetic problems. The increasing prevalence of NCCLs with the ageing of population represents a challenge in management of the same in dental profession.

Reference:

Keywords: Non Carious Cervical Lesions, Tooth Wear Index, Periodontal Status. - Shwethashri Permi
POSITIVE ASPIRATION AND ITS SIGNIFICANCE DURING INFERIOR ALVEOLAR NERVE BLOCK - A PROSPECTIVE STUDY

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Abstract :
Background and aims : It is a basic rule to aspirate before injection when giving an inferior alveolar nerve block because the local anaesthetic may fail if the injection is given into a blood vessel, and the local anaesthetic solution may have undesirable systemic effects. There are reports that indicate aspiration is not performed in every injection. The aim of the present study was to assess the incidence of intravascular needle entrance in inferior alveolar nerve block injections.

Patients and methods : Interns and postgraduates of our institute performed inferior alveolar nerve block injections using conventional technique in 250 patients undergoing minor oral surgical procedures. The results of aspiration were reported. Aspirable syringes and 27 gauge long needles were used, and the method of aspiration was similar in all cases.

Data were analyzed using t-test.

Results : 20% of inferior alveolar nerve block injections were aspiration positive. Of all injections, 15.8% were intravascular on the right side and 14.8% were intravascular on the left. There were no statistically significant differences between right and left injection sites (P = 0.778). Between the ages of 9 and 19 the incidence of intravascular penetration was significantly greater than at other ages (10/28 compared with 39/222, P = 0.04).

Conclusion : Aspiration of the syringe after the needle had been placed in position for an inferior alveolar nerve block (but before the anaesthetic solution was injected) in 250 patients showed that the tip of the needle was in a blood vessel in 49 (20%). Aspiration of blood was significantly more common in patients aged 9-19 years than in all others (P=0.04). It seems that side of injection has no considerable effect in incidence of intravascular needle entrance.

Keywords : Inferior alveolar nerve, injection, local anesthesia.

Introduction :
Local anesthetics are drugs that induce a transient and completely reversible state of loss of sensation in a circumscribed area of the body, caused by a depression of excitation in nerve endings or an inhibition of the conduction process in peripheral nerves.

These drugs can be categorized as amides and esters¹. Amides are metabolized in liver by microsomal enzymes and mainly removed from kidney in unionized form. Esters which have high hydrolyzing potency are metabolized by cholinesterase enzyme and removed from kidney in a more ionized form compared to amides¹. Main drugs of amide group are lidocaine, mepivacaine, and prilocaine. Main esters include tetracaine, benzocaine and procaine¹. Local anesthetic solution may contain a vasoconstrictor in addition to the local anesthetic agent.

High dose or accidental intravascular injection of local anesthetic agent with vasoconstrictor may result in cardiovascular and central nervous system toxicity, as well as tachycardia and hypertension.¹,⁶,⁸ Primary signs and symptoms of overdose are hypertension, tachycardia, tachypenia, headache, and vertigo. Other symptoms that
may occur later are vision or auditory disorders, anesthesia of tongue and perioral areas or chill. If the blood level of the drug continues to increase, it can lead to unconsciousness, breathing depression and arrest.

A number of factors increase the toxicity potential of anesthetic agents including age, weight, pregnancy, hereditary deficiency of cholinesterase enzyme, blood vessel constriction, technique and speed of injection, the blood supply in area of injection, and vasoconstrictors which are added to anesthetics to slow down absorption and reduce bleeding.

Accidental injection into the vessels may occur in all intraoral injection techniques; however, when injecting into a highly vascular area, such as the pterygomandibular space during inferior alveolar nerve block injection, there is always the increased risk of an intravascular injection, vascular damage and hemorrhage with hematoma formation.

Using aspirable syringes, avoiding needles smaller than 25 gauge, slow injection and aspiration in two different places can minimize incidence of injection into the vessels. Therefore, aspiration is necessary to avoid intravascular injection.

Considering the facts that intravascular injection may lead to overdose and toxicity and that there is a high risk of intravascular injection in IANB, the aim of this study was to assess the incidence of positive aspiration during inferior alveolar nerve block injections.

Patients and Methods:
We studied inferior alveolar nerve blocks in 250 patients at the department of oral and maxillofacial surgery at our institute, Mangalore, Karnataka, India.

A Luer syringe with a 24G needle 32mm long was used. The needle was directed from the opposite quadrant premolar area towards the mandibular foramen. After the needle had made contact with the bone, it was withdrawn 2–3mm and the piston of the syringe was drawn back so that the entry of blood into the syringe could be seen. The method of aspiration was similar in all cases. Two aspirations were performed before injection with the needle bevel in different directions. If blood was aspirated the needle was withdrawn and the injection repeated.

Age of the patient, injection technique, side of injection, and aspiration result were recorded. Data were analyzed using t-test.

Results:
This study included 250 patients undergoing inferior alveolar nerve block injections using conventional technique.

51.6% of them were performed by post-graduates and 48.4% by interns.

51% of them were injected on the right side of mandible and 49% of them on the left.

Positive aspiration was observed in 17.82% and 22.31% of IANB injections performed by postgraduates and interns respectively (Table 1). There were no statistically significant differences between the operators in aspiration results (P = 0.754).

Overall incidence of needle entrance into the vessel was 20%.

Of all injections, 15.38% were intravascular on the right side and 15.03% were intravascular on the left. The difference between intravascular injections on the right and left sides was not statistically significant (P = 0.778).

Between the ages of 15 and 19 the incidence of intravascular penetration was significantly greater than at other ages (10/28 compared with 39/222, P = 0.04).

Table 1: Incidence of aspiration of blood before inferior alveolar nerve block according to age and sex

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Number of IANBs (%)</th>
<th>No. of Positive Aspiration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-graduates</td>
<td>129</td>
<td>23 (17.82%)</td>
</tr>
<tr>
<td>Interns</td>
<td>121</td>
<td>26 (22.31%)</td>
</tr>
<tr>
<td>Total</td>
<td>250</td>
<td>49 (20%)</td>
</tr>
</tbody>
</table>
Discussion:
Intravascular injection of local anaesthetic during inferior alveolar nerve block is common\(^1\). According to some authors aspiration is not necessary because intravascular injection of local anaesthetic is rare (frequency 0.5%).

These authors maintained that even if that does happen, the amount of solution contained in one anaesthetic cartridge (2%, 1.8 ml) is not enough to be toxic.

Most authors do not agree with this, however, and consider aspiration before an inferior alveolar nerve block to be necessary. Injection to a highly vascular area such as pterygomandibular space during an inferior alveolar nerve block has a high risk of intravascular needle entrance. Accidental intravascular injection of local anesthetic agent with vasoconstrictor may result in cardiovascular and central nervous system toxicity, as well as tachycardia and hypertension\(^6\,7\,8\,9\).

The haemodynamic effects of a local anaesthetic with 1:100,000 vasoconstrictor have been studied in healthy people\(^3\). This concentration does not cause substantial changes to the cardiovascular system when intravascular injection of the local anaesthetic is avoided. However, greater concentrations (>1:50 000), or even the rapid intravascular injection of the cartridge of anaesthetic solution, may have dangerous haemodynamic effects in patients with cardiovascular disease.

According to the results of this study, the rate of intravascular needle entrance in inferior alveolar nerve block injections was 20%, which is a relatively high incidence. This notable finding emphasizes the necessity of aspiration before IANB injections.

The total rate of intravascular needle entrance during IANB injections was higher than the result of a previous study (11.7%)\(^1\).

According to the current study, it seems that the side of injection has no considerable effect in incidence of intravascular needle entrance.

It seems that the rate of intravascular needle entrance might be higher among general dental practitioners, though not statistically significant in this study. General dental practitioners should be encouraged to consider the potential for anatomical complications when administering any dental local anaesthetic. Failure to do so can result not only in less-than optimal local anesthesia but, more significantly, in minor – perhaps major – consequences in the form of local and systemic complications.

Conclusion:
The high incidence of intravascular injection during inferior alveolar nerve block that we found proves that aspiration is necessary because the failure of anaesthesia is accompanied by an increased likelihood of serious systemic complications, which may even endanger the life of the patient.

Acknowledgement:
The authors thank Dr. Smitha Bhat and Dr. Deepthi Shetty, A. B. Shetty Memorial Institute of Dental Sciences for their support and help in carrying out this study.

References:
EVALUATION OF HAZARDS OF WASTE MATERIALS IN CLINICS AND HOSPITALS : A RESEARCH

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Abstracts:
Wastes from the cities and villages cannot be avoided from man's existence. It is essential to safely put these unwanted or discarded material away, in the interest of the community. During human activities a lot of waste matter is produced due to various development project, industrialization and modernization of the community. In this study waste materials were collected from various hospitals and rural and urban residential areas. These wastes were divided into two main categories- Health care waste and domestic waste. The survey indicated 80% solid waste deals with the domestic and urban waste while only 20% deals with the health care waste. The health care waste is regarded hazardous and may cause a variety of health risk.

Keywords: Urbanization, Health care, pathogens, refuse, segregation

Introduction:
In any community it is essential to safely put unwanted or discarded material away. Healthy cities and villages cannot thrive with insanitary wastes and indifferent sewage disposal. Waste, nevertheless, cannot be avoided totally from man’s existence either, so much so, that each one of us is responsible for about 500 gms of solid waste and 100-150 liters of sewage/sullage every day.

During the human activities, a lot of waste matter is produced with industrial, biological development, modernization and urbanization. There is an increase use of these materials and as a result the productions of variety of waste products are also increased (1).

The waste products are either solid wastes or liquid wastes or excremental filth. Different types of wastes impinge upon physical, mental and social health of the individual or a community in various ways. Hospital is the places where individual is housed for different periods of time for curative, rehabilitative, preventive or promotive services, as a suspect of disease or when suffering from disease. City hospital, health care institutions and research centers use a wide variety of drugs like cytotoxic drugs, corrosive chemicals and radioactive substance which ultimately become part of hospital waste. In addition, the increased use of disposables in the hospitals has brought in its wake many ills such as inappropriate recycling, unauthorized and illegal reuse and increased quantity of wastes disposal, many times infected (2&3).

The exposure to health care waste may result in infections and diseases or injury. The hazardous nature of the medical waste may be because it may contain infectious materials/agents or maybe genotoxic or may be radioactive. It may contain 'sharps' such as blades, syringes and needles etc. The prick of these objects result into the introduction of infected material into the human body (4&5).

The purpose of the study is to evaluate the waste material collected from the clinics and hospitals and methods to dispose of these materials by various methods.

Keywords: Urbanization, Health care, pathogens, refuse, segregation - Anand Kumar
Material and Methods:
The samples (waste materials) were collected from various hospitals in Lucknow district and rural and urban residential areas. The samples were divided into two categories- Hospital waste and Residential (public places under municipal limits of Lucknow and adjacent areas). In the hospital scenario, generation of biochemical waste was done at almost all areas and at all levels. Samplings were collected from various hospitals, nursing homes, clinics, dispensaries and P.H.C.’s for assessment (Table-I). For residential waste, samplings were collected from different areas of Lucknow which includes Indira Nagar, Gomti Nagar, Mahanagar, Aliganj, Nirala Nagar, Kaiserbagh etc. These sampling data of residential areas were taken from Nagar Maha Palika, Lucknow (Table-II).

These waste were again divided into infectious (Health Care) waste and non-infectious (Domestic) waste. Infectious waste (Fig: I) included those waste generated in hospital, which was capable of causing infectious diseases or disability. The infectious waste was also generated in clinical areas. These were taken from:

\[\text{INFECTIOUS WASTE}\]
- Wards
- Laboratories
- Experimental rooms
- Mortuary
- Clinics

\[\text{INFECTIONOUS WASTE}\]

Non-infectious waste (Fig-II) were included those waste generated from domestic places (urban municipal waste) which were not infectious and does not cause any hazards. These wastes were taken from different sources as under:

\[\text{NON-INFECTIOUS WASTE}\]
- Office
- Guest room
- Hostels
- Store
- Residential areas
- Kitchen
- Housekeeping

In our study, the comparison of waste between domestic (Non-infectious) waste and health care (Infectious) waste showed that out of total waste generated in the city 80% were domestic waste and 20% were health care waste (Table-III). The health care waste was of small amount as compared to domestic waste. In hospitals, the amount of waste generated per bed varies with the type of hospital, however, on an average 1-5 kg of waste per bed was generated. Estimates of hospital waste were made from number of beds in the city and average amount of waste created per bed. There had been a wide range, depending upon the waste generation and the method of estimation.

In Lucknow city, normally 1-5 kg/bed/day of waste was generated. From clinics the solid waste generated was 1 kg to ½ kg per clinic per day. The waste collected from dispensaries and PHCs were 2 kg to ½ kg per dispensary per day. Therefore the average of solid waste generated from health care was 4.5 to ½ kg per bed per day (Table-IV).

Waste collected from the residential areas of Nagar Maha Palika was mainly of two types- Solid waste disposal and waste water disposal. The solid waste contributed the maximum percentage of waste (about 80% of the total waste while the water waste disposal was 15%. The other waste (5%) included spare parts of vehicles and polythene which could be reusable for various purposes (Table V).

The waste generated from the health care was of different categories. These categories include the infectious and other wastes. The other wastes are pathological waste, sharps, pharmaceutical waste, genotoxic waste, chemical waste, wastes from radioactive heavy metals and pressurized containers. The infectious waste contributed the main waste from the hospitals and nursing homes (45 to 55%). The next was the chemical and pharmacological waste (15 to 20%). The sharp waste such as blades, knife, and scissors contributed to 10 to 15%. Radioactive waste from X-ray matching, radionuclide’s associated to about 10 to 15% (Table VI and Table VII).

Discussion:
Disposal of wastes is largely the domain of sanitarians and public health engineers. Health professionals need to have
a basic knowledge of the subject since improper disposal of wastes constitute a health hazard. The solid wastes include garbage (food wastes), rubbish (paper, plastic, wood, metal, glass etc.), demolition product (bricks, masonry and pipes), sewage treatment residues (sludge and solids from the course screening of domestic sewage), dead animals, manure and other discarded materials (6). In cities it is called ‘refuse’, in country side it is called litter and in general it is called solid waste. The sources of refuse are street refuse (collected by street cleaning services), market refuse (collected from market such as purified vegetables and animal matter), stable litter (collected from stables containing animal droppings and left over animal feeds), industrial refuse (comprises wastes such as calcium carbonate and explosive materials), domestic refuse (such as ash, rubbish and garbage) (7). This indicates that municipal waste is of much more in amount in comparison to hospital waste. The survey conducted indicates that refuse collected from cities amounts about 80% while the waste collected from hospital was 20% of the total waste in the cities. Both of these types of wastes are causing a health hazard to the community which ranges from transport of pathogens to man through flies and dust to possibility of water, soil and air pollution. The hospital waste is causing more health problem because of the much percentage of (45%) of the infected materials. The other such as sharps chemicals and radioactive materials are also having health hazards to the community.

The waste materials generated by the hospitals may be termed as 'hospital waste', 'medical waste' and 'regulated medical waste' because of variety of wastes generated in the hospital. The term ‘medical waste’ is used to describe any waste which is generated in the diagnosis, treatment or immunization of human beings or animals. Biomedical waste is used for any solid, fluid or liquid waste including its container and any intermediate product generated during research activities or in the production or testing of biological and animal waste from slaughter houses. Clinical waste is any waste coming out of medical care patient in hospitals or other health care establishments. Pathological waste is the waste removed during surgery/autopsy or other medical procedures including human tissues, organs, body parts, body fluids etc. Infectious waste is that biomedical waste which may transmit viral, bacterial or parasite diseases, if, concentration and virulence of pathogenic organisms is sufficiently high (8). The most appropriate way of identifying the categories of health care waste is by sorting the waste into color-coded plastic bags/containers yellow, red, blue, black. The recommended segregation and color coding should be as per central pollution control board regulations. The key to minimization and effective management of health care waste is segregation (separation) and identification of the waste, appropriate handling, treatment and disposal of waste by type, reduce costs and do much to protect public health. Segregation should always be the responsibility of the waste producer, should take place as close as possible to when the waste is generated and should be so maintained in storage areas and during transport. This is important to separate the infected from non-infected waste. In infected waste again segregation should be done for biochemical, pathological, radioactive, sharps waste materials(1&3).

Thus the survey done in Lucknow City revealed that the quantity of solid waste generated in hospitals and nursing homes generally ranges from ½ kg to 4 ½ kgs per bed. The total quantity of hospital waste generated in Lucknow is about 30 tones per day. Out of this nearly 45 to 50% is infectious; segregation of infectious waste from non-infectious wastes is done only in about 20% of hospitals. This the survey indicates 80% solid waste, deals with the normal domestic and urban waste management system while only 20% dealt with in health care waste. Out of this 16% are pathological and infectious waste, 1% sharp waste, 3 % chemical and pharmacological waste, less than 1% special waste, such as radioactive or cytotoxic waste, pressurized contains or broken thermometers and used batteries. These surveys are also coinciding with the survey conducted in the Bangalore city for the waste management system.
**Conclusion:**

It is concluded from the study that between 75 to 90 percent of the waste produced in the cities is non-risk or 'general' health care waste, comparable to domestic waste. It comes mostly from administrative and housekeeping functions of the health care establishment and may also include waste generated during maintenance of health care premises. The remaining 10-25 percent health care waste is regarded hazardous and may create a variety of health risk.

**References:**

EFFECT OF COMMUNITY PARTICIPATION ON KNOWLEDGE OF SELECTED VECTOR BORNE DISEASES AMONG THE SELF HELP GROUPS

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Abstract:
The study is conducted to assess the effect of community participation on knowledge of selected vector borne diseases among the self help groups. The sample include eight self help groups having 10 members each, with 40 in the experimental and control group each. Research approach was quantitative-evaluative approach and design used was quasi experimental pre test post test control group design. The study was carried out in two phases. In the first phase, the health teaching by the researcher was given to selected members of self help groups with a duration of 45 minutes and in the phase 2, these trained members gave health teaching to the other members of the self help groups. A leaflet was given to the control group. The post test knowledge was assessed over a period of 7 to 9 days after the intervention in both the phases. The community participation has found to be effective with a p value of .001. The study concluded that the community participation was effective in terms of knowledge gain.

Keywords: Community Participation, Knowledge.

Introduction:
World Health Organisation quotes that an estimated 300 million malaria infections occur each year, with 2 million deaths. They have identified malaria as one of the three major diseases of poverty along with HIV and tuberculosis. About 40% of the world’s population is at risk. According to the World Health Organization (WHO), Dengue is the most rapidly spreading mosquito-borne viral disease in the world. It infects between 50 million and 100 million people annually, with 500,000 cases of the more severe infection known as dengue hemorrhagic fever.

The chikungunya infection has showed a massive increase in its incidence as high as 5 million in India and South East Asia since 2005 as per the report of WHO. India reported a massive chikungunya epidemic in 2006. Chikungunya has re emerged in India since 1973, when the attack rate was 37.5%. However, in the 2006 epidemic, the attack rate increased to 45% in some places. The initial estimate of people affected with filariasis is 1.2 billion. The WHO bulletin of January 2012 says that more than 1.3 billion people in 72 countries worldwide are threatened by lymphatic filariasis, commonly known as elephantiasis and over 120 million people are currently infected, with about 40 million disfigured and incapacitated by the disease.

A survey conducted in Bangalore in 2010, in the urban and rural areas to assess the knowledge, attitude and practice in determining the perceived risk by the community of mosquito borne infectious diseases and the level of knowledge regarding mosquitoes. The study result showed that more than 90% of the people interviewed perceived mosquitoes as a problem only rather than their disease causing potential. The researcher also has given stress in health education campaigns.

Since it is evident that the vector borne diseases are prevalent, many studies have been done to determine the knowledge and practice on prevention of vector borne diseases.
diseases among the adults. Studies have been also done to determine the effectiveness of community participation and it was found to be effective. Hence the investigator was interested to assess the effect of community participation in improving the knowledge and practice in prevention of selected vector born diseases.

Materials and Methods:

Study hypotheses:
The following hypotheses were tested at 0.05 level of significance.

1. \( H_1 \): there will be no significant difference between post intervention knowledge scores on prevention of selected vector borne diseases between the experimental and control group

2. \( H_2 \): there will be no significant difference between pre and post intervention knowledge scores on prevention of selected vector borne diseases within the experimental group

Study design and study population:
This quantitative study adopted an evaluative approach to identify the effectiveness of community participation on knowledge regarding prevention of selected vector borne diseases and the design used was quasi experimental pretest - post test control group design. The study population was all the adults who resides in the adopted villages of Manipal College of Nursing, Manipal which are Athrady and Hirebettu and comprised of 5000.

The estimated sample size was 15 in each group with a clinical significant difference of 5; however it was decided to select 40 in each group on the basis of 20% assumed attrition. The sample size was 40 in experimental group and 40 in control group.

Administrative permissions were obtained from the self help group incharge and informed consent from all participants. Ethical clearance was obtained from The Institutional Ethics Committee, Kasturba hospital, Manipal.

Data collection instruments and measurements
The following tools were used to collect the data

Tool 1: Background Proforma
The investigator, for collecting the background information of the sample, developed a demographic proforma. It consisted of 11 items such as age, gender, religion, educational status, occupation, income, type of family, exposure to vector borne diseases, awareness on vector borne diseases, source of information, and the duration of being in a self help group. The tool was validated by seven experts, translated into Kannada and pretested among five adults residing in a village.

Tool 2: Structured Knowledge Questionnaire on prevention of selected vector borne diseases
The questionnaire dealt with dynamics of disease transmission, epidemiological triad and the prevention and control. It had a total of 47 items divided into two sections, section A and B with 28 and 19 items in each section respectively. The items in the section A had 5 alternate responses and the items in the section B was dichotomous type. The respondents were requested to select the best possible option by encircling the correct answer. The minimum score was 1 and the maximum score was 47. Knowledge score was arbitrarily classified as inadequate (1-15), moderately adequate (16-31), adequate (32-47). The tool was validated by seven experts, translated into Kannada and pretested among five adults residing in a village and the reliability was tested by test retest method among 20 adults residing in a village and \( r=.89 \)

Pilot study was conducted among 20 sample and no changes were made in the tool or in the design of the study.

Procedure
The study was carried out in two phases. Tool 1 and 2 was administered among the selected participants. In the first phase, the health teaching by the researcher was given to selected members of self help groups with a duration of 45 minutes and in the phase 2, these trained members gave health teaching to the other members of the self help groups. A leaflet was given to the control group. The post test knowledge was assessed over a period of 7 to 9 days after the intervention in both the phases.
Statistical analysis
The data were analysed using both Descriptive and inferential using Statistical Package for Social Science Version 16 (SPSS 16).

Descriptive statistics: Frequency and percentage distribution, mean and standard deviation were used to describe the sample characteristics.

Inferential statistics: Mann Whitney U test and paired t test was used to test the effectiveness of intervention between and within the group respectively.

Results

Phase 1

- Majority of the samples fall under the age category of 18-28 years (60%) in the experimental group and 30% in each categories for the control group.
- In both the phases, all the samples are females and they all belong to Hindu religion.
- In the experimental group, 50% of the samples educational level is higher secondary and in control group, both primary and higher secondary with 40% each. In the phase 2, majority of them in the experimental group (60%) as well as in the control group (80%) had primary level of education
- None of them have suffered from any type of vector borne diseases in the past.
- The mean pretest score was 24.10 and mean post test score was 29 which showed a significant increase in the mean scores with a SD of 3.604 and 4.497 respectively.

Phase 2

- The majority accounts for 40-50 years of age (36.7%) in the experimental and 29-39 years (33.3%).
- 100% of the people had moderately adequate knowledge on the pre and post test in the control group whereas, in the experimental group there was 100% in moderately adequate category which showed an increase to 50% and falling under adequate knowledge category and 50% moderately adequate category. In phase 2, 20% of the people in the experimental group had inadequate knowledge during the pretest and on the post test 19% had moderately adequate and 11% had adequate knowledge, whereas in the control group, 76.7% moderately adequate and 23.3% had inadequate knowledge during the pre and post tests respectively

Effectiveness of community participation on knowledge between the groups

<table>
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<tr>
<th>Knowledge</th>
<th>Median</th>
<th>Inter quartile range</th>
<th>Z value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
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<td>15.75-22.00</td>
<td>5.788</td>
<td>.001</td>
<td></td>
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</tbody>
</table>

*significant at p < 0.05 level

Effectiveness of community participation on knowledge with in the group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Experimental group</th>
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<th>df</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Mean</td>
<td>Mean diff.</td>
<td>SD</td>
<td>11.435</td>
</tr>
</tbody>
</table>

*significant at p < 0.05 level

Discussion:

In the present study, all (100%) the people had moderately adequate knowledge on the pre and post test in the control group whereas, in the experimental group it was 100% in moderately adequate category which showed an increase to 50% and falling under adequate knowledge category and 50% moderately adequate category. In phase 2, 20% of the people in the experimental group had inadequate knowledge during the pretest and on the post test 63.3% had moderately adequate and 36.7% had adequate knowledge, whereas in the control group, 76.7% moderately adequate and 23.3% had inadequate knowledge during the pre and post tests respectively.

The findings were supported by a survey done by Amul BP, Hitesh R, Shah P, Patel Jignesh G, Sharma R, in the year of 2011. The results of the study showed that 90% of the samples agreed that mosquitoes are a problem. 30.4% did not know breeding sites of mosquitoes. Only 11.6% of people associated clean water collections with mosquito breeding. Regarding diseases transmitted by mosquito, 62% answered malaria, 37.4% were not aware and 8.8% people mentioned about Filariasis, Dengue or Japanese encephalitis. 4.7% granted mosquito control as responsibility of community. 61.4% were using repellents for prevention against mosquito bites and 39% not taking
any preventive measure. The researchers concluded that the knowledge was inadequate.\(^8\)

**Effectiveness of community participation**

The present study findings reveal that the community participation is effective in terms of knowledge gain with a significance of \(p=0.001\).

The study is supported by a randomised controlled study done by Hien LTT, Takano T, Seino K, Ohnishi M, Nakamura K, to evaluate the effectiveness of an educational program entitled ‘Capacity building’ for community leaders in a healthy living environment. The researchers also aimed to assess the usefulness of a participatory style of education and the applicability of an intersectoral approach in the educational process. The study took place in Vietnam in the year 2005. There was a qualitative evaluation of the educational program by participants and facilitators to assess the appropriateness of the intervention. The intervention group showed a significant improvement from the pre-test score of 32.0+11.9 to the post-test score of 75.8+14.4 \((P, 0.001)\), whereas no statistical change was observed in the control group. The conclusion was that the community leaders, who are representatives of various sectors and mass organizations within the community, can be important implementers in the promotion of a healthy living environment.\(^9\)

**Conclusions:**

The following conclusion was drawn from the present study:

- The community participation was effective in terms of gain in knowledge regarding prevention of selected vector borne diseases among the adults.

**Acknowledgements:**

The study was successfully completed by the help and guidance of Mr. Shashidara Y N (guide), Mrs. Manjula (co-guide), Dr. Anice George (Dean, Manipal College Of Nursing, Manipal).

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INSCIENCE, DAY TO DAY STRUGGLE AND DISTRESS :
LIVED EXPERIENCES OF PATIENTS WITH CHRONIC
LEG AND FOOT ULCER

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Abstract :
Chronic leg and foot ulcers leads to negative physical, physiological, social and psychological impact on clients and families, thus decreasing their quality of life. A qualitative study on experiences of person living with chronic venous ulcer in Sweden, reported that person living with chronic ulceration have experiencing the decreased wellbeing, pain and struggle between the hope and despair. In this study phenomenological design was used. Six participants were interviewed with interview schedule by the purposive sampling method. Lack of knowledge and ignorance, dressing and foot care, day to day struggle, discomforts, financial hardship, Emotional reaction and self-adaptive measures and supports were six themes identified in the Qualitative data analysis. It was reported that, feeling of fear, loneliness/sad were experienced by the patients. Severe pain in the wound site that interfere with day to day activities and produces stress in relation to meeting daily activities and difficulty in financial resources because of decreased work capacity and loss of job. The adaptive measures like massaging the around the wound, playing with children, doing small works in sitting position and accepting the situation, consuming alcohol and smoking were followed. Participant encountered herbal medicine worsens the leg ulcer. Results were highlighted the impact of the chronic leg and ulcer and psychological and emotional disturbances ignorance of adequate leg ulcer care inevitably increases the risk of amputation. Study recommended the intervention to deal the emotional disturbances in order to prevent the risk of distress and depression.

Keywords : leg ulcer, foot ulcer and experiences.

Introduction :
The world health organization reported that the chronic diseases will be the cause for one third of death and disability in 2020. Management of chronic disease pose a special challenge in a health care delivery system. In India, totally 53% of deaths are due to chronic disease. In Indian scenario, very few studies were conducted related to the live experiences of patient with chronic leg ulcer. It is very difficult to measure the subjective experiences of patients quantitatively. So the researcher felt that there is need to understand deeply about their experiences related to living with chronic leg ulcer.

Chronic leg ulcer is a life threatening complication of vascular diseases and diabetes mellitus. Leg and foot ulcer are often recalcitrant to healing, tend to recur and become long-term chronic healthcare problems.

In UK, a study was explored the depression in people treated for chronic venous leg ulceration, assess the impact of excessive exudates, (leading to leakage and odour, on their daily lives) and overall health and quality of life. The findings shows that odour and excessive exudates leading to leakage had an adverse effect on patients' psychological state, leading to feelings of disgust, self-loathing low self-esteem, social isolation and depression. The study recommended the healthcare professionals focus towards the measures to rectify the impact of odour and exudates leakage on patients' health and healing.

In Indian scenario, very few studies were conducted related to the live experiences of patient with chronic leg ulcer. It is very difficult to measure the subjective experiences of patients quantitatively. So the researcher felt that there is need to understand deeply about their experiences related to living with chronic leg ulcer.
**Objectives:**
1. Exploring the experiences of patient living with a chronic leg ulcer.
2. Describe the patient experiences related to care of chronic leg and foot ulcer.

**Materials and Methods:**
Phenomenologist assumes that human experience is inherently subjective. Interpretive phenomenological design was used to explore the experience of the patient living with chronic leg and foot ulcer. The non probability purposive sampling was used to select the participants.

**Inclusion criteria**
1. Diagnosed by the registered medical practitioner as diabetic foot ulcer.
2. Age between 30 years to 60 years
3. Able to understand and speak either Kannada, Malayalam or English
4. Interested to share their experiences
5. Had the site of ulcer below knee
6. Visited the K.S Hegde hospital for the treatment
7. In all the stages of diabetic foot ulcer
8. Underwent all the type of surgical procedure for the diabetic foot
9. Patient in the stage of before and after the surgical procedure

**Exclusion criteria**
1. Chronic leg and foot ulcer patient suffering with any other serious co existing illness.
2. Patient those who are uncooperative.
3. Patient those who are unconscious, drowsy and disoriented at the time of study.

**Sample & sample size**
Patients those who are fulfilling the sampling criteria. Sample size comprises of 6 patients with chronic leg and foot ulcer.

**Setting**
The study was conducted in K.S Hegde Medical College Hospital, Mangalore.

**Data collection procedure**
The data was collected from the participant by using interview schedule with open ended questions. The informed consent was obtained from the participant. Researcher recruited the participant based on the predetermined sampling criteria. Researcher collected the data regarding the patient perception and experiences related to living with chronic leg ulceration in the form of rich description. Researcher field notes, translator description and audio recording contributed the data base for study and serve to ensure the trust worthiness. Researcher used the Kannada and Malayalam translator to collect field notes of interview.

**Scientific adequacy of the research**
The researcher presented the original feeling, thoughts and perception of the participant in relation to living with the chronic leg and foot ulcer. The study strictly followed the privacy, confidentiality of the ethical clearance procedure. This study conducted by the researcher as a part of Ph.D program. Ensure the validity of the research, validity of qualitative analysis was done with peer group. Valuators were selected in the field of nursing. Most of the valuators given 100% agreement for the qualitative analysis.

**Results**
The data analysis done by using Moustakas (1994) method. The process of data analysis will be done along with the help of translator. Following this initial step, the rich descriptions were analysed. The transcripts were converted into formulated statements. Meaning of formulated statement and themes were identified. Themes will be analyzed for exhaustive description. The participants shared the experiences were presented. Some of the participants not recognized the severity of the wound at the initial stages. The one male participant shared that “I have just scratched my skin with my own finger nail because of itching. But I never known that it became a severe chronic leg ulcer”.

**Lack of knowledge (inscience)**
All the participants were evaluated that not having
adequate knowledge to prevent the occurrence of diabetic foot. More specifically not cautious about prevention of injury in the lower extremity. Two of the them had applied the herbal medicine which worsens the wound further. Two participants were not aware about the seriousness of the diabetic foot ulcer and not taken on time treatment. Participants were not followed the regular check up ,diet and follow up

Dressing and foot care
Most of the participant not aware dressing for the leg and foot ulcer. Participants were dressed the wound by the local hospital worker and relatives. Most of the participants not aware about the diabetic foot wear.

Information seeking
All of them did not know the seriousness or impact of the ulcer in the starting stage. Most of them ignored seeking the proper health care support. Two of the participant already suffered with one or two episode chronic leg ulcer either in the same leg or other leg for more than one year. Most of them were not aware about the amputation.

Day to day struggle
In a real way these participants were put their life in day to day struggle to manage the leg and foot ulcer. Chronic struggling, hospitalization, lack of mobility, pain, bleeding, leakage and sleep disturbances were the factors increasing the daily battle. Most of the participants moving with assistance and using plastic bags to cover the wound site to prevent becoming wet and soiled.

“Though I have adequate financial resources like land, shop and rubber, This age I am sitting in the hospital often and not able to do my work and responsibilities properly. It is very difficult situation in the life”

Discomforts
The participant have throbbing type of pain in the foot especially surroundings and it was very severe in intensity. Five out of six participants had severe pain in the ulcer and lead to sleep disturbances and immobility. One participant experienced complete loss of sensation in the leg. Fever and chills and difficulty in eating because of the odour from the wound discharge were also reported by them.

Financial hardship
Female participants having the financial difficulties and male participants not having much financial difficulties but one participant expressed loss of job making him to feel very difficult. Participants experienced difficulty in doing the work because of the pain, immobility.

Emotional reaction.
The participant got embarrassed and tensed. “Yesterday the staff nurse came and dressed my wound. I got scared. The wound was bleeding profusely. I am very scare to see my wound.”

One of the male participants was looking depressed and bothering about the hospitalization. Young male participant lost his hope in his life. The participant was feeling very bad about often suffering with health problem, loss of mobility and not going for the work regularly. “I am feeling very difficult with this situation often I am facing this problem in this age”

Self Adaptive Measures.
Watching TV and outside the window, playing and talking with the children, support from the family members and talking with the neighbors were adaptive measures used by the participants and they used these measures to cope with pain, emotional feeling, boredom and compensating the loss of mobility. The entire male participants were used to consume alcohol. Two of the male participant were smokers.

Baseline information
Duration of the leg ulcer for the entire participant was more than six months and one participant suffering for last five years. The entire participant wound surface area were more than 9 cm except two participant. Site of the ulcer for most of the participant were plantar aspect of the foot and for some of them it extended to dorsum aspect of the foot. Equally the participant had the ulcer in left and right leg. Four of the participant were falls in the age group between 50-60 years and two of the participant 30-35 years. Equally both male and female participant were included in the study.
Two individuals mentioned that the leg ulcer formed due to the corn in the foot and two of them got due to the formation of small ulcer, one person got gangrene and another person got the ulcer due to the scratching of the leg with his own finger nails. Out of six participants, four participant foot ulcers was a second episode and others were got the foot ulcer as a first episode.

**Table 1 :** Identified themes and grouping of formulated statements related to knowledge

<table>
<thead>
<tr>
<th>Lack of knowledge and ignorance</th>
<th>Dressing and foot care</th>
<th>Information seeking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approached the herbal medicine.</td>
<td>dressed by the local un trained hospital worker, Used the damaged foot wear. Not using the diabetic foot wear.</td>
<td>first victim in their life getting such type of ulcer, gathered from the health care professionals is inadequate, Not knowing the seriousness or impact of the ulcer in the starting stage, Delay in approaching the surgeon.</td>
</tr>
<tr>
<td>Not taking the diabetic diet to contro blood sugar level. High blood sugar level was ruled out after the occurrence of chronic foot ulcer. Not followed proper follow up and regular check up.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 2 :** Identified themes and grouping of formulated statements related to struggle.

<table>
<thead>
<tr>
<th>Day to day struggle</th>
<th>Discomforts</th>
<th>Financial hardship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Getting assistance for going toilet and bathing. Using plastic bags to cover the wound site to prevent becoming wet and soiled. Struggling with the leakage from the wound and its odour. Sleep disturbances because of the pain, dressing and leakage.lack of mobility,</td>
<td>loss of sensation in the leg, fever and chills in relation to leg and foot ulcer, throbbing type of pain in the foot, Profuse bleeding from the wound. Wound surface area more than 9cm. Wound on the plantar and Dorsum aspect of foot</td>
<td>difficulty in doing the work now a days because of the pain, Taking loan for the hospital expenses stopped his work because of the participant sickness.</td>
</tr>
</tbody>
</table>

**Table 3 :** Identified themes and grouping of formulated statements related to emotional reaction.

<table>
<thead>
<tr>
<th>Emotional reaction.</th>
<th>Self adaptive Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling of neglected, Embarrassed, feeling tensed and giddiness by seeing wound, Bothering about the hospitalization. Fear about the future. Fear of meeting responsibility and death.</td>
<td>Doing some of the house hold works in a sitting posture, watching TV, Watching outside the window, playing and talking with the children Accepted and ready to face leg ulcer. support from their family members, Smoking and Using Alcohol.</td>
</tr>
</tbody>
</table>

**Discussion :**
Totally six themes were identified in the analysis such as lack of knowledge and ignorance, information seeking, Day to day struggle, Discomforts, emotional reaction and Inadequate knowledge, ignorance, leads to poor ulcer care. Pain, odor, leakage from the wound, bleeding and sleep disturbances are the struggle are experienced by the person daily. Pain and immobility were the major issues, creates diminished the work capacity and sleep disturbance were some discomforts experienced by them. Feeling of sad, neglected, worrying about the illness, loneliness, fear about the wound, and fear about meeting the responsibilities and death were the emotional disturbances experienced by them.

Watching television, playing with children, smoking, alcoholism are coping resources and acceptance was the coping strategy were adapted by the participants mainly used to adapt with pain and family members are supporting adequately to meet their daily activities. Interestingly one participant used constructive coping strategy acceptance. Financial difficulties, loss of job and diminished work capacity faced by the all the participants. There is need to create the awareness about the self care, foot care, foot wear and amputation.

**Keywords :** leg ulcer, foot ulcer and experiences. - Kirupa P.
Findings was supported, a study was conducted to explore the lived experience of people who have non-healing venous ulcers in UK. Interpretative phenomenological analysis was utilized to identify themes and patterns. The core themes identified through analysis were biographical disruption, ways of coping, social implications and therapeutic relationships. The emergent themes reveal the impact of chronicity in participants’ experience of chronic leg ulcers, their various emotional and problem-focused coping strategies and the positive role the district nurse plays in their lives. This study places leg ulceration within the body of literature on chronicity 16.

Conclusion:
The experiences of the participants suggest the number of conclusions as follows

The ignorance and lack knowledge related to chronic leg and foot ulcer were the main factor for the long term struggling. Daily battle with this damages the satisfaction with life and produces psychological distress and negative impact on the quality of life. The adaptive measures of the participant were inadequate to meet the impact of this chronic illness. The negative coping strategies adapted by the males were worsening the problem and increase the risk of other health problems. Financial difficulties and diminished work capacity further aggravated the impact of the disease and increased risk of losing the support. The emotional reactions associated with chronic ulcer increases the psychological distress. Continues struggle with this problem were the root cause for psychological disturbances and associated risk specially depression.

Apart from physical problems, emotional disturbances and psychological risks were arising equally in this daily battle with leg and foot ulcer. Emotion needs of these patients should be taken care in order to promote coping with illness, self care, health and healing. Minimal psychological intervention need to prevent the risk of distress and depression and motivated for the self care.

Acknowledgement:
My heartfelt thanks to the ethical and research committee of the Nitte university and K.S. Hedge Medical Academy, guide Dr. B. Preethamrai, Professor Department of Surgery and Dr. Shrinivasa Bhat U., Associate Professor, Department of Psychiatry K.S. Hegde Medical Academy, Mangalore for their valuable suggestions.

My gratitude to the valuators of the qualitative analysis by Prof. Mrs. Kanakavalli S. M.Sc (N) Ph.D, Prof. Sujatha Kannappan, Ms. Sujatha Lakshmi R. M.Sc(N), Mrs. Manimegalai and Prof. Kannumillli Visalakshi

My thanks to the Principal Prof. Asha P. Shetty and Special thanks to the translators Ms. Sonia Sebastian M.Sc (N) and Ms. Chaitra Naik  B.Sc (N), K. Pandyaraja Ballal Nursing Institute, College of Nursing.

References:
1. www.who.int/chp/chronic_disease/report

Keywords: leg ulcer, foot ulcer and experiences. - Kirupa P.
SALIVARY CORTISOL LEVELS IN MOTHERS OF CHILDREN WITH AUTISM - A BIOCHEMICAL STUDY

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Abstract:
Background: Cortisol is a hormonal marker of stress which gets released into the blood by adrenal glands during a stressful situation. Mothers of children with autism will usually be experiencing great psychological trauma and therefore will be under high levels of stress. This stress might disturb the health and normal physiology of these mothers thus there is a need for study on the stress markers like cortisol in mothers of children with autism.

Materials and Methods: Saliva of 20 mothers of children with autism and 20 mothers of healthy children were collected during early hours of the day (8 – 8.30 am) and during evenings (4 – 4.15 pm) subjected for cortisol assay using ELISA test. RESULTS: Mothers of children with autism were found to have significantly lower levels of salivary cortisol throughout the day as compared to mothers of healthy children.

Conclusion: There is a need for interventions for mothers of children with autism compared mothers of healthy children due to poor psychological well-being. Various studies in the past has attributed this state of psychological distress to the behavioural problems encountered in autistic children. However very few studies highlight the impact of this stress on the health of the individual as it can affect the normal physiology of the body. The present study was undertaken to examine whether the stress experienced by mothers of autistic children affected their salivary cortisol levels.

Keywords : Autism, Stress, Cortisol.

Introduction:
Cortisol is a hormonal marker of stress which gets released into the blood by adrenal glands during a stressful situation due to the activation of hypothalamic-pituitary-adrenal (HPA) axis. Cortisol follows a diurnal pattern, with high concentrations in the morning and a decline throughout the day, with the lowest levels in the evening and at night. This circadian rhythm is well-established by the third month of infancy. Cortisol plays an important role in various functions like glucose regulation, maintenance of immune system and also protein synthesis. However various studies have stated that prolonged periods of stress and activation of HPA axis can cause harmful effects like suppression of immune responses, bone growth and also poor cognitive performances.

Mothers of children with autism are usually under high levels of stress as compared mothers of healthy children due to poor psychological well-being. Various studies in the past has attributed this state of psychological distress to the behavioural problems encountered in autistic children. However very few studies highlight the impact of this stress on the health of the individual as it can affect the normal physiology of the body. The present study was undertaken to examine whether the stress experienced by mothers of autistic children affected their salivary cortisol levels.

Materials and Methods:
The aim of the study was to examine the diurnal pattern of salivary cortisol levels in mothers of autistic children and mothers of healthy children and to compare them.

Sample:
The participants consisted of 20 mothers of children with autism (study group) and 20 mothers of healthy children (control group). The participants for the study group were selected from the mothers of autistic children attending a special school in Kerala, and the participants for the control group were selected from the mothers of healthy children.
reporting for dental treatment to the Department of Pedodontics and Preventive Dentistry, A.B. Shetty Memorial Institute of Dental Sciences, Mangalore. The participants selected were mothers of the children from the age group 8-12 years.

The mean age group of mothers of autistic children were 34.05((SD±5.987) and the mean age group of mothers of healthy children were 34.9((SD±5.875).

Informed consent was obtained from the mothers and the concerned authority of the special school to conduct the study. Ethical clearance was obtained from the ethical committee of institute. Individuals who were medically compromised and who were on medication was excluded from the study.

Procedure:
Whole unstimulated saliva was collected from the study group and control group during early hours of the day (approx. 8 – 8.30 am) and during evenings (approx. 4 – 4.15 pm) using the Zunt method. The individuals were instructed not to consume any food one hour prior to the collection of saliva. Approximately 5ml of saliva was collected from each participant and was refrigerated at 0 ° Celsius until it was subjected for cortisol assay using ELISA test. Diametra cortisol assay kit was used for this purpose.

Statistical analysis: The data collected were statistically evaluated using paired t test with SPSS software version 11.0.

Results:
MOTHERS OF NORMAL CHILDREN (control):
- Levels of salivary cortisol in the morning for mothers of normal children ranged from 66 nanograms per millilitre (ng/ml) to 160 ng/ml with the mean level being 89.95 ng/ml (SD±24.894). (table.1).
- Levels of salivary cortisol in the evening for mothers of normal children ranged from 41 ng/ml to 90 ng/ml with the mean level being 57.2 ng/ml (SD±14.684). (table.1).

MOTHERS OF AUTISTIC CHILDREN (STUDY GROUP):
- Levels of salivary cortisol in the morning for mothers of autistic children ranged from 56.2 ng/ml to 105 ng/ml with the mean level being 58.2 (SD±17.289). (table.1).
- Levels of salivary cortisol in the evening for mothers of autistic children ranged from 23 ng/ml to 88 ng/ml with the mean level being 43.45 ng/ml (SD±14.94). (table.1).

COMPARISON OF CORTISOL LEVELS IN MOTHERS OF AUTISTIC & NORMAL CHILDREN:
The difference in the cortisol levels from morning to evening was lower in mothers of autistic children with t value of -5.402 and p <0.001(TABLE.1).

<table>
<thead>
<tr>
<th>GROUP</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>T</th>
<th>Degree of freedom</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOTHERS OF NORMAL CHILDREN</td>
<td>20</td>
<td>89.95</td>
<td>24.894</td>
<td>4.685</td>
<td>38</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>MOTHERS OF AUTISTIC CHILDREN</td>
<td>20</td>
<td>58.2</td>
<td>17.289</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evening</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOTHERS OF NORMAL CHILDREN</td>
<td>20</td>
<td>57.2</td>
<td>14.384</td>
<td>2.965</td>
<td>38</td>
<td>0.005</td>
</tr>
<tr>
<td>MOTHERS OF AUTISTIC CHILDREN</td>
<td>20</td>
<td>43.45</td>
<td>14.94</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOMDIFF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOTHERS OF NORMAL CHILDREN</td>
<td>20</td>
<td>-32.75</td>
<td>13.122</td>
<td>-5.402</td>
<td>38</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>MOTHERS OF AUTISTIC CHILDREN</td>
<td>20</td>
<td>-14.75</td>
<td>7.06269</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion:
Salivary cortisol levels were assessed in this study as they reliably reflected the circulating hormonal levels and thereby giving a fair amount of knowledge about the adrenal activity in a non-invasive manner.

The salivary cortisol levels followed a normal diurnal rhythm in the mothers of healthy children; i.e. the levels were high in the morning and decreased in the evening. The mothers of children with autism showed lower salivary cortisol levels both in the morning as well as in the evening.
on comparison with mothers of healthy children. This cortisol profile of HPA hypo activity is in contrast to the profile exhibited during an acute stressful situation but is similar to the profile exhibited by people experiencing chronic stress like parents of children with cancer, individuals experiencing posttraumatic stress disorder and soldiers in battle.\textsuperscript{11,12,13}

As the present study was undertaken for a single day it cannot be conclusively said that mothers of children with autism can be added to the above mentioned groups experiencing chronic stress but it gives a hint about the possible physiologic interactions that chronic stress causes in this group of individuals. Further this hypo activity of cortisol hormone can have several detrimental effects like attentional problems, fatigue etc.

In future it would be valuable to assess cortisol patterns in mothers of young children with autism who have had a shorter period of stress exposure than the mothers of children of older age group used in this study (8-12 years). Also the co-relation between the salivary cortisol levels and stress could be validated by conducting the present study on a larger sample size and consecutive days.

In conclusion, the present study indicated that mothers of autistic children experience chronic stress which can be due to various factors like concern for their children, anticipating behavioural problems of their children, social image etc.

Therefore interventions like behavioural modifications that reduce behavioural problems of children with autism, counselling the parents of children with autism, stress relieving exercises like meditation would enhance the health & quality of life of mothers of children with autism and thus should be one of the top priority for service provision in the families of children with autism.

References:
Introduction:
Exposure to ionizing radiation increases production of Reactive oxygen species and can lead irradiated cells into the state of oxidative stress, which has been implicated in an enormous variety of natural and pathological processes. Oxidative stress on nervous tissue can produce damage by several interacting mechanisms. This may alter variety of central nervous system (CNS) - mediated processes. Anxiety disorders are the highly prevalent psychiatric disorders, affecting an estimated 25% of the adult population at some point during their lifetime. It has been demonstrated that flavonoids possess mild sedative and anxiolytic effects. The naturally occurring flavonoids and their synthetic derivatives have been reported to selectively bind to the central benzodiazepine receptors, and to exert anxiolytic and other benzodiazepine-like effects in animals.

Original Article

DIETARY SUPPLEMENTATION OF NATURAL AND SYNTHETIC PRODUCTS REDUCES ANXIETY IN MICE AGAINST ELECTRON BEAM RADIATION INDUCED OXIDATIVE STRESS

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Abstract:
Background: Due to the increased use of ionizing radiation in various aspects of human life, free radical formation is greatly augmented during exposure. This causes damage to the central nervous system. The natural and synthetic products have proven therapeutic benefits. Nardostachys jatamansi, an indigenous medicinal plant showed to promote physical and mental health augment resistance of the body against disease and has shown potent antioxidant activity. 1, 2, 4 triazole derivatives are the synthetic organic compound which has various pharmacological activities.

Objectives: To study the anxiolytic and protective effect of 100mg of ethanolic extract of Nardostachys jatamansi (NJE) and triazole (AMT) on the mice exposed to 6Gy Electron beam radiation (EBR).

Materials and Methods: The animals were treated with 100mg of NJE and Triazole for 15 days before radiation exposure. The anxiety status of animals observed once for every 3 days during experiment period. The biochemical estimations were carried 15 days after irradiation in mice brain homogenate.

Results and Conclusion: Treatment of mice with phytochemical and synthetic compound before irradiation caused a significant depletion in anxiety, lipid peroxidation followed by significant elevation in catalase, total antioxidant, and total protein. Our results indicate that the protective activity of NJE and triazole on radiation induced anxiety and oxidative stress may be due to free radical scavenging and increased antioxidant level in mice.

Keywords: Free radicals, Anxiety, Electron beam, Oxidative stress.
neuroprotective activities\textsuperscript{[5-7]}.

Triazoles are the important class of heterocyclic compounds having three nitrogen atoms. They are of two types, 1, 2, 3 triazoles and 1, 2, 4 triazoles. Various 1, 2, 4 triazoles and its derivatives are found to be linked with diverse pharmacological activities. Compounds containing 1,2,4-triazole ring have been reported to possess different biological activities such as antimicrobial\textsuperscript{[8]}, antifungal\textsuperscript{[9]}, anti-inflammatory\textsuperscript{[10]}, antiviral\textsuperscript{[11]}, anticancer\textsuperscript{[12, 13]}, analgesic\textsuperscript{[14]}, and anticonvulsant\textsuperscript{[15]} activity depending on the substituent in the ring system.

In the present study, the potential and modulatory role of Nardostachys jatamansi and Triazole derivative has been explored on radiation induced changes in anxiety and oxidative stress in mice.

**Materials and Methods:**

**Plant material and preparation of extract:**

The plant material i.e. rhizome powder of Nardostachys jatamansi was collected from GENUINE chemical co, Mumbai. This powder was extracted with 95% ethanol at room temperature, concentrated in reduced temperature and pressure on rotary evaporator and stored at 4°C.

**Chemistry**

4-amino-5-mercapto 1, 2, 4-triazoles was prepared according to the methods proposed in literature\textsuperscript{[16]}.  

\[ \text{Thiocarbohydrazide} + \text{alkanoic acid} \xrightarrow{\text{65°C/1.30min}} \text{4-amino-5-mercapto-3-substituted-1, 2, 4-triazole} \]

Where, \( R=H \) for AMT

**Animal care and handling:**

Animal care and handling was carried out according to the guidelines set by WHO (World Health Organization; Geneva, Switzerland). The institutional animal ethical committee has approved this study. Swiss albino mice aged 6 - 8 weeks and weighing 25±5 g, taken from an inbred colony, was used for this study. The mice were maintained under controlled conditions of temperature and light (light: 10 h; dark: 14 h). The animals were housed in a polypropylene cage containing sterile paddy husk (procured locally) as bedding throughout the experiment. They were provided standard mouse feed and water ad libitum.

**Irradiation:**

The irradiation work was carried out at Microtron centre, Mangalore University, Mangalore, Karnataka, India. The animals were restrained in well-ventilated perspex boxes and exposed to whole-body electron beam at a distance of 30 cm from the beam exit point of the Microtron accelerator at a dose rate of 72 Gy/min.

**Experimental protocol:**

The following groups of animals were used.

- **Group I: Control**
- **Group II: Animals were exposed to 6Gy (sub-lethal dose) electron beam radiation (EBR).**
- **Group III: Animals were received on N.jatamansi extract (100mg/kg body weight) orally for 15 days (The required amount of NJE was dissolved in 10%DMSO). 1 hour after final dose animals were exposed to 6Gy EBR.**
- **Group IV: Animals were received on triazole (AMT) (100mg/kg body weight) orally for 15 days (The required amount of AMT was dissolved in dist water). 1 hour after final dose animals were exposed to 6Gy EBR.**

**Elevated Plus Maze Model\textsuperscript{[17]}**

The plus-maze apparatus, consisting of two open arms (16 x 5 cm) and two closed arms (16 x 5 x 12 cm) having an open roof. Both the drugs (100 mg/kg) were administered orally for 15 days once daily and the last dose was given on the 15th day, 60 min prior to radiation exposure. The mouse
was placed at the center of the maze with its head facing the open arm. During the 5 min experiment, the behavior of the mouse was recorded as: the number of entries into the open or closed arms and time spent by the mouse in each of the arms. An arm entry was defined as the entry of all four paws into the arm. The animals were observed once for every 3 days during experiment period.

**Dissection and homogenization of Brain**

On 15th day post irradiation, animals were scarified by cervical dislocation, followed by decapitation. The whole brains were removed and 10% (W/V) tissue homogenates were prepared in 0.4M phosphate buffer pH7.0, centrifuged for 25 min at 5000 rpm at 4°C and the supernatant was used for estimation of the following biochemical assays.

**Lipid peroxidation (LPx):**

LPx was measured by the method of Beuege and Aust. Briefly, serum was mixed with TCA-TBA-HCl and was heated for 15 min in a boiling water bath. After centrifugation the absorbance was recorded at 535 nm using a UV-Vis double beam spectrophotometer. The LPx has been expressed as Melondialdehyde in µM per liter.

**Total antioxidant capacity:**

Total antioxidant capacity of serum was determined by the phosphomolybdenum method as described by Prieto et al. The serum was precipitated with 5% TCA, it was then made to react with TAC reagent containing phosphomolybdenum at 95°C for 90 min. The absorbance was read at 695nm.

**Catalase activity:**

Catalase activity in RBC was measured spectrophotometrically as previously described. The method is based on the fact that catalase causes breakdown of H₂O₂ (30mM). The H₂O₂ was mixed in 3ml of Phosphate buffer (pH 7.0) and then 50µl of 1:20 diluted erythrocyte was added and the changes in absorbance at 240 nm were recorded up to 2 min at the interval of 15sec. The enzyme activity was expressed as Units mg Hb⁻¹.

**Total protein**

The total protein in the brain tissue was estimated by biuret method. 20µl of tissue homogenate was mixed with 1ml of reagent. 5 min after incubation the absorbance was read at 546nm. The results were expressed as gram protein per 100ml of 10% homoginate.

**Statistical analysis**

Results were expressed as Mean ± standard deviation. Comparison between the control and treated groups were performed by analysis of variance (ANOVA), followed by student’s t-test. In all the test, criterion for statistical significance was P<0.05.

**Results:**

The test conducted in the elevated plus maze had shown positive results. The irradiated animals showed spending more time in closed arm than the open arm. The time spending in closed arm can be directly considered as the level of anxiety. We also observed, there was an increase in level of anxiety from the day of irradiation to the 15th day after irradiation. The treatment groups, both NJE and Triazole have showed decreased level of anxiety when compared to irradiated group (Table 1).

The irradiation of mice to 6Gy of electron beam radiation induces lipid peroxidation. The irradiated group had showed significant increased Melondialdehyde (MDA) level and decrease in the catalase, total protein and antioxidant level. But the pre supplementation of NJE and AMT before irradiation had showed the decreased level of lipid peroxidation and increased level of catalase, total protein (Graph 1), antioxidant when compared to irradiated group (Table 2). This proves that the synthetic and natural product with antioxidant property helps in lowering the oxidative stress in irradiated mice.

**Discussion:**

Anxiety may be regarded as a particular form of behavioral inhibition that occurs in response to environmental events that are novel. It has been established that there are lot of plant secondary metabolites being employed in the treatment of psychotic disorders especially for anxiety in...
Table 1: Effect of NJE and AMT on animals in EPM model

<table>
<thead>
<tr>
<th></th>
<th>Before Irradiation</th>
<th>15th day after irradiation</th>
<th>Before Irradiation</th>
<th>15th day after irradiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>6Gy Irradiated animal</td>
<td>12.50±2.10</td>
<td>2.50±1.09</td>
<td>9.90±1.10</td>
<td>5.53±1.50</td>
</tr>
<tr>
<td>NJE treatment</td>
<td>10.75±2.15</td>
<td>6.80±2.55</td>
<td>11.12±2.10</td>
<td>5.00±1.75</td>
</tr>
<tr>
<td>AMT</td>
<td>12.10±2.70</td>
<td>7.10±1.25</td>
<td>10.25±1.55</td>
<td>6.23±1.65</td>
</tr>
</tbody>
</table>

Values are expressed as Mean ± Standard deviation. P<0.05 as compared to treated group with 6Gy irradiated radiation group.

Graph 1: Effect of Treatment with NJE and AMT on Total Protein Levels in Brain of Mice Exposed To Electron Beam Radiation

Values are expressed as Mean ± Standard deviation. P<0.05 as compared to treated group with 6Gy irradiated radiation group.

Graph 1: Effect of Treatment with NJE and AMT on Total Protein Levels in Brain of Mice Exposed To Electron Beam Radiation

Values are expressed as Mean ± Standard deviation. P<0.05 as compared to treated group with 6Gy irradiated radiation group.

Keywords: Free radicals, Anxiety, Electron beam, Oxidative stress.

Conclusion:

From the above observations the study conclude that ethanolic extract of *Nardostachys jatamansi* and synthetic triazole compound possesses anxiolytic activity, also it showed protective effect against radiation induced oxidative stress. However further studies are required to know the exact mechanism of action.
References:
ASSESSMENT OF NUTRITIONAL STATUS OF PATIENTS RECEIVING CHEMOTHERAPY

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Abstract:
Background: Cancer treatment itself and particularly chemotherapy seems to be an important nutritional risk factor. Early nutritional assessment can identify problems to help patients increase or maintain weight, improve their response to treatment, and reduce complications. This study aimed to determine the nutritional status of patients receiving chemotherapy.

Methods: A prospective study was conducted among 30 subjects between 30 and 70 years of age diagnosed with cancer of various sites and scheduled for first cycle of chemotherapy. Nutritional status of each subject was assessed based on nutritional parameters i.e. Anthropometric [BMI (body mass index), MAMC (mid-arm muscle circumference), TSF (triceps skinfold thickness)], MAC (mid-arm circumference) and Biochemical [(Hb and Albumin)] measurements before the initiation of chemotherapy, and follow-up assessment was performed on the third week after the first cycle of chemotherapy.

Results: In this study it has been found that 90% of subjects suffered from weight loss after the first cycle of chemotherapy (3wks post treatment). The ‘t’ test showed a significant decrease in TSF [t=5.4(p<0.01)] and MAC [t=6.86 (p<0.01)] before and after 3 weeks of chemotherapy. The ‘t’ test showed a decrease in MAMC, t=5.83(p<0.01) before and after 3 weeks of chemotherapy. The mean serum Albumin level of the patients before and after 3weeks of chemotherapy was 3.16±.50 g/dl and 3.07±.49 g/dl respectively. A significant decrease in albumin [t=4.17 at p<0.01 level] was observed in patients after chemotherapy. The mean haemoglobin level of the patients before and after 3weeks of chemotherapy was10.64±1.88 g/dl and10.41 ± 1.89 g/dl respectively, which showed a significant decrease [(t=13.32 at p<0.01 level)].

Conclusion: The nutritional status assessment must be carried out on each patient at the beginning and during the treatment. The cancer patients who are receiving chemotherapy are at risk of malnutrition.

Keywords: Cancer, chemotherapy, nutrition, nutritional status, nutritional status assessment.

Introduction:
Cancer and cancer therapy affect nutritional status through alterations on the metabolic system and reduction in food intake. All of the treatments for cancer i.e. systemic chemotherapy, radiation and surgery result in damage to normal tissues, and at the same time produce intense side effects such as diarrhea, oral mucositis, nausea, and vomiting that limit eating. Malnutrition and severe weight loss become evident as the disease progresses1. Chemotherapy treatment especially is associated with several side effects like nausea, vomiting, oral mucositis, xerostomia, diarrhea, constipation, and food aversion which play an important role in decreased food intake, nutrient loss, energy expenditure alterations and weight loss, particularly lean body mass. These conditions predispose patients towards malnutrition, especially when there are frequent and prolonged periods of chemotherapy treatment2.

The purpose of nutritional screening is to identify those patients who are at nutritional risk and therefore at higher risk of complications. Malnutrition in hospitalized patients is a critical issue and has been associated with a significant increase in morbidity and mortality2,4,5. The detection of malnourished patients is possible if the importance of the issue is understood and the patient’s nutritional status is

Keywords: Cancer, chemotherapy, nutrition, nutritional status, nutritional status assessment. - Beena Chacko
evaluated on admission to hospital. Nutritional status assessment may be directed to several nutrition features\(^1\).

Assessment should begin while treatment is being planned and should focus on current nutritional status and anticipated nutritional problems related to treatment\(^6\). It has been suggested that maintaining energy balance or preventing weight loss during cancer treatment, is the most important nutritional goal especially those who are already undernourished\(^1\). Several methods for assessing the nutritional status exist. The deficiency of one gold standard measure has led researchers to develop several nutritional indices to stratify patients at increased risk for poor outcomes\(^6\). The important factors to assess include physical examination, anthropometrics and laboratory parameters which may reflect nutrient deficits\(^7\). This study aimed to measure the nutritional status of patients receiving chemotherapy before the initiation and 3 weeks after the first cycle of chemotherapy.

**Materials and Methods**

This study was undertaken after the approval by the Institutional Ethical Committee and obtaining consent from the study participants. The study was conducted in the Oncology wards of GKNM Hospital, Coimbatore. This was a prospective study where the subjects were studied before the initiation and 3 weeks after the first cycle of chemotherapy. A total of 30 subjects with cancer of stomach, lung, rectum, thyroid, breast, vaginal vault and oral cavity admitted for the first cycle of chemotherapy treatment who fulfilled the inclusion criteria were recruited using purposive sampling technique. Before the initiation of the data collection, informed consent was obtained from all the subjects. Data collection tools used were 1) demographic proforma to collect demographic data i.e. age, gender, marital status, education, type of cancer, chemotherapy drugs and 2) Anthropometric measurements (Height, Weight, BMI, Triceps skinfold thickness, Mid-arm circumference and Mid-arm muscle circumference) and biochemical parameters (Hemoglobin and Serum Albumin).

Data collection was done in two phases: - 1\(^{st}\) *phase*- During the admission for the first cycle of chemotherapy, anthropometric measurements were assessed before the initiation of chemotherapy. Data about biochemical parameters was collected from the medical record.

2\(^{nd}\) *phase*- After three weeks of first cycle of chemotherapy (during admission to the hospital for the second cycle), before the initiation of second cycle, anthropometric measurements were reassessed. Data about biomedical parameters was collected from the medical record.

**Estimation of body mass index (BMI)**: The current height and weight of all the subjects were measured. Weight was taken to the nearest 0.1 kg. Height was obtained by using stadiometer. The patients’ feet were kept together against the measuring board and head was kept right. BMI was calculated using the formula: weight in kilograms (kg) divided by height in meters (m) squared.

Patients were categorized based on WHO standard range: - <18.5 kg/m\(^2\) (underweight), 18.5-24.9 kg/m\(^2\) (acceptable/normal weight), 25-29.9 kg/m\(^2\) (overweight), >30 kg/m\(^2\) (obese).

**Estimation of Mid-arm muscle circumference (MAMC)**: Mid-arm muscle circumference was estimated by measuring triceps skinfold thickness (TSF) and mid arm circumference (MAC). Measurement of skin fold thickness at the triceps (TSF) provided an estimate of body fat, while mid arm circumference (MAC) and mid arm muscle circumference (MAMC) were used to estimate muscle mass. TSF was measured (to the nearest 0.2mm) using a calibrated skinfold caliper. Measurement of a vertical fold of the right arm was made midway between the tip of the acromion and olecranon process (at the same level as the MAC measurement), by pinching the skin fold with the thumb and index finger at the marked landmark and applying the calipers 1cm below, with the arm hanging vertically and the palm facing up. The average value of three measurements was directly compared to age-specific percentile values, with TSF below the 5th age-specific percentile considered evidence of
moderate/severe fat loss and subsequent moderate malnutrition. Mid-arm circumference (MAC) was obtained (to the nearest 0.1cm) by a measuring tape placed around the patient's upper arm in the same location where TSF measurement was made with the subject's arm hanging relaxed at their side. Mid-upper arm muscle circumference (MAMC) was calculated by using the formula: - MAC (cm) – [.314xTSF (mm)]. Average MAC and TSF values were used to calculate mid-arm muscle circumference (MAMC).

For descriptive purposes means and standard deviations (±SD) were reported. Changes in the outcome variable between baseline and the end of 3 weeks of chemotherapy were determined using paired t-test.

Results:

Demographic-socioeconomic characteristics: 36.6% (11) were male and 63.3% (19) female. The average age was 52.90 ± 13.03. 93.3% of them were married, 26.7% of the study subjects were graduates, and 36.3% of them were employed. 40% of them had less than 10,000/- monthly income.

Medical history: 16.6% of subjects were diagnosed with cancer of cervix, 10% with cancer of breast and stomach respectively, 6.6% were with cancer of ovary, thyroid, buccal mucosa, esophagus and larynx respectively. Other subjects were with Hodgkin’s lymphoma, cancer of lung, rectum, vaginal vault and oral cavity. Most of the subjects (66.7%) were disease free. Majority of the subjects (64%) were anemic before and after the chemotherapy. Only 15% of the subjects complained of nausea, vomiting, taste changes during the three weeks post treatment.

Body Mass Index (BMI): BMI was calculated using the standard formula: Weight in kilograms (kg) divided by Height in meters (m) squared. The average height was 156.23±7.61. Regarding weight, 23.3% of subjects were underweight, 43.3% normal weight, 23.3% overweight and 6.6% obese. Three weeks after the treatment, all the subjects had weight loss from 1-3 kg irrespective of the type of cancer, except two subjects with cancer breast, who gained weight (1-2 kg), but remained in the same category of BMI. Before initiation of the first cycle of chemotherapy, the mean weight was 55.96±9.81 and after 3 weeks of chemotherapy mean weight was 54.36±9.96. The mean BMI before and 3 weeks after chemotherapy was 23.17±5.33 kg/m² and 22.54±5.42 kg/m² respectively. The t-test showed significant change i.e. decrease in weight before initiation and 3 weeks after chemotherapy [t=9.002, p<0.01] (Table 1 and 1.1).

Mid-arm Muscle Circumference (MAMC): MAMC was calculated using the formula:

MAC (cm) – [.314xTSF (mm)] where MAC is mid-arm circumference and TSF is triceps skinfold thickness. These anthropometric measurements also showed a decrease before and after the chemotherapy. The mean triceps skinfold thickness (TSF) before and after 3 weeks of chemotherapy was 14.54±2.36 mm and 14.41±2.38 mm respectively, and the mid-arm circumference (MAC) before and after 3 weeks of chemotherapy was 27.46±1.62 cm and 27.27±1.61 cm respectively. The t’ test showed a significant decrease in TSF and MAC measurements t=5.4(p<0.01) and t=6.86 (p<0.01) before and after 3 weeks of chemotherapy.

The mean mid-arm muscle circumference (22.90±1.35 cm and 22.76±1.33 cm respectively) before and after 3 weeks of chemotherapy. The t’ test showed a decrease in MAMC, t=5.83(p<0.01) before and after 3 weeks of chemotherapy [Table 1 and 1.1].

Biochemical Parameters: The mean serum Albumin level of the patients before and after 3 weeks of chemotherapy was 3.16±.50 g/dl and 3.07±.49 g/dl respectively (Table2). The result on application of t’ test showed significant decrease in the albumin levels [t=4.17, p<0.01], before and after 3 weeks of chemotherapy (Table 2.1).

The mean haemoglobin level of the patients before and after 3 weeks of chemotherapy was 10.64±1.88 g/dl and 10.41±1.89 g/dl respectively (Table2). Majority of the subjects (70%) were mildly anemic before and after 3 weeks of chemotherapy. The results show significant decrease in hemoglobin levels (p<0.01) before and after 3 weeks of chemotherapy.
3 weeks of chemotherapy, but remained within the reference limits [Table 2.1]. Kallajavi et al. investigated the effect of chemotherapy on various laboratory tests, and found that hemoglobin decreased transiently at 5-8 weeks but remained within the reference limits.

Table 1: Anthropometric characteristics of subjects before initiation and after three weeks of first cycle of chemotherapy

<table>
<thead>
<tr>
<th>Anthropometric measurement</th>
<th>Before the start of 1st cycle of chemotherapy Mean±SD</th>
<th>3 weeks after 1st cycle of chemotherapy Mean±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>156.23±7.61</td>
<td>156.23±7.61</td>
</tr>
<tr>
<td>Weight *</td>
<td>55.96±9.81</td>
<td>54.36±9.96</td>
</tr>
<tr>
<td>BMI *</td>
<td>23.17±5.33</td>
<td>22.54±5.42</td>
</tr>
<tr>
<td>TSF *</td>
<td>14.54±2.36</td>
<td>14.41±2.38</td>
</tr>
<tr>
<td>MAC *</td>
<td>27.46±1.62</td>
<td>27.27±1.61</td>
</tr>
<tr>
<td>MAMC *</td>
<td>22.90±1.35</td>
<td>22.76±1.33</td>
</tr>
</tbody>
</table>

* BMI (Body Mass Index) = Weight / Height in m²
* MAC (Mid-Arm Circumference in cm)
* TSF (Triceps Skin Fold thickness in mm)
* MAMC (Mid-Arm Muscle Circumference) (cm) = MAC (cm) – [3.14 × TSF (mm)]

Table 1.1: Paired samples’ t’ test for Anthropometric measurements before initiation and after 3 weeks of first cycle of chemotherapy

<table>
<thead>
<tr>
<th>Anthropometric measurements</th>
<th>Paired Differences Mean±SD</th>
<th>t’ value</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI before and 3wks after chemotherapy</td>
<td>.633±.385</td>
<td>.07</td>
<td>9.002</td>
<td>29</td>
</tr>
<tr>
<td>MAMC before and after 3wks of chemotherapy</td>
<td>.147±.138</td>
<td>.025</td>
<td>5.83</td>
<td>29</td>
</tr>
</tbody>
</table>

* significant

Table 2: Biochemical Measurements of subjects before initiation and after three weeks of first cycle of chemotherapy

<table>
<thead>
<tr>
<th>Laboratory test</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albumin before 1st cycle of chemotherapy</td>
<td>3.16±.50</td>
</tr>
<tr>
<td>Albumin after 3wks of first cycle of chemotherapy</td>
<td>3.07±.49</td>
</tr>
<tr>
<td>Hb before 1st cycle of chemotherapy</td>
<td>10.64±1.88</td>
</tr>
<tr>
<td>Hb after 3wks of first cycle of chemotherapy</td>
<td>10.41±1.89</td>
</tr>
</tbody>
</table>

* significant

Discussion:
In the present study, about 90% of patients suffered from weight loss 3 weeks after the first cycle of chemotherapy, irrespective of the type of cancer, except two patients with cancer breast who had a weight gain of 1-2 kg. These changes in weight were not statistically significant. Weight changes are valuable indicators of nutritional risk. Assessment of changes in body weight over time can be a more informative indicator of nutritional decline (Davies. 2005).

In the present study BMI before chemotherapy and 3 weeks after chemotherapy was (23.17 vs 22.54; P< 0.01). Body mass index is positively associated with patients suffering from colon, kidney, esophagus, and breast cancer (Reeves et al. 2007). The triceps skinfold thickness, mid-arm circumference and mid-arm muscle circumference were also found to have a decrease before and after the chemotherapy treatment. Based on this study, both the anthropometric measurements [(BMI) and (MAMC)] were effective markers for assessing nutritional status.

Biochemical and hematological parameters are subject to homeostatic mechanisms and may be altered by underlying disease and/or treatment. The most common biochemical measurements used to assess nutritional status are blood parameters such as serum albumin and hemoglobin (Davies. 2005). In this study, all patients had a reduction in serum albumin level before and 3 weeks after chemotherapy, but remained within normal range (3.16±.50 g/dl and 3.07±.49 g/dl). This finding is in agreement with the finding of Usharani et al. (2004) where...
a significant decrease in albumin before chemotherapy and 3 weeks after chemotherapy (p=0.018) was observed.

Majority (64%) of the subjects were mildly anemic before and 3wks after chemotherapy. Anemia is the most common hematological abnormality in cancer patients; unfortunately, it is often un-recognized and un-treated which can affect their nutritional status. Kallajavi et al. (2000), investigated the effect of chemotherapy on various laboratory tests, and found that hemoglobin decreased transiently at 5-8 weeks but remained within the reference limits, and albumin did not change.

The present study has found that cancer patients receiving chemotherapy experienced weight change, and decrease in biochemical parameters before and after chemotherapy. Therefore, these patients are at risk of malnutrition if they didn't have any help to prevent or to minimize the effect of chemotherapy on their nutritional status.

**Conclusion:**

Nutritional assessment throughout the course of chemotherapy plays an important role in the early recognition of cancer and treatment associated malnutrition. Knowledge of changes in nutritional status due to cancer or due to its therapy will not only help in better management of nutritional problems, but will also enable better clinical outcome. Nutritional screening should be undertaken immediately following admission to ensure that any nutritional decline due to therapy or disease progression is identified as early as possible and can be dealt with. The implementation of both screening and assessment tools is essential for effective nutritional intervention and management of cancer patients receiving chemotherapy.

Based on the findings of this study, it is recommended that all cancer patients receiving chemotherapy require a baseline nutritional assessment with the start of the treatment, and should focus on current nutritional status and anticipated nutritional problems related to treatment. The health care personnel (physicians, nurse and diéticians) must make sure that during active cancer treatment patient should maintain adequate energy intake to prevent weight loss.

**Acknowledgement:**

We thank the management, nursing superintendent, medical oncologist and staff of the concerned hospital for their cooperation and support.

**References:**

COMPARATIVE STUDY TO ASSESS THE STRESS AMONG WORKING AND NON-WORKING ANTENATAL MOTHERS IN SELECTED HOSPITALS OF UDUPI DISTRICT

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Abstract:
A comparative study was conducted to assess the stress among working and non-working antenatal mothers in order to develop an information leaflet on antenatal stress management.

Materials & Methods: Descriptive survey study was conducted among working and non-working (30 each) antenatal mothers between the age group of 18-40 years in three local hospitals of Udupi district. The stress was assessed using stress assessment scale and selected a purposive sampling technique.

Results: Data shows majority (47%) of the non-working antenatal mothers were in the age group of 18-25 years, 63% of them were primiparous mothers, among these (53%) were between 29-40 weeks of gestation. Most of the working (67%) participated were in the age group of 26-32 years, majority (73%) of them were moderate workers and primipara mothers, 57% of them were between 29-40 weeks of gestation. Stress assessment scale was used to assess the stress. 63% of working antenatal mothers sometimes felt that they had lack of strength, 67% of working and 50% of non-working antenatal mothers sometimes complaining of not getting adequate sleep at night, 50% of working antenatal mothers sometimes felt that they were lacking in socialization due to pregnancy. The t value showed that (p= 0.007) there was significant difference between working and non working antenatal mothers stress score.

Conclusion: Since all antenatal mothers participated in this study had mild stress and there was significant difference among working and non-working antenatal mothers stress score. The researchers concluded that antenatal mothers are at more risk of developing stress during pregnancy.

Keywords: Working and non-working antenatal mothers, stress, information leaflet.

Introduction:
Pregnancy is a joyful event, however pregnancy, motherhood and child birth are not at all romance and dreamy nostalgia but it is a serious reality which has its own inherent risks to health and survival both for the women and for the infant she bears, which are present in every society and in every setting.

Carmichael SL et al conducted a population-based case-control study on maternal stressful life events and risks of birth defects among 1,355 case mothers and 700 control mothers in USA. Maternal stress was measured by responses to 18 yes/no questions about life events that occurred from 2 months before through 2 months after conception. An increase in the stressful life events index was associated with increased risk of cleft palate, cleft lip with or without cleft palate, d-transposition of the great arteries, and tetralogy of Fallot, after adjustment for maternal race-ethnicity, education, obesity, age, smoking, drinking, intake of folic acid-containing supplements, neighborhood crime, and food insecurity. The odds ratio for a 3-unit change in the stress index was 1.45 (95% confidence interval = 1.03-2.06) for cleft palate. Increased stress was associated with an increased risk of spinal bifida and anencephaly particularly among women.
who did not take folic acid supplements. A 3-unit change in stress was associated with a 2.35-fold increased risk of anencephaly among women who did not take supplements (CI =1.47-3.77) and a 1.42-fold increased risk among women who did (CI =0.89-2.25).²

Prenatal maternal stress has been shown to be an indicator of adverse birth outcomes.

Studies have indicated that high levels of stress in pregnancy have been associated with negative outcomes such as low birth weight and preterm labour. Negative outcomes such as depression and anxiety related to the pregnancy can lead to stress and can lead to less healthy behaviours.³ Recent interest has focused on the potential etiologic roles of acute and chronic stressors, the psychological distress caused by those stressors, and the hypothalamic pituitary-adrenal axis. The maternal serum or plasma corticotrophin-releasing hormone (CRH) concentration measured in early pregnancy has been shown to be a risk marker of subsequent preterm birth.⁴

Pregnancy is a boon from God. Stress is not good for the mother during the term. It can have adverse side effects. It is very important for the mothers to remove anxiety. This is also a part of the stress management process. Anxiety during pregnancy is very harmful. It may result in false labor or premature birth. It can also cause hypertension. The effects can be disastrous for the unborn foetus.⁵

Pregnant women who are working fulltime in a high stress job should cut down their working hours to around 24 hours a week during pregnancy, Dutch researchers said babies of stressed working mums suffered adverse health effects. Pregnant women who work more than 32 hours a week in a high stress job are more likely to have babies who cry excessively; children with low birth weight and are more at risk for the dangerous pregnancy condition called pre-eclampsia, according to research published.⁶

It is evident from review of literature that stress during pregnancy is harmful to both mother and fetus and stress is more among working antenatal mothers, especially who work for more than 32 hours per week. Therefore researchers felt that it is important to avoid the stress by using appropriate stress management techniques. Hence this study was undertaken to assess the stress among working and non working antenatal mothers with a view to develop an information leaflet on antenatal stress management.

Material and Methods:
A descriptive survey design was adopted for the present study. The study was conducted in 3 local hospitals of Udupi district, Karnataka state, India. Total of 60 working and non working antenatal mothers (30 each) between the age group of 18- 40 years were selected using purposive sampling technique.

The inclusion criteria used was working and non-working antenatal mothers who were available at the time of data collection, willing to participate in the study, able to read and write Kannada and without any bad obstetrics history. Demographic Proforma and Stress Assessment Scale have been used to collect the data.

Stress Assessment Scale is a readymade tool and we obtained from a study on 'Development of a stress scale for pregnant women in the South Asian context: the A-Z stress scale with the permission of Dr Ambreen Kazi and some modifications done to as per lifestyle of this research setting. The data collected were analyzed using the descriptive and inferential statistics with the help of SPSS 16.0 version.

Results:
Sample characteristics:
Data shows that out of 30 nonworking antenatal mothers 47% of them were in the age group of 18-25 years. 57% had an educational status of PUC & above, 63% were primipara mothers and 53% were between 29-40 weeks of gestation. Whereas 67% working antenatal mothers were in the age group of 26-32 years. 53% had an educational status of PUC & above, all of them had working hours of 6-8 hours of duty/day and 73% were moderate workers. Majority (73%) of them were primipara mothers and 57% were between 29-40 weeks of gestation.
Table 1: Frequency and percentage distribution of sample characteristics (working and non working antenatal mothers)  

<table>
<thead>
<tr>
<th>Sample characteristics</th>
<th>Working</th>
<th>Non working</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(f) (%)</td>
<td>(f) (%)</td>
</tr>
<tr>
<td><strong>Age (in years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-25</td>
<td>7 23</td>
<td>14 47</td>
</tr>
<tr>
<td>26-32</td>
<td>20 67</td>
<td>12 40</td>
</tr>
<tr>
<td>33-40</td>
<td>3 10</td>
<td>4 13</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hindu</td>
<td>23 77</td>
<td>16 53</td>
</tr>
<tr>
<td>Muslim</td>
<td>3 10</td>
<td>8 27</td>
</tr>
<tr>
<td>Christian</td>
<td>4 13</td>
<td>6 20</td>
</tr>
<tr>
<td><strong>Educational status of the participant</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary (5-7th standard)</td>
<td>1 3</td>
<td>1 3</td>
</tr>
<tr>
<td>High School (8-10th standard)</td>
<td>13 44</td>
<td>12 40</td>
</tr>
<tr>
<td>PUC and above</td>
<td>16 53</td>
<td>17 57</td>
</tr>
<tr>
<td><strong>Educational status of the husband</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary (5-7th standard)</td>
<td>1 3</td>
<td>1 3</td>
</tr>
<tr>
<td>High School (8-10th standard)</td>
<td>13 44</td>
<td>13 44</td>
</tr>
<tr>
<td>PUC and above</td>
<td>16 53</td>
<td>16 53</td>
</tr>
<tr>
<td><strong>Occupation of the participant</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>- -</td>
<td>30 100</td>
</tr>
<tr>
<td>Working</td>
<td>30 100</td>
<td>- -</td>
</tr>
<tr>
<td><strong>If yes; working hours</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-8</td>
<td>30 100</td>
<td>- -</td>
</tr>
<tr>
<td>9-11</td>
<td>- -</td>
<td>- -</td>
</tr>
<tr>
<td><strong>Nature of work</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sedentary worker</td>
<td>8 27</td>
<td>- -</td>
</tr>
<tr>
<td>Moderate worker</td>
<td>22 73</td>
<td>- -</td>
</tr>
<tr>
<td><strong>Occupation of husband</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>- -</td>
<td>2 7</td>
</tr>
<tr>
<td>Professional</td>
<td>11 37</td>
<td>12 40</td>
</tr>
<tr>
<td>Others (sweepers, attenders, carpenters, masonry etc.)</td>
<td>19 63</td>
<td>16 53</td>
</tr>
<tr>
<td><strong>Type of family</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear</td>
<td>22 73</td>
<td>21 70</td>
</tr>
<tr>
<td>Joint</td>
<td>8 27</td>
<td>9 30</td>
</tr>
<tr>
<td><strong>Monthly income (Rs)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,000 to 6,000</td>
<td>1 3</td>
<td>2 7</td>
</tr>
<tr>
<td>6,001 to 9,000</td>
<td>9 30</td>
<td>8 27</td>
</tr>
<tr>
<td>&gt; 9,000</td>
<td>20 67</td>
<td>20 66</td>
</tr>
<tr>
<td><strong>Source of information (health)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Television, magazines and newspapers</td>
<td>15 50</td>
<td>9 30</td>
</tr>
<tr>
<td>Health personnel</td>
<td>5 17</td>
<td>11 36</td>
</tr>
<tr>
<td>Friends</td>
<td>- -</td>
<td>- -</td>
</tr>
<tr>
<td>Family members</td>
<td>4 13</td>
<td>5 17</td>
</tr>
<tr>
<td>Others (net sources)</td>
<td>6 20</td>
<td>5 17</td>
</tr>
<tr>
<td><strong>Parity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primipara</td>
<td>22 73</td>
<td>19 63</td>
</tr>
<tr>
<td>Multipara</td>
<td>8 27</td>
<td>11 37</td>
</tr>
<tr>
<td><strong>Period of gestation (in weeks)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;=12</td>
<td>1 3</td>
<td>2 7</td>
</tr>
<tr>
<td>13-28</td>
<td>13 40</td>
<td>12 40</td>
</tr>
<tr>
<td>29-40</td>
<td>17 57</td>
<td>16 53</td>
</tr>
</tbody>
</table>

Keywords: Working and non-working antenatal mothers, stress, information leaflet - Pratibha Kamath
**Table 2:** Item wise percentage distribution of stress among Working (W) and Non-working (NW) antenatal mothers

<table>
<thead>
<tr>
<th>Items of Stress Assessment Scale</th>
<th>Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Very often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel tired and worn out</td>
<td>10</td>
<td>13</td>
<td>60</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>I easily get irritated</td>
<td>17</td>
<td>37</td>
<td>60</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>I feel that I have lack of strength</td>
<td>13</td>
<td>37</td>
<td>63</td>
<td>47</td>
<td>20</td>
</tr>
<tr>
<td>I am not getting adequate sleep at night</td>
<td>13</td>
<td>17</td>
<td>67</td>
<td>50</td>
<td>17</td>
</tr>
<tr>
<td>I am suffering from lack of appetite</td>
<td>47</td>
<td>60</td>
<td>50</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td>I fear about labour pain</td>
<td>30</td>
<td>40</td>
<td>43</td>
<td>53</td>
<td>17</td>
</tr>
<tr>
<td>I get palpitations when I think about my pregnancy and labour</td>
<td>80</td>
<td>63</td>
<td>14</td>
<td>30</td>
<td>7</td>
</tr>
<tr>
<td>I feel lonely</td>
<td>97</td>
<td>67</td>
<td>-</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td>I easily get irritated</td>
<td>53</td>
<td>60</td>
<td>34</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>I feel that I have lack of strength</td>
<td>77</td>
<td>77</td>
<td>16</td>
<td>20</td>
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</tr>
<tr>
<td>I am not getting adequate sleep at night</td>
<td>46</td>
<td>70</td>
<td>27</td>
<td>27</td>
<td>3</td>
</tr>
<tr>
<td>I feel that there is insufficient money to meet the daily needs</td>
<td>33</td>
<td>57</td>
<td>40</td>
<td>23</td>
<td>17</td>
</tr>
<tr>
<td>I feel that my pregnancy will have effect on my health</td>
<td>93</td>
<td>73</td>
<td>7</td>
<td>27</td>
<td>-</td>
</tr>
<tr>
<td>I find myself very much worried about my dependents</td>
<td>27</td>
<td>53</td>
<td>43</td>
<td>37</td>
<td>13</td>
</tr>
<tr>
<td>I am concerned about the expenditure of my forth coming events</td>
<td>30</td>
<td>60</td>
<td>34</td>
<td>23</td>
<td>30</td>
</tr>
<tr>
<td>I am concerned about in-laws/guests visiting at odd times</td>
<td>53</td>
<td>60</td>
<td>34</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>I feel that I have no freedom to take decisions</td>
<td>83</td>
<td>77</td>
<td>17</td>
<td>23</td>
<td>-</td>
</tr>
<tr>
<td>I am tensed about my husband’s inattention</td>
<td>93</td>
<td>73</td>
<td>7</td>
<td>27</td>
<td>-</td>
</tr>
<tr>
<td>I am worried about my husband’s problems</td>
<td>50</td>
<td>53</td>
<td>27</td>
<td>47</td>
<td>23</td>
</tr>
<tr>
<td>I am worried about my husband’s unstable emotional status</td>
<td>77</td>
<td>77</td>
<td>16</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td>I am concerned about the increasing prices of everyday goods</td>
<td>46</td>
<td>70</td>
<td>27</td>
<td>27</td>
<td>3</td>
</tr>
<tr>
<td>I am worried about the sex of my unborn child</td>
<td>94</td>
<td>80</td>
<td>3</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>I have difficulty in accessing the health care</td>
<td>50</td>
<td>74</td>
<td>47</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>I am tensed when the household work get delayed due to my condition</td>
<td>30</td>
<td>60</td>
<td>47</td>
<td>37</td>
<td>3</td>
</tr>
<tr>
<td>I am worried about waking up late due to pregnancy</td>
<td>43</td>
<td>70</td>
<td>47</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>I feel that I am lacking in socialization due to pregnancy</td>
<td>33</td>
<td>77</td>
<td>50</td>
<td>23</td>
<td>7</td>
</tr>
<tr>
<td>I am worried about the appearance of my unborn child</td>
<td>70</td>
<td>77</td>
<td>20</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>I am worried about the sex of my unborn child</td>
<td>73</td>
<td>73</td>
<td>27</td>
<td>24</td>
<td>-</td>
</tr>
<tr>
<td>I am worried about illness of my family members</td>
<td>67</td>
<td>57</td>
<td>27</td>
<td>43</td>
<td>6</td>
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<tr>
<td>I face overload in carrying out my work</td>
<td>60</td>
<td>60</td>
<td>37</td>
<td>37</td>
<td>3</td>
</tr>
<tr>
<td>I feel that I am not spending enough time with family members</td>
<td>40</td>
<td>80</td>
<td>34</td>
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<td>13</td>
</tr>
</tbody>
</table>

**Table 3:** Comparison between total stress score of working antenatal mothers and non-working antenatal mothers

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working antenatal mothers</td>
<td>21.33</td>
<td>9.87</td>
<td>2.773</td>
<td>0.007</td>
</tr>
<tr>
<td>Non-working antenatal mothers</td>
<td>14.7</td>
<td>8.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Stress assessment scores:**

The stress assessment scale was used to assess the stress of working and non-working antenatal mothers, consisted of 30 items and the total scores were arbitrarily classified as no-stress (0) mild-stress (1-40) moderate-tress (41-80) and severe-stress (81-120). Data shows that about 60% of working and 77% of non-working antenatal mothers sometimes felt that they were tired and worn out, 60% of working antenatal mothers sometimes got easily irritated, 63% of them sometimes felt that they had lack of strength, 67% of working and 50% of non-working antenatal mothers sometimes complained of not getting adequate sleep at night, 50% of working antenatal mothers sometimes suffered from lack of appetite and socialization. (Table 2)

**Comparison between total stress score of working and non-working antenatal mothers**

Since the data was normally distributed independent t - Test was used to do the comparison of total stress score of working and non-working antenatal mothers and
investigators observed that (t = 2.773, df = 58, p = 0.007). Since p < 0.05 researchers concluded that, there is significant differences between working and non-working antenatal mothers stress score. (Table.3)

**Discussions:**

The findings of the present study indicated that the working antenatal mothers had working hours of 6-8 hours/day and 73% were moderate workers. About 53% non-working and 57% working antenatal mothers were between 29-40 weeks of gestation. The finding of the study is supported by the following study.

Prospective Cohort Study conducted by Vrijkotte TGM et al., on First Trimester Working Conditions and Birthweight among 8266 pregnant women at Amsterdam, Netherlands. The result revealed that, a workweek of 32 hours or more and high job strain were significantly associated with birth weight.⁷

The findings of the present study revealed that there is significant difference between working and non-working antenatal mothers stress score. The mean and standard deviation (SD) of the stress scores of working antenatal mothers (mean= 21.33, SD= 9.87) was more than non-working antenatal mothers (mean= 14.7, SD= 8.6). This is supported by the following study.

Albrecht SA et al conducted a co relational descriptive survey study on Anxiety levels, health behaviours, and support systems of pregnant women in metropolitan city. The findings showed that, there was significant positive correlation between trait anxiety with high occupation level (r = .68, p = .001).⁸

**Conclusion:**

The study concludes both working and non-working antenatal mothers were at more risk of developing stress. All antenatal mothers participated in this study had mild stress and there was significant difference between working and non-working antenatal mothers stress score.

An information leaflet was developed by the investigators on antenatal stress management and discussed and distributed to the antenatal mothers.

**References:**

5. Adele pilliteri. Maternal and child health nursing, edition 5th. Lippincott Williams Wilkins publishers, Newyork; p.g no -295,125
Introduction:
Physical anthropology is not just the study of human structure or morphology. It is a living science too; all one has to do, is to observe the living. A recent observation of mine concerns the resting position of the upper limb in overweight and obese individuals.

In 'normal weight for age' and height people, the upper limbs are held dangling down the sides of the body (in a position of rest), with the palms facing or held adjacent to the thigh. In other words, the free limb is held in a semi-pronated forearm position, with the thumb facing forwards (anteriorly).

Now shift focus to the obese: the palm is held facing backwards (posteriorly), the hemi-pronated forearm now over-rides a medially rotated humerus. The thumbs, do not point anteriorly (forward) but medially (inward), the back of the hand (the dorsum of the palm) face the onlooker.\(^1\) In individuals midway between slim and obese, (the stocky, overweight or stout) the upper limb is partially rotated medially. The dorsum of the palm turns more medially as the body weight increases: the degree of axial rotation being directly related to the rise in weight. The heavier one is, the more medially rotated the free upper limb is in the erect posture (see figure).

Keywords: limb rotation, gleno-humeral joint, obesity

Abstract:
The human body’s structure is remarkable in that it is basically uniform across the populations. Apart from a few dissimilarities in skin color and external features, at the visceral and microscopic levels, man is unusually identical. Minor ethnic variations, both acquired or congenital and atavistic traits apart, human morphology is universal.

In this brief communication I present and discuss an observation made on the position of the free upper limb in the erect adult. It is seen that body weight influences forelimb position. In the stout, stocky and overweight, the upper limb is at rest, held medially rotated (axially); the degree of axial rotation being directly related to the increase in body weight.

Keywords: limb rotation, gleno-humeral joint, obesity

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Note The alteration in the degree of axial rotation (medially) of the free upper limb in the transition from slim (thin) to overweight to obese

Keywords: limb rotation, gleno-humeral joint, obesity

- Arunachalam Kumar
Discussion:
In the obese, at rest, the forearm and forearm, as a single unit held rotated in the vertical long axis medially to the extent of 90°. The oddity in positioning, is seen in both sexes, but in infants, perhaps due to a difference in pattern of deposition of fat and adipose tissue, it is not apparent or observable. The body morphology induced alteration in the position of the freely suspended upper limb raises a number of questions.

How or why forelimb anatomy is altered in the overweight is a mystery. The questions now raised by this oddity are:

At what precise stage in the weight gain graph does the axial (vertical) medial rotation start?

Is the rotation reversible by reducing weight or dieting? What happens to the limb position in those yo-yoing between bulimia and anorexia?

Why does the limb change its anatomical status and position when weight is gained?

What is the relationship (if any) between the individual’s adipose tissue (fat) content, lipid profile and its metabolism to the degree of axial rotation in the forelimbs?

Does the range of axial rotation occur only at the gleno-humeral joint or do the radio-ulnar joints also contribute to its degree and range?

Is it possible that in the obese, the additional adipose tissue deposited in the axilla and juxta-scapular regions, may slightly alter the anatomical position of the scapula, shifting the glenoid to face more anteriorly than just the normal antero-laterally? Any displacement in glenoid angularity, even minuscule, could significantly alter the in-situ position of the suspended free upper limb, rotating it medially - apparently and actually (assuming that the rotation is initiated and maintained only at the shoulder joint).

More interestingly, could one apply the range of rotation as a ‘rough’ and index for estimating or assessing body weight status?

The human form holds an amazing maze of cryptic, and as yet undiscovered bio-mechanisms. That the in-situ rotation dynamics of the upper limb along it’s vertical axis\(^2,3\), can be used as a kinetically quantifiable external indicator to body weight status is quite an interesting proposition.

References
2. Arunachalam Kumar, Forelimb axial rotation and obesity https://groups.yahoo.com/neo/groups/ixedoc/conversations/topics/5
Introduction:
Adolescence is a transition period from childhood to adulthood and is characterized by a spurt in physical, endocrinal, emotional, and mental growth. As the direct reproducers of future generations, the health of adolescent girls influences not only their own health, but also the health of the future population. Almost a quarter of India’s population comprises of girls below 20 years.¹

One of the major physiological changes that take place in adolescent girls is the onset of menarche, which is often associated with problems of irregular menstruation, excessive bleeding, and dysmenorrhea. Of these, dysmenorrhea, recurrent, cramping lower abdominal pain during menstruation is one of the common problems experienced by many adolescent girls. The prevalence of dysmenorrhea among adolescent girls ranges from 60 to 83 percent. Many adolescence reported limitation on daily activities.

Background: Dysmenorrhea, recurrent cramping lower abdominal pain is one of the common problems experienced by many adolescent girls. The prevalence of dysmenorrhea among adolescent girls ranges from 60 to 83 percent and many adolescence reported limitation on daily activities.

Method: A descriptive survey was conducted among 233 adolescent girls in four residential schools of Udupi district, Karnataka to identify dysmenorrhea, characteristics and associated symptoms.

Results: The prevalence of dysmenorrhea in adolescent girls was found to be 146(62.70%). Out of 233 samples 28(12%) had mild pain, 77(33%) had moderate pain and 41(17.6%) had severe pain during menstruation. Tiredness 110(75.34%), back pain 106(72.60%) and irritability 97(66.43%) were the most common symptoms associated with dysmenorrhea. A positive association was found between dysmenorrhea and family history.

Conclusion: Dysmenorrhea is a very common problem among adolescent girls and they experience a number of physical, gastrointestinal and psychological symptoms. The findings of this study indicate the magnitude of the problem and the need for appropriate intervention through a change in lifestyle.

Keywords: Adolescent girls, dysmenorrhea, menstrual characteristics.
of focus on the content of the courses" and 26.9% reporting "not being able to answer the questions in exams despite having the knowledge". Majority 77.3% reported "having problems with their families" when they are experiencing menstrual pain.  

A descriptive cross-sectional study was conducted in the schools in Sidon city, Lebanon among 389 schoolgirls on their menstrual experiences. It shows that 97% used negative words like “disgusting” (30.5%), “painful” (9.1%), “bad” (8.8%), “I hate it” (5%), “it’s hard” (3.9%), “depressing” (3.8%), “like a disease” (3.4%), “tiring” (3.4%), “I wish I never had it” (0.9%), “ridiculous” (0.9%), “like a virus”, “embarrassing” (0.6%) and others (0.3%). The findings indicate that the dysmenorrhoea is higher among the girls having negative menstrual experiences. This shows that even though menstruation is a blessing most of the girls are not able to perceive it and consider it as a curse throughout their life due to the pain associated with it.  

Another study was conducted to find the incidence of dysmenorrhoea among 1648 adolescent girls in selected districts of Karnataka. In that the incidence of dysmenorrhoea was found to be 87%, of these 46.69% had severe pain during menstruation. Among those 63% of girls experienced dysmenorrhoea before the onset of bleeding and 37% experienced after the onset of bleeding.  

Statement of the problem  
A descriptive study to assess dysmenorrhoea, Characteristics and associated symptoms among adolescent girls in selected residential schools of Udupi district, Karnataka.  

Aims and objectives  
1. identify dysmenorrhoea and associated symptoms among adolescent girls in selected residential schools of Udupi district.  
2. assess the characteristics of dysmenorrhoea among adolescent girls in selected residential schools of Udupi district.  
3. find out the association between dysmenorrhoea and selected variables.  

Materials and methods:  
A descriptive survey was used for the study. The settings for the study were residential schools in Udupi district. Only adolescent girls between 12 to 17 years, studying in residential schools were included in the study. Simple random sampling was used to select the four residential schools in Udupi district by using lottery method. The schools selected were Sharada residential school, Udupi, Sri Bhuvanendra residential school, Karkala, Little rock residential school, Brahmavar and Jawahar Navodaya Vidyalaya, Hebri. All the adolescent girls who met the sampling criteria were included in the study. The total sample size was 233. The data was collected from 5th January to 10th March 2013.  

The tools developed by the researcher were validated by seven experts. Data were collected in January 2013, after obtaining permission from concerned school authorities and participant’s informed consent. Tool 1: Baseline proforma, Tool 2: Dysmenorrhoea questionnaire, Tool 3: Numerical Pain Scale. The baseline proforma consisted of the background information of the samples. Dysmenorrhoea questionnaire was constructed to know in detail regarding the history, characteristics and symptoms associated with dysmenorrhoea. It consist of four sections. Section 1 – Menstrual history, section 2 – Dysmenorrhoea associated symptom checklist, section 3 – Dysmenorrhoea characteristics and section 4 – Effects of Dysmenorrhoea. The intensity of pain was measured by using a numerical pain scale. It’s a line with equidistant marks from 0 to 10. The minimum score was 0 and maximum score was 10. The scores were arbitrarily classified as mild dysmenorrhoea (1-3), moderate dysmenorrhoea (4-7) and severe dysmenorrhoea (8-10).  

Content validity was established by the percentage of agreement of experts. The test-retest method was employed to find out the reliability, where ‘r’ was found to be 0.98.  

Results:  
1. Description of baseline variables  
Majority of the adolescent girls 159(68.2%) belonged to
the age group of 12-14 years as shown in Table 1. In that most of the adolescent girls 151(64.8%) were staying in nuclear family. Out of 233 sample, most of the adolescent girls 117(50.2%) were having the family history of dysmenorrhoea. Majority of the adolescent girls 167(71.7%) were having mixed diet and in that 192(82.4%) of them were not having any known medical problems.

2. Dysmenorrhoea and associated symptoms

Majority of the adolescent girls 146 (62.7%) experienced dysmenorrhoea as shown in Table 2. Further analysis was conducted to find out the severity of dysmenorrhoea and from fig 1, it can be seen that out of 233 samples, 28(12%) had mild pain, 77(33%) had moderate pain and 41(17.6%) had severe pain during menstruation.

There were 24 symptoms grouped under physical, gastrointestinal, eliminational and psychological symptoms in dysmenorrhoea associated symptom checklist. The ranking of the symptoms in Table 3, showed tiredness 110(75.34%), back pain 106 (72.60%) and irritability 97(66.43%) as the most common symptoms associated with dysmenorrhoea. Diarrhoea 10(6.84%), nausea 16(10.9%) and vomiting 16(10.9%) were the least common symptoms associated with dysmenorrhoea among adolescent girls.

3. Dysmenorrhoea characteristics

3.1 Description of Menstrual history

Majority of the adolescent girls 146(62.7%) attained menarche at the age of 12-13 years and in that most of the adolescent girls 125(53.6%) are having a menstrual cycle of 21-28 days duration as shown in Table 5. Of the total 233, most of the adolescent girls 135(57.9%) are having a menstruation for 5-6 days in a month and they are changing an average of 2-3 soaked pads per day147(63.1%) as depicted in table 4.

3.2 Description of samples based on menstrual pain characteristics.

As depicted in table 5, most of the adolescent girls 68(46.6%) are having dysmenorrhoea from their first menstruation onwards. It’s also found that majority of the adolescent girls 71(48.6%) experienced dysmenorrhoea for 1-4 hours. In that most of the adolescent girls 66(45.2%) are having severe pain during their first day of menstruation and when considering the body parts having pain most of them 53(36.3%) are having back pain and lower abdominal pain.

3.3 Description on the effects of menstrual pain

Dysmenorrhoea affects the studies of most of the adolescent girls 53(36.3%), in that majority of them are feeling weak and tired. When considering the hours of rest, majority 77(52.7%) are taking rest only for <6 hrs during the time of dysmenorrhoea. Only least number of participants shows those dysmenorrhoea affects their daily activities 66(44.5%) and sleep 57(39%). Further analysis was conducted to know about the action taken for dysmenorrhoea during school hours and results showed that majority of the adolescent girls 74(50.7%) manage the situation by self and 42(28.8%) ask permission from teacher and go to hostel during the time of dysmenorrhoea. Only very few adolescent girls are having the habit of skipping meals during dysmenorrhoea and in that most of them are skipping lunch 35(23.9%).

4) Association between dysmenorrhoea and selected variables

Study showed an association between family history and dysmenorrhoea (Z=16.673, p-value=0.001) and there is no association between age in years, onset of menarche, duration of menstrual flow, dietary pattern and family history of dysmenorrhoea.

<table>
<thead>
<tr>
<th>Sample characteristics</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-14</td>
<td>159</td>
<td>68.2</td>
</tr>
<tr>
<td>15-17</td>
<td>74</td>
<td>31.8</td>
</tr>
<tr>
<td>Year of study</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7&lt;sup&gt;th&lt;/sup&gt;</td>
<td>45</td>
<td>19.3</td>
</tr>
<tr>
<td>8&lt;sup&gt;th&lt;/sup&gt;</td>
<td>51</td>
<td>21.9</td>
</tr>
<tr>
<td>9&lt;sup&gt;th&lt;/sup&gt;</td>
<td>68</td>
<td>29.2</td>
</tr>
<tr>
<td>10&lt;sup&gt;th&lt;/sup&gt;</td>
<td>69</td>
<td>29.6</td>
</tr>
<tr>
<td>Type of family</td>
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<td></td>
</tr>
<tr>
<td>Nuclear Family</td>
<td>151</td>
<td>64.8</td>
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</tbody>
</table>
Table 2: Frequency and percentage of dysmenorrhoea

<table>
<thead>
<tr>
<th>Presence of dysmenorrhoea</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>146</td>
<td>62.7</td>
</tr>
<tr>
<td>No</td>
<td>87</td>
<td>37.3</td>
</tr>
<tr>
<td>Total</td>
<td>233</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 3: Frequency and percentage distribution of the dysmenorrhoea associated symptoms

<table>
<thead>
<tr>
<th>Physical symptoms</th>
<th>Frequency</th>
<th>Percentage (%)</th>
<th>Ranking of the symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiredness</td>
<td>110</td>
<td>75.3</td>
<td>1</td>
</tr>
<tr>
<td>Headache</td>
<td>42</td>
<td>28.7</td>
<td>11</td>
</tr>
<tr>
<td>Giddiness</td>
<td>33</td>
<td>22.6</td>
<td>15</td>
</tr>
<tr>
<td>Sleeplessness</td>
<td>47</td>
<td>32.19</td>
<td>10</td>
</tr>
<tr>
<td>Increased sleep</td>
<td>41</td>
<td>28.08</td>
<td>12</td>
</tr>
<tr>
<td>feeling fullness in lower abdomen</td>
<td>71</td>
<td>48.6</td>
<td>7</td>
</tr>
<tr>
<td>back pain</td>
<td>106</td>
<td>72.6</td>
<td>2</td>
</tr>
<tr>
<td>tenderness of breasts</td>
<td>24</td>
<td>16.4</td>
<td>17</td>
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<tr>
<td>knee pain</td>
<td>50</td>
<td>34.2</td>
<td>9</td>
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<td>swelling of legs</td>
<td>23</td>
<td>15.7</td>
<td>18</td>
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<tr>
<td>facial puffiness</td>
<td>33</td>
<td>22.6</td>
<td>15</td>
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<tr>
<td>Gastrointestinal symptoms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of appetite</td>
<td>39</td>
<td>26.7</td>
<td>13</td>
</tr>
<tr>
<td>Increased appetite</td>
<td>22</td>
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<td>19</td>
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<tr>
<td>Nausea</td>
<td>16</td>
<td>10.9</td>
<td>20</td>
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<tr>
<td>Vomiting</td>
<td>16</td>
<td>10.9</td>
<td>20</td>
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<tr>
<td>Eliminational symptoms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>constipation</td>
<td>29</td>
<td>19.8</td>
<td>16</td>
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<tr>
<td>Diarrhea</td>
<td>10</td>
<td>6.8</td>
<td>21</td>
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<tr>
<td>Increased frequency of urination</td>
<td>50</td>
<td>34.2</td>
<td>9</td>
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<tr>
<td>Profuse sweating</td>
<td>38</td>
<td>26</td>
<td>14</td>
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<tr>
<td>Psychological symptoms</td>
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</tr>
<tr>
<td>Depression</td>
<td>57</td>
<td>39</td>
<td>8</td>
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<tr>
<td>Mood swings</td>
<td>78</td>
<td>53.4</td>
<td>5</td>
</tr>
<tr>
<td>Irritability</td>
<td>97</td>
<td>66.4</td>
<td>3</td>
</tr>
<tr>
<td>Inability to concentrate</td>
<td>82</td>
<td>56.1</td>
<td>4</td>
</tr>
<tr>
<td>Nervousness</td>
<td>77</td>
<td>52.7</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 4: Frequency and percentage distribution based on menstrual history

<table>
<thead>
<tr>
<th>Sl.no</th>
<th>Sample characteristics</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Age of menarche</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;12</td>
<td></td>
<td>54</td>
<td>23.2</td>
</tr>
<tr>
<td>12-13</td>
<td></td>
<td>146</td>
<td>62.7</td>
</tr>
<tr>
<td>14-15</td>
<td></td>
<td>31</td>
<td>13.3</td>
</tr>
<tr>
<td>&lt;15</td>
<td></td>
<td>2</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Keywords: Adolescent girls, dysmenorrhoea, menstrual characteristics - Nayana S. George
Table 5: Frequency and percentage distribution of adolescent girls based on dysmenorrhoea characteristics

<table>
<thead>
<tr>
<th>Sl.no</th>
<th>Sample characteristics</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Experience of pain due to menstruation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>first menstruation onwards</td>
<td>68</td>
<td>46.6</td>
</tr>
<tr>
<td></td>
<td>within an year after first menstruation</td>
<td>34</td>
<td>23.3</td>
</tr>
<tr>
<td></td>
<td>after one year</td>
<td>30</td>
<td>20.5</td>
</tr>
<tr>
<td></td>
<td>after two or more years</td>
<td>14</td>
<td>9.6</td>
</tr>
<tr>
<td>2)</td>
<td>Day of menstruation with severe pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>One day before the onset of menstruation</td>
<td>31</td>
<td>21.3</td>
</tr>
<tr>
<td></td>
<td>On the first day</td>
<td>66</td>
<td>45.2</td>
</tr>
<tr>
<td></td>
<td>On the second day</td>
<td>50</td>
<td>34.24</td>
</tr>
<tr>
<td></td>
<td>Any other days</td>
<td>13</td>
<td>8.90</td>
</tr>
<tr>
<td>3)</td>
<td>Total duration of pain in hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;1</td>
<td>39</td>
<td>26.7</td>
</tr>
<tr>
<td></td>
<td>1-4</td>
<td>71</td>
<td>48.6</td>
</tr>
<tr>
<td></td>
<td>5-8</td>
<td>28</td>
<td>19.2</td>
</tr>
<tr>
<td></td>
<td>&gt;8</td>
<td>8</td>
<td>5.5</td>
</tr>
<tr>
<td>4)</td>
<td>Body parts having pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>lower abdomen only</td>
<td>46</td>
<td>31.5</td>
</tr>
<tr>
<td></td>
<td>lower abdomen and back only</td>
<td>53</td>
<td>36.3</td>
</tr>
<tr>
<td></td>
<td>lower abdomen, back and legs</td>
<td>43</td>
<td>29.5</td>
</tr>
<tr>
<td></td>
<td>other body parts</td>
<td>4</td>
<td>2.7</td>
</tr>
<tr>
<td>5)</td>
<td>Measures taken to get relief from abdominal pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>medicines</td>
<td>15</td>
<td>10.2</td>
</tr>
<tr>
<td></td>
<td>hot applications</td>
<td>18</td>
<td>12.32</td>
</tr>
<tr>
<td></td>
<td>massage</td>
<td>15</td>
<td>10.2</td>
</tr>
<tr>
<td></td>
<td>bedrest</td>
<td>108</td>
<td>73.97</td>
</tr>
<tr>
<td></td>
<td>any other</td>
<td>5</td>
<td>3.42</td>
</tr>
<tr>
<td></td>
<td>no measures</td>
<td>4</td>
<td>2.73</td>
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</table>
### Table 6: Frequency and percentage distribution of the effects of menstrual pain

<table>
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<th>Sl.no</th>
<th>Sample characteristics</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Effect on daily activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td>65</td>
<td>44.5</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>81</td>
<td>55.5</td>
</tr>
<tr>
<td>2)</td>
<td>Effect on studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>school absenteeism</td>
<td>5</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>feeling weak and tired</td>
<td>53</td>
<td>36.3</td>
</tr>
<tr>
<td></td>
<td>lack of concentration</td>
<td>32</td>
<td>21.91</td>
</tr>
<tr>
<td></td>
<td>Not interested to study</td>
<td>21</td>
<td>14.38</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>48</td>
<td>32.9</td>
</tr>
<tr>
<td>3)</td>
<td>Effect on sleep</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td>57</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>89</td>
<td>61</td>
</tr>
<tr>
<td>4)</td>
<td>Rest during the time of dysmenorrhoea</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;6hrs</td>
<td>77</td>
<td>52.7</td>
</tr>
<tr>
<td></td>
<td>6-18hrs</td>
<td>24</td>
<td>16.4</td>
</tr>
<tr>
<td></td>
<td>18-24hrs</td>
<td>5</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>&gt;24hrs</td>
<td>2</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>38</td>
<td>26</td>
</tr>
<tr>
<td>5)</td>
<td>Action taken for dysmenorrhoea during school hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>inform class teacher and seek help</td>
<td>8</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>inform friends and get help</td>
<td>30</td>
<td>20.5</td>
</tr>
<tr>
<td></td>
<td>manage the situation by self</td>
<td>74</td>
<td>50.7</td>
</tr>
<tr>
<td></td>
<td>ask permission from teacher and going to hostel</td>
<td>42</td>
<td>28.8</td>
</tr>
<tr>
<td></td>
<td>other measures</td>
<td>2</td>
<td>1.8</td>
</tr>
<tr>
<td>6)</td>
<td>Skipping meals during dysmenorrhoea</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>breakfast</td>
<td>17</td>
<td>11.6</td>
</tr>
<tr>
<td></td>
<td>lunch</td>
<td>35</td>
<td>23.9</td>
</tr>
<tr>
<td></td>
<td>dinner</td>
<td>21</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>any other</td>
<td>5</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>84</td>
<td>57.5</td>
</tr>
</tbody>
</table>

### Table 7: Association between dysmenorrhoea categories and selected variables.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Dysmenorrhoea categories</th>
<th>Chi-square</th>
<th>p-value</th>
<th>Significance</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>mild</td>
<td>moderate</td>
<td>severe</td>
<td></td>
</tr>
<tr>
<td>1. Age in years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-14</td>
<td>16</td>
<td>53</td>
<td>25</td>
<td>4.283</td>
</tr>
<tr>
<td>15-17</td>
<td>12</td>
<td>24</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>2. Onset of menarche</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;12</td>
<td>8</td>
<td>17</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>12-13</td>
<td>18</td>
<td>48</td>
<td>19</td>
<td>10.377</td>
</tr>
<tr>
<td>14-15</td>
<td>2</td>
<td>11</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>&gt;15</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3. Duration of menstrual flow</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;3</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>11.277</td>
</tr>
<tr>
<td>3-4</td>
<td>12</td>
<td>18</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>5-6</td>
<td>13</td>
<td>46</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>&gt;6</td>
<td>2</td>
<td>10</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>4. Dietary pattern</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vegetarian</td>
<td>4</td>
<td>22</td>
<td>13</td>
<td>3.266</td>
</tr>
<tr>
<td>mixed diet</td>
<td>25</td>
<td>56</td>
<td>27</td>
<td></td>
</tr>
</tbody>
</table>
Nitte University Journal of Health Science

Keywords: Adolescent girls, dysmenorrhea, menstrual characteristics. - Nayana S. George

Variables | Dysmenorrhea categories | Chi-square | p-value | Significance
--- | --- | --- | --- | ---
7. Family history of dysmenorrhea | mild | moderate | severe | 8. Sleep | mild | moderate | severe | 7. Family history of dysmenorrhea | yes | 16 | 40 | 30 | 0.001* | Significant
no | 12 | 37 | 11 | 0.439 | 0.803* | Not significant
8. Sleep | yes | 10 | 32 | 15 | 8. Sleep | yes | 10 | 32 | 15 | 0.439 | 0.803* | Not significant
no | 18 | 45 | 26 | 0.439 | 0.803* | Not significant

*Pearson chi-square test was used
**Fissure exact test was used for categories with less than 5 samples.

Fig 1: Pie diagram showing percentage of adolescent girls with dysmenorrhea.

Discussion:

1. Dysmenorrhea characteristics
A cross sectional descriptive survey was conducted by Charu Shrotriya and Amita Ray in Mangalore on 560 female medical students, to evaluate the menstrual characteristics. The study findings showed that most of the participants 84.2% (472) had started menstruating between 12-14 years of age. A large chunk of students had menstrual cycle duration of 21 to 35 days; 97.2% (533) and a very small number (2.8%) had cycle length <21 days and >35 days. Most of the interviewees did not have dysmenorrhea among their immediate family members; 60.5% (339). The study findings support the present study findings except in case of family history of dysmenorrhea where 50% of participants had a family history of dysmenorrhea.

A community based cross-sectional study was conducted in 2013, among 440 adolescent girls in the rural area of Bijapur, Karnataka to know their menstrual pattern. The results showed that mean age of menarche of adolescent girls in the present study was 14 years; mean duration of blood flow 3.9±5.07 days and mean intermenstrual period 28.7±3.26 days. The findings support the present study findings.

The findings of the present study indicated that 146(62.7%) reported to have menstrual disturbance, of these treatment taken for menstrual discomforts bed rest(73.97%), medicines (10.2%),hot applications (12.32%) and other measures like lime juice, fenugreek water (3.4%). A study was conducted on prevalence and impact of dysmenorrhea on Hispanic female adolescents. A total of 706 Hispanic adolescent girls were interviewed.85% reported to have dysmenorrhea, of these treatments taken for dysmenorrhea included rest (58%), medications (52%), Hot water application (26%), 49% consulted the physician. The study supports the findings of the present study.

2. Dysmenorrhea and associated symptoms
The findings were supported by a cross sectional study conducted in Egypt by Eman Mohammed among the four secondary schools for girls in Assuit city. Simple random sampling was used to select 845 adolescent girls. The results of the study showed that the prevalence of dysmenorrhea was 76.1% (n = 643); of these, 26.6% described their menstrual pain as mild, 32.0% as moderate and 41.4% as severe.

An exploratory survey conducted by Anil K Agarwal to study evidence of severity of dysmenorrhea with associated symptoms and general health status. Multistage cluster sampling technique was used to select 970 adolescent girls of age 15 to 20 years studying in selected higher secondary schools. The results of the study showed that the three
most common symptoms associated with menstruation were lethargy and tiredness (first), depression (second) and inability to concentrate in work (third), whereas the ranking of these symptoms on the day after the stoppage of menstruation showed depression as the first common symptom. This study support the present study findings\(^1\).

3. Association between dysmenorrhoea and selected variables

The findings are contradicted by a cross-sectional study conducted on 500 healthy females aged 18-28 years in Mysore. Standardized Self-reporting questionnaires were used to obtain relevant data. Majority (72.9%) of the participants experienced menstrual pain. More than 50% dysmenorrhoeic subjects experienced pain every menstrual cycle. Among the factors studied menstrual flow, length of flow and family history exhibited positive association while family size had an inverse association to a significant extent (p = 0.01).\(^7\)

Conclusion:
Dysmenorrhoea is a very common problem among adolescent girls and they experience a number of physical, gastrointestinal, eliminational and psychological symptoms associated with it. Adolescent girls, almost silently suffer the pain by dysmenorrhoea and the symptoms associated with it. It is found to be a leading cause of low academic performance. The finding of this study indicates the need for appropriate intervention through lifestyle changes.

Acknowledgement:
We express our sincere thanks to Dr. Anice George, Dean, MCON and all the principals of selected schools for giving administrative permission to conduct the study. Our heartiest thanks to all the people whose names are not mentioned here, but directly and indirectly helped us to complete the work.

References:
A CORRELATIVE STUDY TO ASSESS THE PSYCHOLOGICAL WELLBEING AND SELF-ESTEEM AMONG ADULT CHILDREN OF MENTALLY ILL PARENT/S IN SELECTED HOSPITAL OF UDUPI DISTRICT

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Abstract:
Introduction: Caregivers across the world, who are often unrecognised and under supported, are deeply and personally impacted by the care they provide. The recognition of high levels of caregiver morbidity demands a holistic approach and nurses need to be more responsive to the needs of carers and care-recipients rather than focussing on the patient alone. Aims and Objectives: to determine the psychological wellbeing of adult children with mentally ill parent/s, to assess the level of self-esteem of adult children of their mentally ill parent/s, and to find the relationship between psychological wellbeing and self-esteem.

Study design: descriptive correlational study design.

Methods and materials: study was conducted among 63 adult children of mentally ill parents by using convenient sampling technique. A survey approach was used for the study. Tools used for the study were Demographic Proforma, Psychological wellbeing scale, and Rosenberg’s self-esteem scale.

Results: Majority, 35 (55.6%) of the samples were found to be having high psychological wellbeing. 27 (42.9%) of the samples were intermediate psychological wellbeing and only 1 (1.6%) participant was having low psychological wellbeing. Majority (68.3%) of the samples were found to be having normal self-esteem. (30.2%) of the samples were with low self-esteem and only (1.6%) participant was having high self-esteem. There is no significant correlation was found between psychological wellbeing and self-esteem (r = 0.044, p= 0.730).

Key words: adult children, psychological wellbeing, self-esteem, mentally ill parent/s

Introduction:
Caring for older frail and chronically ill family members is not without costs; although the caregiving role can be rewarding, it can also be highly stressful. It is now well established that family members who provide care to frail and disabled older adults are at greater risk for experiencing health problems, as well as psychiatric morbidities, such as anxiety and depressive symptomology, than non-caregivers. Through studies it is understood that a caregiver will go under a lot of psychological demand that influences the psychological wellbeing, self-esteem and perceived stigma of the caregivers³.

A study conducted by K. S. Shaji, Roy K. George, Martin J. Prince and K. S. Jacob in Kerala on 2007 to observe the behavioural symptoms and caregiver burden in dementia, whose sample consisted of 79.3% women who were living with their families, revealed that symptoms like activity disturbances; aggressiveness and delusions in particular are indeed troublesome to the caregiver and that many factors might positively and negatively influence the experience of caregiver burden and modulate the psychological impact of providing care to the demented relative.²
In a study conducted by Papastavrou E., et al. at Cyprus on family caregiver burden among volunteer sample of 172 caregiver/care recipient dyads who were all patients suffering from probable Alzheimer’s type dementia and were recruited from neurology clinics, suggested that irrespective of the community, caregivers have high level of burden. The findings reveal that 68.02% of caregivers were highly burdened and even, 65% exhibited depressive symptoms and the burden was related to patient psychopathology and caregiver sex, income and level of education. It has been observed that women are more likely to experience social restrictions because of their caring role (Montgomery 1996), and they experience higher levels of burden when compared with men caregivers (Thomson et al. 2004). It was also found that caregivers with higher education and better remuneration had lower levels of burden; it seems that these factors may function as buffers to the stressors of care giving.2

A study conducted by Linju Ann Alias on 2011 to assess the co-dependency and depressive symptoms among caregivers of alcoholics using 140 caregivers from 3 hospitals in Udupi district revealed that 10% caregivers has severe co-dependency and 15% caregivers has severe depressive symptoms and that there is no association between co-dependency and depressive symptoms.3

Caregivers across the world, who are often unrecognized and under supported, are deeply and personally impacted by the care they provide. Despite the burdens they shoulder, many caregivers report enormous positive feelings about the care they provide. Health professionals, mental health nurses have an important role to acknowledge the burden of the caregivers. Caregivers need resources and support to sustain this loving and valuable care of those with psychiatric disorders1.

Materials and methods:
A descriptive correlational study design was adopted and study was conducted among 63 adult children of mentally ill parents. After obtaining the administrative permission, the researcher approached the study subjects, explained the purpose of the study and obtained their consent after assuring them the confidentiality of the data. Participants were adult children who were above the age of 18 years and had at least one parent, who had been diagnosed with Schizophrenia, Affective disorder or Organic mental disorder, as per the ICD-10 criteria, for more than 6 months. Adult children having any physical illness, past/current psychiatric illness, unwilling to participate in the study and those who were illiterate were excluded from the study. Adult children were selected through purposive sampling technique from the psychiatry OPDs and wards of Kasturba hospital, Manipal.

Data was collected using Demographic Proforma, Psychological wellbeing scale (PWB), by Bhogle and Jaiprakash, 1995 and Rosenberg’s self-esteem scale. Psychological wellbeing tool is a 28 item questionnnaire in a forced choice (Yes/No) format. In the tool, 10 statements (4, 5, 6, 10, 12, 14, 15, 16, 21 and 24) are negative and rest 18 statements are positive. Scores are classified as (0-9) as low psychological wellbeing, (10-20) as intermediate psychological wellbeing and (21-28) as high psychological wellbeing. Higher the score, higher the psychological wellbeing. Rosenberg self-esteem scale is a structured rating scale to assess self-esteem of general population, developed by Rosenberg (1965). Rosenberg reported that internal consistency reliability of the instrument range from (r=0.85 to 0.88). The scale consists of 10 items; each item is scored on a four point scale under the options: strongly agree, agree, disagree, and strongly disagree, five statements were positive and five negative with a total score of 30. Scores are classified as below 15 as low self-esteem, 15-25 scores as normal self-esteem and above 25 are considered as high self-esteem. Higher the scores, higher the self-esteem.

Statistical Methods:
Descriptive (frequency and percentage) and inferential (Spearman’ correlational coefficient) statistics were used for the analysis of the study. Non parametric (Spearman correlation coefficient) test was used to find the correlation between psychological wellbeing and Self-esteem.
Results:

Table 1: Frequency and percentage distribution of sample characteristics

<table>
<thead>
<tr>
<th>Sample characteristics</th>
<th>Frequency (f)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (in years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 – 27</td>
<td>31</td>
<td>49.2</td>
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<tr>
<td>28 – 37</td>
<td>13</td>
<td>29.6</td>
</tr>
<tr>
<td>38 – 47</td>
<td>11</td>
<td>17.5</td>
</tr>
<tr>
<td>48 – 57</td>
<td>3</td>
<td>4.8</td>
</tr>
<tr>
<td>58 and above</td>
<td>5</td>
<td>7.9</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>28</td>
<td>44.4</td>
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<tr>
<td>Female</td>
<td>35</td>
<td>55.6</td>
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<tr>
<td><strong>Religion</strong></td>
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<tr>
<td>Hindu</td>
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<td>Christian</td>
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<td>Muslim</td>
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<td>9.5</td>
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<td><strong>Marital status</strong></td>
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<td>50</td>
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<td>40</td>
</tr>
<tr>
<td>Widow/widower</td>
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<td>10</td>
</tr>
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<td><strong>Educational status</strong></td>
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</tr>
<tr>
<td>No formal education</td>
<td>5</td>
<td>7.9</td>
</tr>
<tr>
<td>Up to 8th standard</td>
<td>11</td>
<td>17.4</td>
</tr>
<tr>
<td>Up to 10th standard</td>
<td>10</td>
<td>15.8</td>
</tr>
<tr>
<td>Pre university</td>
<td>9</td>
<td>14.2</td>
</tr>
<tr>
<td>Graduation</td>
<td>22</td>
<td>34.9</td>
</tr>
<tr>
<td>Post-graduation and above</td>
<td>6</td>
<td>9.5</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional</td>
<td>18</td>
<td>28.6</td>
</tr>
<tr>
<td>Non professional</td>
<td>25</td>
<td>39.7</td>
</tr>
<tr>
<td>Not working</td>
<td>20</td>
<td>31.7</td>
</tr>
<tr>
<td><strong>Monthly income (in Rupees)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,000 - 5000</td>
<td>23</td>
<td>36.5</td>
</tr>
<tr>
<td>5001 - 10,000</td>
<td>11</td>
<td>17.5</td>
</tr>
<tr>
<td>10,001 - 15,000</td>
<td>11</td>
<td>17.5</td>
</tr>
<tr>
<td>15,001 - 20,000</td>
<td>8</td>
<td>12.7</td>
</tr>
<tr>
<td>&gt;20,000</td>
<td>10</td>
<td>15.9</td>
</tr>
<tr>
<td><strong>Parent/s’ current diagnosis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>18</td>
<td>28.6</td>
</tr>
<tr>
<td>Mood disorders</td>
<td>28</td>
<td>44.4</td>
</tr>
<tr>
<td>Organic psychiatric disorder</td>
<td>17</td>
<td>27.0</td>
</tr>
<tr>
<td><strong>Duration of parent/s illness</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 months – 1 year</td>
<td>18</td>
<td>28.6</td>
</tr>
<tr>
<td>&gt;1year - 2 years</td>
<td>17</td>
<td>27</td>
</tr>
<tr>
<td>&gt;2years - 5 years</td>
<td>17</td>
<td>27</td>
</tr>
<tr>
<td>&gt;5years - 10 years</td>
<td>4</td>
<td>6.3</td>
</tr>
<tr>
<td>&gt;10 years</td>
<td>7</td>
<td>11.1</td>
</tr>
<tr>
<td><strong>Number of times your parent/s is admitted to any hospital for mental illness</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>34</td>
<td>54.0</td>
</tr>
<tr>
<td>once</td>
<td>16</td>
<td>25.4</td>
</tr>
<tr>
<td>Twice</td>
<td>7</td>
<td>11.1</td>
</tr>
<tr>
<td>3 times or more</td>
<td>6</td>
<td>9.5</td>
</tr>
</tbody>
</table>

The data presented in figure 1 shows that out of 63 participants, Majority 35 (55.6%) of the samples were found to be having high psychological wellbeing. 27 (42.9%) of the samples were with intermediate psychological wellbeing and only 1 (1.6%) participant was having low psychological wellbeing.

Figure 2: Doughnut diagram showing the percentage distribution of self-esteem in adult children of mentally ill parent/s

The data presented in Figure 2 shows that out of 63 participants majority (68.3%) of the samples were found to be having normal self-esteem. 19 (30.2) samples were with low self-esteem and only 1 (1.6%) participant was having high self-esteem.

Table 2: Correlation between the psychological wellbeing and self-esteem

<table>
<thead>
<tr>
<th>Variables</th>
<th>(r) value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological wellbeing and self-esteem</td>
<td>0.044</td>
<td>0.730</td>
</tr>
</tbody>
</table>

The data in presented in the table 2 shows that there is no significant correction between psychological wellbeing and self-esteem (r = 0.044, p= 0.730).
Discussion:
In the present study, out of 63 participants, majority, 35 (55.6%) of the samples were found to be having high psychological wellbeing. 27 (42.9%) of the samples were with moderate psychological wellbeing. This finding supports the reports of a study conducted by Roy K. George et al. to observe the behavioral symptoms and caregiver burden of dementia patients revealed that many factors might positively and negatively influence the experience of caregiver burden and modulate the psychological impact of providing care to the demented relative.²

The study also found that out of 63 participants, majority, 43 (68.3%) of the samples were found to be having normal self-esteem. 19 (30.2%) of the samples were with low self-esteem and only 1 (1.6%) participant was having high self-esteem. A study by Kathleen, LeClear and O'Connell about the experiences, needs of, and interventions for children of seriously mentally ill mothers was found that there was a severe disruption of self-esteem for adult children of their mentally parents.⁷

In the present study, no correlation was found between psychological wellbeing and self-esteem (r = 0.044, p= 0.730) among adult children of mentally ill parents. The findings are contradicting to the finding by a study conducted by Noonan AE and Tennstedt SL, in new England shows that the relationship between meaning in caregiving that is, positive beliefs about the caregiving situation and the self as caregiver and the psychological well-being of 131 caregivers to community residing frail elders. Measures of well-being included depression, self-esteem, mastery, role captivity, and loss of self. Meaning in caregiving explained a significant portion of correlation in wellbeing and self-esteem scores even after demographic and stressor variables had been controlled.⁸

Conclusion:
The present study found that majority, (55.6%) of the samples was found to be having high psychological wellbeing. (42.9%) of the samples with intermediate psychological wellbeing. About (68.3%) of the samples found to be having normal self-esteem. (30.2%) of the samples with low self-esteem and only (1.6%) participant was having high self-esteem. There is no significant relationship was found between psychological wellbeing and self-esteem. Health professionals, mental health nurses have an important role to acknowledge the burden of the caregivers. They are in a position to render support and refer to get further support through social workers and community agencies.

Acknowledgement:
We acknowledge all the subjects who participated in the study willingly.

References:

Keywords: adult children, psychological wellbeing, self-esteem, mentally ill parent/s - Savitha
**FREQUENCY OF ABO AND RHEUSUS (D) BLOOD GROUPS IN DAKSHINA KANNADA DISTRICT OF KARNATAKA - A STUDY FROM RURAL TERTIARY CARE TEACHING HOSPITAL IN SOUTH INDIA**

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Abstract:
**Background**: ABO and Rh blood groups are most important blood groups in human beings. The frequency of four main blood group systems varies in population throughout the world and even in different parts of country. Objective of this study was to identify distribution of ABO and Rh blood group system.

**Materials and methods**: The study was conducted in rural tertiary care hospital from January 2008 to December 2012. Data were collected from Blood Bank grouping records. All blood samples processed during period of observation were included in study.

**Results**: During the period of observation total 43,103 numbers of blood groups were performed. Patient's samples were 28,305 and donor's samples were 14,798. The frequency of blood group O in our population was 42.0% (40.1% O Rh positive and 1.8% O Rh negative). The frequency of blood group B in our population was 27.3% (25.6% B Rh positive and 1.62% B Rh negative) followed by blood group A was 25.8% (24.3% A Rh positive and 1.4% A Rh negative) and blood group AB was 4.8% (4.4% AB Rh positive and 1.4% AB Rh negative) and a two Bombay blood group donors (0.0046%). Rh positive were 94.64% and Rh negative were 5.35%.

**Discussion**: O positive blood group is significantly high in our population. Every transfusion centre should have a record of frequency of blood group system in their population. It helps in inventory management. Knowledge of blood group distribution is important for clinical studies, for reliable geographical information and for forensic studies in the population.

**Key words**: Blood group, ABO, Rh

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There are differences in the distribution of ABO, and Rh (D) blood groups amongst different populations. The study of blood groups plays an important role in various genetic studies, in clinical studies for reliable geographical information and in blood transfusion practice, which will help in reducing morbidity and mortality rate. Knowledge of distribution of ABO and Rhesus (Rh) blood group is also essential for effective management of blood bank inventory.¹ ²

The present study was aimed to identify distribution of
ABO and Rh (D) blood groups in patients and donor population from a tertiary care hospital.

Materials and methods:
A retrospective study was carried out at a tertiary care teaching hospital, Blood Bank, from January 2008 to December 2012. The blood groups of donors and patients of either sex were studied. Total of 43,103 subjects were screened for their blood groups. The blood samples were collected by venepuncture in EDTA containing vacutainer. ABO and Rh blood grouping were done by agglutination test using anti-A, anti-B and anti-D human sera. Blood group (ABO) and Rhesus factor was done by the antigen antibody agglutination test. The antisera used were obtained from Tulip Diagnostics. Antiseras used for ABD were monoclonal anti-A, monoclonal anti-B, monoclonal anti-D (IgM). Antiseras used for Du test is monoclonal anti-D (IgG) and for Bombay blood group anti-H lectin.

Statistical analysis
Frequency, percentage and proportions for each variable were calculated and 95% confidence interval (CI) was taken to define normal range.

Results:
Out of total 43,103 subjects, patient’s samples were 28,305 and donor’s samples were 14,798. The frequency of blood group O in our population was 42.0% (40.1% O Rh positive and 1.8% O Rh negative). The frequency of blood group B in our population was 27.3% (25.6% B Rh positive and 1.62% B Rh negative) followed by blood group A was 25.8% (24.3% A Rh positive and 1.4% A Rh negative) and blood group AB was 4.8% (4.4% AB Rh positive and 1.4% AB Rh negative) and a two Bombay blood group donors (0.0046%). Rh (D) positive were 94.64% and Rh (D) negative were 5.35%.

<table>
<thead>
<tr>
<th>Table I: Frequency of ABO and Rh blood group systems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Blood groups</strong></td>
</tr>
<tr>
<td>ABO blood group</td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>AB</td>
</tr>
<tr>
<td>O</td>
</tr>
<tr>
<td>Bombay</td>
</tr>
<tr>
<td>Rh negative</td>
</tr>
<tr>
<td>Rh positive</td>
</tr>
<tr>
<td>Rh negative</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table II: Distribution of ABO and Rhesus (D) blood group among study population (n=43,103)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Blood group</strong></td>
</tr>
<tr>
<td>A positive</td>
</tr>
<tr>
<td>B positive</td>
</tr>
<tr>
<td>AB positive</td>
</tr>
<tr>
<td>O positive</td>
</tr>
<tr>
<td>A negative</td>
</tr>
<tr>
<td>B negative</td>
</tr>
<tr>
<td>AB negative</td>
</tr>
<tr>
<td>O negative</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table III: Comparison of frequency percentage of ABO and Rhesus blood group in different areas of India</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
</tr>
<tr>
<td>Northern India</td>
</tr>
<tr>
<td>Lucknow</td>
</tr>
<tr>
<td>Punjab</td>
</tr>
<tr>
<td>Jodhpur</td>
</tr>
</tbody>
</table>
Keywords: Blood group, ABO, Rh - Chandrika Rao

<table>
<thead>
<tr>
<th>Population</th>
<th>A</th>
<th>B</th>
<th>AB</th>
<th>O</th>
<th>Rh positive</th>
<th>Rh negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western India</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Ahmedabad</td>
<td>21.94</td>
<td>39.40</td>
<td>7.86</td>
<td>30.79</td>
<td>95.05</td>
<td>4.95</td>
</tr>
<tr>
<td>Eastern Ahmedabad</td>
<td>23.30</td>
<td>35.50</td>
<td>8.80</td>
<td>32.50</td>
<td>94.20</td>
<td>5.80</td>
</tr>
<tr>
<td>Surat</td>
<td>24.10</td>
<td>34.89</td>
<td>8.69</td>
<td>32.32</td>
<td>94.18</td>
<td>5.82</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>23.38</td>
<td>31.89</td>
<td>8.72</td>
<td>30.99</td>
<td>95.36</td>
<td>4.64</td>
</tr>
<tr>
<td>Eastern India</td>
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<td></td>
</tr>
<tr>
<td>Durgapur (steel city)</td>
<td>23.90</td>
<td>33.60</td>
<td>7.70</td>
<td>34.80</td>
<td>94.70</td>
<td>5.30</td>
</tr>
<tr>
<td>Southern India</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bangalore</td>
<td>23.85</td>
<td>29.95</td>
<td>6.37</td>
<td>39.82</td>
<td>94.2</td>
<td>5.8</td>
</tr>
<tr>
<td>Vellore</td>
<td>21.86</td>
<td>32.69</td>
<td>6.70</td>
<td>38.75</td>
<td>94.5</td>
<td>5.5</td>
</tr>
<tr>
<td>Davangere</td>
<td>26.15</td>
<td>29.85</td>
<td>7.24</td>
<td>31.76</td>
<td>94.8</td>
<td>5.2</td>
</tr>
<tr>
<td>Shimoga – Malnad</td>
<td>24.27</td>
<td>29.43</td>
<td>7.13</td>
<td>39.17</td>
<td>94.93</td>
<td>5.07</td>
</tr>
<tr>
<td>Present study</td>
<td>25.8</td>
<td>27.3</td>
<td>4.8</td>
<td>42.0</td>
<td>94.6</td>
<td>5.35</td>
</tr>
</tbody>
</table>

Table IV: Comparison of frequency and percentage of ABO and Rhesus blood group in different countries of the world

<table>
<thead>
<tr>
<th>Population</th>
<th>A</th>
<th>B</th>
<th>AB</th>
<th>O</th>
<th>Rh positive</th>
<th>Rh negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Britain</td>
<td>42.0</td>
<td>8.0</td>
<td>3.0</td>
<td>47.0</td>
<td>83.0</td>
<td>17.0</td>
</tr>
<tr>
<td>USA</td>
<td>41.0</td>
<td>9.0</td>
<td>4.0</td>
<td>46.0</td>
<td>85.0</td>
<td>15.0</td>
</tr>
<tr>
<td>Nigeria</td>
<td>21.60</td>
<td>21.40</td>
<td>2.80</td>
<td>54.20</td>
<td>95.20</td>
<td>4.80</td>
</tr>
<tr>
<td>New Guinea</td>
<td>22.50</td>
<td>23.70</td>
<td>4.70</td>
<td>48.90</td>
<td>95.90</td>
<td>4.10</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>24.0</td>
<td>17.0</td>
<td>4.0</td>
<td>52.0</td>
<td>93.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Pakistan</td>
<td>22.40</td>
<td>32.40</td>
<td>8.40</td>
<td>30.50</td>
<td>93.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Nepal</td>
<td>34.0</td>
<td>29.0</td>
<td>4.0</td>
<td>32.50</td>
<td>96.70</td>
<td>3.30</td>
</tr>
</tbody>
</table>

Discussion:
The study of distribution of blood groups is important as it plays a vital role in blood transfusion, organ transplantation, genetics research, human evolution, forensic pathology and some groups have shown associations with diseases like duodenal ulcer, diabetes mellitus, urinary tract infection and Rh and ABO incompatibilities of newborn.

We compared our results with other studies carried out in
different geographical areas. The studies done in Northern parts of India by Chandra et al at Lucknow, Sindhu et al at Punjab and Behra et al at Jodhpur showed blood group B was the commonest, followed by O, A and AB, which is different from our study. In Western parts of India like in Eastern Ahmedabad by Wadwa MK et al, Western part of Ahmedabad by Patel Piyush et al, studies done at Surat by Nidhi et al and Giri et al at Maharashtra, showed blood group B is the commonest followed by O, A and AB. Our study showed commonest blood group as O followed by B, A and AB. Study done in Eastern part of India, Durgapur by Nag et al and in Southern part of India by Periyavan et al at Bangalore, Das PK Nair et al at Vellore, at Davangere by Mallikarjuna S. et al and at Shimoga – Malnad study done by Girish et al found that commonest blood group was O followed by B, A and AB. The same prevalence was found in our study i.e. O was more frequent than B, followed by A and AB. [Table III]

Outside India, studies were carried out in different countries of the World like Britain, USA, Canada, Australia, New Zealand, Saudi Arabia, Pakistan and Nepal. Except in Pakistan and Nepal, the incidence of Rhesus (D) positive blood group in most of the part of India varies from 94% to 98% and 2% to 6% were Rh negative. The present study results are within this range.

**Conclusion:**

The O blood group is significantly high in our population and comparatively low AB blood group. Every transfusion centre should have a record of frequency of blood group system in their population. It helps in inventory management. Knowledge of blood group distribution is also important for clinical studies, for reliable geographical information and for forensic studies in the population.

**References:**

COMPUTE KNOWLEDGE ON SELF CARE MANAGEMENT OF PREGNANCY INDUCED HYPERTENSION BETWEEN PRIMI GRAVID AND MULTIGRAVIDA

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Abstract:

Objectives: to assess and compare the knowledge on self-care management of pregnancy induced hypertension among primi gravida and multi gravida mothers.

Method: A non-experimental descriptive comparative was conducted between 40 primi gravida mother and 40 multi gravida mothers who were selected by using purposive sampling to assess knowledge on self-care management of pregnancy induced hypertension. Self-structured questionnaire was used to collect the data. Appropriate Descriptive and inferential statistics were used to analyse data and to draw inferences.

Results: 55% of primi gravida mothers and 40 % of multi gravid mothers had inadequate knowledge. Only 2.5% of primi gravida and 5% of multi gravid mothers had adequate knowledge. Respondents from primigravida had knowledge about 31.8 % and 38.6% regarding signs & symptoms and Preventive measures. 35% and 44.7 % of multi mothers were aware about signs & symptoms and preventive measures respectively. Which shows all the respondent were less aware about pregnancy induced hypertension. And there is an association between age & Monthly income on knowledge level.

Conclusion: There is a necessity to provide information for those specific at risk population. Which helps to increase the knowledge, develop positive attitude, prevent complications and to have better maternal and child health.

Key words: Pregnancy induced hypertension, Self-care management, HELLP and eclampsia.

Introduction:

Pregnancy and childbirth are special events in women’s lives and indeed, in the lives of their families. This can be a time of great joy and joyful anticipation. It can also be a time of fear, suffering and even death. Even though pregnancy is not a disease; but a normal physiological process, it is associated with certain risks to the health and survival both for women and neonates, pregnancy induced hypertension is one among those complications.¹

Causes of pregnancy induced hypertension are unknown. With early diagnosis, more severe complications like imminent eclampsia, eclampsia and HELLP syndrome can be averted. The association between primi parity and pre-eclampsia is so widely accepted that it is at the core of several patho physiological theories. For example, it has been proposed that pre-eclampsia is the consequence of a maternal immune reaction against paternal antigens expressed in the placenta and that this reaction might result in defective trophoblast invasion and subsequent placental dysfunction. The lower risk of pre-eclampsia among multiparous women has been attributed to desensitisation after exposure to paternal antigens in the placenta during previous pregnancies. The lower risk has also been attributed to smoother trophoblastic invasion after modification of maternal spiral arteries during the first pregnancy.²

Keywords: Pregnancy induced hypertension, Self-care management, HELLP and eclampsia. · Prathima P.
Ten million women develop preeclampsia each year around the world. Worldwide about 76,000 pregnant women die each year from preeclampsia and related hypertensive disorders. And, the number of babies who die from these disorders is thought to be on the order of 500,000 per annum.\(^3\)

In developing countries, a woman is seven times as likely to develop preeclampsia as a woman in a developed country. From 10-25% of these cases will result in maternal death.\(^4\)

Preeclampsia should be detected and appropriately managed before the onset of convulsions (eclampsia) and other life-threatening complications.

Health maintenance is an important aspect of prenatal care. Participation of the mother in the care ensures the prompt reporting of the possible problems. Prenatal care is one of the models of primary and secondary prevention of disease. In order to reduce the increasing maternal mortality rates, women with hypertensive disorders in pregnancy should be inform of their disease and satisfactory medical information should be provided by their health care providers.\(^5\)

As a result of inadequate knowledge, negative attitude and lack of preventive practice will increases the incidences of complicating pregnancy with pregnancy induced hypertension. Maternal death could be prevented if women well able to have adequate knowledge and positive attitude towards attending antenatal clinic, utilize good health service and by following preventive practices. This study was aimed to compare the knowledge on self-care management of pregnancy induced hypertension between primi gravida and multi gravida mothers.

Objectives:
1. To assess the knowledge level on self-care management of Pregnancy Induced hypertension among primi gravida mothers.
2. To assess the knowledge level on self-care management of Pregnancy Induced hypertension among Multi gravida mothers.
3. To compare the knowledge level on self-care management of Pregnancy Induced hypertension between primi gravida mothers and multi gravid mothers.
4. To find out association between selected demographic variables and knowledge level on self-care management of pregnancy induced hypertension.

Materials and methods:
To achieve the objectives a descriptive comparative design was adopted. The population of the study included antenatal mothers in a hospital. Thus 80 mothers were selected using purposive sampling technique. Samples were 40 primigravida mothers and 40 multigravida mothers. This study was conducted in St. Mary hospital Bangalore.

A structured self-administered questionnaire was used to collect data. It consisted of two parts. Part –I was used to collect demographic data of pregnant women which includes age, education, religion, occupation, income and parity. Part- II that was aimed at assessing the knowledge on self-care management of Pregnancy Induced Hypertension. The questionnaire has 34 items which includes definition, risk factors, Signs and symptoms, preventive measures and complication. The knowledge level were classified based on the score obtained as inadequate (< 40%), moderately adequate (41 to 75%), Adequate (> 76%).

The prepared tool was validated by experts. The reliability of the tool was found. Stability of the tool was checked by using test and retest method (r=0.90), about reliability internal consistency was assessed through cronbach’s alpha (r= 0.73). After obtaining permission from the hospital, the study was conducted. Data was collected through self-administered questionnaire.

Pregnant women who fulfill inclusion and exclusion criteria were selected. Purpose of the study was explained and oral consent was obtained from each participant and they were assured that study is only for academic purpose, information obtained from them will be kept confidential. The questionnaire was administered individually. The
instructions were given in the beginning of the administration of the questionnaire. All the questions in the questionnaire are self-explanatory and multiple choice questions. Participants were requested to read the questions carefully to provide the information as best of their knowledge, on an average each participant took 40 - 45 minutes to complete the questionnaire.

Analysis and Results:

I: Description of demographic characteristics
In the present study it was found that 55% (22) of primigravida mothers and 62.5% (25) of multigravida mothers were in the age group of 21-25 years, 30% (13) of primigravida mothers educated up to UG, 32.5% (13) of multigravida mothers were educated upto PUC, majority of the mothers were in Hindu religion 72.5% (29) and 62.5 % (25) respectively from Primigravida and multigravida mothers. About their family monthly income 42.5% (17) of primigravida mothers income upto 15,000/- and 30 % (12) of multigravida mothers income upto 10,000, and 82.5% (33) and 90% (36) respectively from primigravida and multigravida mothers were homemakers.

II. Level of knowledge:
Knowledge level of primigravida and multigravida mothers: knowledge level on self-care management of PIH was 55% of primigravida mothers were showing inadequate whereas in multi gravid mothers 40% were in the category of inadequate knowledge. Majority of them from multigravida mothers were coming under moderately adequate knowledge (55%), in primi gravid mothers 42.5% were in this category. From both the group only 2.5% and 5% were showing adequate knowledge respectively from primi gravida and multi gravid mothers.

III. Comparison of knowledge level
In the present primi gravida mothers were demonstrating lesser knowledge in all the aspects. (Fig 3 and Table 1).

Independent t-test was computed to find out significant difference between the groups which was tested at 0.05 level, calculated value was 0.1044 which is lesser than table value i.e 2 hence it is accepted that there is no significant difference between the groups.

IV. Association between knowledge level and selected demographic variable.
The chi-square value calculated for age is 3.76 which is more than table value that is 3.36 and for monthly income calculated value was 4.16 which is more than table value that is 3.36 hence it is significant. Which means there is significant association between the level of knowledge on self-care management and age and Monthly income.

<table>
<thead>
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<th>S.no</th>
<th>Mean</th>
<th>Std</th>
<th>Primi</th>
<th>Multi</th>
<th>Df</th>
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<td>13</td>
<td>14.5</td>
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<td>0.1044</td>
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Table 1: Shows comparison of mean scores between Primigravida and Multigravida mothers.

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<tr>
<th>S.no</th>
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<th>Below Median</th>
<th>Above Median</th>
<th>Total</th>
<th>Df</th>
<th>Chi-square value</th>
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<tr>
<td></td>
<td>&lt;20</td>
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<td>1</td>
<td>2</td>
<td>4</td>
<td>3.76</td>
<td>3.36 $</td>
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<tr>
<td></td>
<td>21-25</td>
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<td>31-35</td>
<td>2</td>
<td>3</td>
<td>5</td>
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<tr>
<td></td>
<td>36-40</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
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<td>31</td>
<td>80</td>
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<tr>
<td>2</td>
<td>Income</td>
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<td>80</td>
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</table>

Table 2: Association between knowledge level and demographic variables.
Fig. 1 Pie diagram of knowledge level among Primigravida mothers.

Fig. 2 Pie diagram of knowledge level among Multigravida mothers.

Fig. 3 Bar Graph shows Area Wise comparison of knowledge on self care management between primi and Multigravida mothers.

Discussion:
Approximately 800 women die from pregnancy or childbirth-related complications around the world every day. Ninety-nine percent occur in developing countries. The higher number of maternal deaths in some areas of the world reflects inequities in access to health services. The complications that account for 80% of all maternal deaths are severe bleeding (mostly bleeding after childbirth), infections (usually after childbirth), high blood pressure during pregnancy (preeclampsia and eclampsia), and unsafe abortion. The remaining 20% are associated with diseases such as malaria and AIDS during pregnancy.

Maternal health and newborn health are closely linked. More than three million newborn babies die every year, and an additional 2.6 million babies are stillborn.

In present study 55% of primigravida mothers and 40% of multigravid mothers had inadequate knowledge. Only 2.5% of primigravida and 5% of multigravida mothers had adequate knowledge. 31.8% and 38.6% of primigravida mothers, 35% and 44.7% of multigravida mothers were aware about signs & symptoms and preventive measures respectively. Which shows they were less aware about pregnancy induced hypertension from both the group.

In Kerala, a study conducted on self-care activity of pregnancy induced hypertension and maternal outcome which revealed that 95% of pregnant women from both the experimental and control group had inadequate knowledge. Experimental group showed increased in knowledge score after teaching programme.

Another study conducted to assess the level of knowledge of antenatal mother regarding prevention of pregnancy induced hypertension. The research design used for the study was Non-Experimental design. Purposive sampling technique was used to select 30 antenatal mothers for the study. The tool used for the study was structured interview schedule. The data gathered were analysed by using descriptive statistics. Findings shows that among 30 adults 0(0%) were having adequate knowledge, 3(10%) were having moderately adequate knowledge and 27(90%) were having inadequate knowledge.

This study and as well as other studies cited shows that there is a necessity to provide information for those specific at risk population. Nurses have more responsibility...
on creating knowledge among antenatal mothers by facilitating distribution of booklets, hand-outs, charts, regularly to all out patient department of hospitals health clinics in rural and urban and they can conduct workshops and camps regarding pregnancy induced hypertension in hospital setup in order to create awareness.

Conclusion:
Most of the complications, related to pregnancy induced hypertension are occurring due to maternal negligence or unawareness on the disease and its management. Self-care offers a real potential for improving their health status, and thus to prevent the severe form of PIH at a deteriorating health cost. Self-care would be the most effective and appropriate approach to enhance both maternal and foetal wellbeing, as well as the successful outcome of pregnancy.

References:
A CLINICAL STUDY OF INCIDENCE AND DISTRIBUTION AND CO- RELATING FACTORS OF CLEFT LIP AND CLEFT PALATE AMONG KARNATAKA & KERALA POPULATION

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Abstract:
The aim of this prospective study is to determine the incidences of cleft lip and palate in Karnataka & Kerala population. It also highlights a part of embryological aspect and theories that help to correlate and understand the incidence of the congenital anomaly. This prospective study were conducted in 1000 patients having cleft lip and palate deformities and classified, incidences and types of patterns of occurrences were statistically analysed. It was observed that incidences of Cleft lip and palate is more common in males were 51.9% and that of Cleft palate is more prevalent in females were 48.1%.

Keywords: Teratogenic drugs, Clefting, Congenital, Philtrum.

Introduction:
Cleft of upper lip and palate are most common major congenital craniofacial abnormality noted 1 in 700 births. Although inheritance may play a role, cleft lip and palate is not considered a single gene disease but are multifactorial etiology with potential contributing factors, including chemical exposures, radiation, maternal hypoxia, teratogenic drugs, nutritional deficiencies especially folic acid, physical obstruction or genetic influences. One prevailing theory states the process of clefting as threshold in which multiple etiological factors come together to raise individual above which the mechanism of fusion fails.1

The orofacial clefts are the congenital deformities, which manifest at birth. Any disturbance during the embryological formation and development and growth of oro facial region will result in the formation of orofacial clefts. No evident statistical analysis in terms of figures regard to incidence of cleft lip and cleft palate in India among South Indian population are available, however international figures are available. As analysed by Fogh and Anderson 1942(Denmark) cited 1:655 frequency R.H. Ivy (1963) from the state of Pennsylvania, USA quoted the incidence of cleft occurrence to be 1:760.1

In India survey conducted by Vellore reported the incidence of cleft lip and cleft palate in the regional population as 1:639. It is now well accepted, that in cases prealveolar clefts, unilateral clefts (75%) are more common than the bilateral clefts (25%). In cases with unilateral prealveolar clefts, left sided cleft is more common than the right side. About 3 to 5% of cleft lip and palates may be associated with congenital deformities of the other parts of the body. 50% of deformities are combined clefts of the lip and palate. About 25% are bilateral ones.

The purpose of study is to evaluate the incidences and occurrences and patterns of distribution of cleft lip and palate cases. This prospective study comprises of 1000 cases randomly taken from Karnataka and Kerala population and categorized to standard classification1, there by determining the anatomical location specification.
and percentage of occurrences of cleft lip and palate among subjects.

**Embryology:**
In the development of cleft lip and palate, intercontact and fusion between maxillary processes and median nasal process is normal. The critical problem is failure of LNP to make contact with MNP. The initial MXP-MNP fusion remains intact in the early stages of cleft, but in 90% it ruptures later. Clefts of the secondary palate is due to failure of palatine shelves to fuse together. Medial Nasal Process forms the middle portion of nose, the middle portion of upper lip called philtrum, middle portion of premaxilla carries four incisors and the entire primary palate. Lateral Nasal Process forms the ala of nose. Premaxillary segment is continuous with nasal septum formed by frontal prominences. Thus maxillary process – MXP + MNP >> upper lip, 2MNP’S + 2 MXP’S >> cheek, maxilla, zygoma and secondary palate.

**Two theories:**
1. Theory of Dursy-His (1931 San Francisco):- put forward the hypothesis of failure of fusion of various facial processes. In fact it sounded a very convincing theory to explain the formation of various degrees of unilateral and bilateral clefts and even the rare midline upper and lower clefts. This explained the presence of Simonart’s band in an incomplete cleft lip. The term process implies finger like projections of tissue and fusion imples that the projections meet, their epithelial walls disappear and then they grow together. It has now been proved that this is not the case. It is realized that it is not a question of processes but of localized prominence.

2. Theory of failure of mesodermal migration:- Fleischmann, a zoology professor (Germany 1910). stated that cleft palate is the arrest of the disappearance of epithelial membrane which remains intact not penetrated by the adjacent mesoderm. This theory was further endorsed by Victor Veau (1935) and supported by Stark (1954). Mesodermal theory proposes that as the oral and nasal cavities deepen, there is an increase in the sizes of facial prominences due to the penetration of mesoderm. As more mesoderm enters the area, the bulging increases so that what was used to be a wall of tissue with ectoderm on one side and endoderm on the other side is transformed into prominences and grooves depending on the amount of mesoderm between the two epithelial layers. Failure of sufficient mesoderm to migrate into a specific area is responsible for the persistence of a groove. With consequent epithelial breakdown the persistent groove gives way to an established cleft. This the most accepted theory.

**Aim of study:**
To determine the incidences and distribution in regional population having cleft lip and cleft palate.

**Materials and Methods:**
Population data for incidences of clefts were assembled from Dept. Oral and Maxillofacial Surgery, A.B. Shetty Memorial Institute of Dental Sciences, Deralakatte-Mangalore. The collected data were categorized into three groups - cleft lip, cleft lip and palate, cleft palate alone. Also they were sub classified as unilateral/bilateral/left/right/complete/incomplete from South Indian Population from Karnataka & Kerala State. Over all sample size selected was One thousand (1000), of these males were 51.9%, females 48.1%.

Chi-Square test was applied to evaluate the goodness of fit of the observed data to expected data of occurrences and the results are given in table 1

<table>
<thead>
<tr>
<th>Table : 1</th>
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<tbody>
<tr>
<td><strong>Unilateral</strong></td>
</tr>
<tr>
<td><strong>Cleft Lip and Palate</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Right</td>
</tr>
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<td>Cleft Lip</td>
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<tr>
<td>Female</td>
</tr>
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<tr>
<td>P value</td>
</tr>
</tbody>
</table>

**Keywords** : Teratogenic drugs, Clefting, Congenital, Philtrum. - Soumi Samuel
Results:

1. Among 1000 patients surveyed 291 patients constituted cleft lip constituted 29.1% cases. Out of which unilateral cases accounted for 24.3% and bilateral 4.8 %. In this study we further categorized into Site prevalences and sex prevalences. Cleft lip among males unilateral complete right side more than females constituting 4.8% and 4.6 %patients respectively. Bilateral cases accounted for 48 cases with males being 2.5 %and females 1.9% subjects.

2. Cleft lip and palate accounted for 53.1% out of 1000 subjects. Unilateral complete cases accounted maximum number of patients of 38% out of which the right side 9.8% subjects and left side prevalence's was more accounting 282 subjects. Incomplete cases right side were 0.2% and left were 1.9 % of subjects. In this study bilateral cases were total of 112 we further categorized as complete and incomplete accounting for 10.2% and 1% respectively.

3. Cleft palate accounts a total of 17.8% ,complete cases constituted of 172 of which males were noted to be 8.7% and females 8.5 %further analysis revealed that complete cleft palate cases were more in number and incomplete palate cases constituted 6 subjects of which males were noted to be 1 and females were noted to be 5 . As per the literature survey incomplete cleft palate cases is a rare entity.

From the above analysis depicting the incidences of Cleft lip and palate is 15.4%.

From above analysis it can be inferred that the comparative incidences of cleft lip and palate cases accounts over all 15.4% cases of which males unilateral cleft lip was noted to be 12.7%, CLP – 20.8% , CP – 8.8%, B/L, CL – 2.8% , CLP – 5.9%

Female population analysis revealed that unilateral cleft lip constituted 11.6%, cleft lip and palate – 20.2% cleft palate – 9% that of bilateral cases constituted cleft lip 2% and cleft lip and palate only 5.3%.
Discussion:
The above mentioned study indicates that the more frequent occurrences of cleft lip and palate cases affects more of male subjects 51.9% than females 48.1%. Cleft lip deformity is more common in males whereas cleft palate deformity is more common in females among Karnataka and Kerala population being 29.1% out of 1000 subjects unilateral cases accounting for 24.3%, bilateral cases 4.8% from above study indicates that unilateral cleft lip cases accounting of 4.8% in males than in females. Cleft lip and palate accounts for 53.1% cases out of 1000 subject’s unilateral occurrences noted on right side is more 3.8% compared to left side 9.8%. Incomplete cleft lip and palate cases accounted least number of 0.2% to 1.9%. Cleft palate were total represented 17.8% of 1000 subjects with males constituting 8.7% females 8.5% it revealed not much differences noted in occurrence of cleft palate among males and female subjects.

Acknowledgements:
Dr. Vikram Shetty – Director – Department of Craniofacial Surgery – Nitte Meenakshi Institute, K. S. Hegde Medical Academy, Nitte University.

Conclusion:
The occurrences of cleft lip and cleft palate continue to plague mankind. A precise identification of factor is difficult owing to its multifactorial etiologies. In view of above study it can be deduced that different types of cleft anomalies and its locations can occur in subjects irrespective of sex in varied anatomical locations. Each type of cleft anomaly has its own unique clinical characteristic feature that the clinician should distinguish and modify treatment plan accordingly. Although treatment for a cleft lip and cleft palate may extend over several years and require several phases of surgical treatments depending upon the involvement, most subjects affected by this condition can achieve normal appearance, speech and function thereby reducing social and psychological stigmata for these subjects.

References:
5. JC Murray – Clinical Genetics, Gene and environmental causes of cleft lip and palate.Wiley Online Library -2002
Introduction:
The incidence of articular cartilage damage has grown due to greater physical activity in all age groups. Unfortunately, articular cartilage lesions, with their limited inherent healing potential, are hard to treat.

A variety of agents, such as non-steroidal anti-inflammatory drugs, chondroitin sulphate, hyaluronic acid and glucocorticoids have been proposed as non-invasive solutions for pain treatment, improvement in function and disability, and ultimate modification of severe chondral degeneration and osteoarthritis with varying success rates.

Current research is investigating new methods for stimulating repair or replacing damaged cartilage, such as matrix metalloproteinase inhibitor, gene therapy, cytokine inhibitor, artificial cartilage substitute and growth factors.

Autologous Concentrated Platelets is a natural concentrate of growth factors from blood. It is observed that these preparations have bone forming properties as well as anti-inflammatory and antibacterial properties.

Platelets aside from their role in coagulation and hemostasis, they contain α-granules with various molecules which are secreted upon their activation. These molecules are growth factors (Platelet derived growth factor, transforming growth factor β, vascular endothelial growth factor), endostatins, platelet factor 4, angiopoietins and thrombospondin 1. All of these are involved in healing processes.

Keywords: PRP-Articular Cartilage-Temporomandibular Joint-Intra Articular Injections.
Moreover, platelets have been identified to have analgesic properties by releasing protease activated receptor 4 peptides

The aim of the pilot study was to evaluate the safety of our protocol, by assessing the number, timing, severity, duration and resolution of adverse effects.

The second aim of this study was to analyse the short term results obtained, to determine feasibility, indication criteria, and application modalities for further wider studies.

The study was done to evaluate efficacy of autologous concentrated platelets in treatment of degenerative disease of temporomandibular joint with respect to pain, mouth opening and mastication.

**Materials and Methodology:**
The first step of the procedure involves withdrawal of 10ml of patient venous blood in a vaccutainer containing sodium citrate.

Platelet count is also done at the time of initial blood draw to ensure the counts are within normal limits.

Patients with any platelet disorder, who have taken NSAIDS in past one week, or who have undergone corticosteroid injection intra-articular in last two months were not included in the study.

After blood withdrawal, it is transferred into a centrifuge tube under sterile aseptic condition.

After which PRP (Platelet Rich Plasma) is prepared from whole blood by double centrifugation cycle.

The first cycle involves centrifugation of whole blood at 1800 rpm for 15 minutes to separate erythrocytes.

After centrifugation, the blood is separated into 3 layers, the lowermost is red layer containing erythrocytes, and middle layer is white containing leucocytes and inflammatory cytokines. The topmost layer is yellow made up of plasma, platelets and growth factors.

The topmost layer is transferred into another centrifuge tube, while the lower two layers are discarded.

Now the topmost layer in another tube is centrifuged at 3500rpm for 10 minutes to concentrate platelets.

At the end of the procedure 2 ml of concentrated PRP is obtained.

Now before injecting PRP, 10% of CaCl₂ (Ca²⁺ = 0.22mEq×dose) is added to PRP unit for activation of the platelets.

**Treatment Procedure and Follow Up**
The prepared platelet concentrate was injected into the upper joint space according to McCains protocol of performing arthroscopy, but only the posterior point was used to enter the joint space and pump PRP.

A line is drawn from middle of the tragus to the outer canthus. The posterior entrance point is located along the canthotragal line, 10 mm from the middle of the tragus and 2 mm below the line.

First the zygomatic arch is palpated and the mandibular condyle is forced into anterior position by the assistant and the preauricular concavity is formed at the marking point of the injection.

Following these 2 ml of PRP is injected into the superior joint space, with the needle being aimed medially and slightly antero superiorly until the contact with glenoid fossa is achieved.

After this PRP is injected into the joint space and the needle is withdrawn.

At the end of the procedure, the patient was asked to open and close the mouth several times for a minute to ensure equal distribution of PRP before it converts into gel.

After the injection the patient was sent home with the advice to continue on oral soft diet for next 3 days and gradually resume to normal diet after 3 days.

All the post-operative complications and adverse effects where recorded.
These patients where recalled for follow up at 2, 4 and 6 months after the procedure was carried out.

Results:
No major adverse events related to injections were observed during treatment and follow-up period. Patients presented with mild pain and swelling at the site of the injection for one week after injection which resolved by itself within a period of week without any intervention. There were no sign of infection or restriction of the joint movement.

There was significant improvement in function of joint, as well as mouth opening and reduction of pain on opening the mouth over a period of two months and the results obtained remained stable over four and six months.

The improvement of scores were better in younger patient compared to that of older age group, these could be attributed to the better healing capacity of younger patients and patient of older age group presented with a more severe degenerative disease compared to the younger patients.

Discussion:
The most important finding of the present study was to investigate this novel biological approach for treatment of degenerative temporomandibular joint. In recent years, there has been an increasing prevalence of use of autologous blood products that might provide cellular and humoral mediators to favour tissue healing in a variety of applications. The rationale is based on the activity of blood growth factors. The growth factors are diverse group of polypeptides that have important role in regulation of growth and tissue development, determination of behaviour of cells, including chondrocytes. The understanding of their effects on chondrocytes is rapidly progressing and many growth factors have been identified as aiding in regulation of articular cartilage. Most of the studies include the transforming growth factor-beta super family (TGF-ß), platelet-derived growth factor (PDGF), insulin like growth factor (IGF), fibroblast growth factor (FGF), and hepatocyte growth factor (HGF).

In particular, TGF-ß is one of the most important factor involved in the process of cartilage regeneration; its function includes increased chondrocyte phenotype.
expression.\textsuperscript{[20,21]} the chondrocyte differentiation of mesenchymal stem cells\textsuperscript{[17, 22]} matrix deposition\textsuperscript{[1]} and counteract with most of the suppressive effects of inflammatory mediators IL 1 on cartilage specific macromolecules synthesis\textsuperscript{[20]}. PDGF also plays an important role in the maintenance of hyaline like chondrogenic phenotype, increases chondrocyte proliferation, upregulation of proteoglycan synthesis, and is a potent chemotactic factor for all cells of mesenchymal origin\textsuperscript{[23]}. IGF is another important cartilage anabolic factor\textsuperscript{[19]} and it has an important role in augmenting the effects of other growth factors found in cartilage.\textsuperscript{[7, 19]} Many other growth factors are involved in cartilage regeneration and metabolism, like FDG and HGF, and they may have chondroinductive actions, independently or more so with additive effects and synergistic interaction.\textsuperscript{[19]} PRP is a blood product that allows in a simple, low cost, and minimally invasive way to obtain a concentration of many of these growth factors\textsuperscript{[11, 12]}, \textsuperscript{[11, 12]}. Platelets contain storage pools of growth factors including PDGF, TGF \( \beta \), IGF-1, FGF and many others. Cytokines, chemokines, and newly synthesised metabolites are also released.\textsuperscript{[25]} PRP derived from centrifugation of blood have platelet concentration four to five time higher than normal blood concentration. The platelet concentrate is activated by addition of calcium chloride, and this results in formation of platelet gel provides an adhesive support that can confine secretion to a chosen site.\textsuperscript{[15]}

Blood derived growth factors have already been studied for their potential in helping cartilage repair and documented in literature. Frisbie\textsuperscript{[24]} administered autologous concentrated in horses with experimentally induced osteoarthritis, obtaining significant clinical improvement in lameness, decreased synovial membrane hyperplasia, less gross cartilage fibrillation, and synovial membrane hemorrhage and increased synovial fluid concentration of interleukin 1 receptor antagonist. Graissamaier\textsuperscript{[27]} investigated the effect of human platelet supernatant on chondrocyte proliferation and differentiation and concluded the addition may accelerate chondrocyte expansion, even though it can also lead to their dedifferentiation. Saito\textsuperscript{[28]} documented preventive effects against osteoarthritis progression with administration of gelatine hydrogel microspheres containing PRP in rabbit model. PRP has also been used as an injectable scaffold for tissue engineering.

These studies and others suggest an important role these biological regulators of chondrocyte on cartilage repair. However for the time being, the evidence base for the use of PRP is in infancy and there are very few paper that address these treatment.

The primary objective of our study was to evaluate the safety of our protocol, by gathering and assessing the number, timing, severity, duration and resolution of the related adverse effects.

No complication such as infection, marked muscle atrophy, fever, hematoma, tissue hypertrophy, adhesion formation or other major events occurred in the subjects. Only minor complication like pain and swelling at the site of injection which was present for a period of week and resolved by itself without any active intervention.

The second aim of the study was to evaluate the effectiveness of PRP in treatment of TMJ disorders with respect to pain, mastication, clicking and interincisal mouth opening. Results showed significant improvement in all the score and the results obtained remained stable over a period of 2-6 months of follow up. Promising results were obtained about safety, feasibility, and short term effectiveness of the treatment protocol.

These reported document of our experience on use of autologous platelet rich plasma concentrate- derived growth factor injections in TMJ as a treatment of cartilage degeneration, represent a low invasive and safe alternative in patient with early stage osteoarthritis. The hypothesis behind the treatment is that PRP injections reduces the inflammatory and degenerative articular processes of the joint, leading to improved function of the joint.

Conclusion:
The preliminary short term results of our pilot study are
encouraging and indicate the treatment with autologous PRP intra articular injection is safe and is useful for treatment of early degenerative articular pathology of TMJ, aiming to reduce pain and improving function and quality of life. However further randomised controlled studies are required to confirm the real potential and to evaluate the durability of the procedure and to better identify the indication criteria.

Also further studies are required to confirm the adequate dosage of PRP and the frequency of the injections required to achieve long term results.

References:

Keywords: vaginal candidiasis, knowledge, pregnant women, awareness program - Malathi G. Nayak
AN INVITRO COMPARATIVE EVALUATION OF FRACTURE RESISTANCE OF ENDODONTICALLY TREATED TEETH OBTURATED WITH RESILON AND GUTTA-PERCHA

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Abstract:
Aim: To compare and evaluate in-vitro the fracture resistance of endodontically treated teeth obturated with resilon & epiphany sealer and gutta-percha using different sealers. Epoxy resin based sealer AH-plus and zinc oxide eugenol based sealer-TubliSeal (EWT).

Methodology: sixty four human single rooted maxillary anterior teeth, cleaned stored in 0.9% saline. All the teeth were decoronated to root length 14mm and bucco-lingual diameter of 5-7mm. After access openings teeth were instrumented using K3 .06 up to final apical size 30/.06 and randomly allocated into 4 experimental groups (n=16 per group). Group 1(Control group): teeth were instrumented but not obturated, Group 2: Resilon cones and epiphany SE-sealer. Group 3: gutta-percha cones and epoxy based sealer AH plus. Group 4: gutta-percha and Tubli seal EWT. Coronal seal was done using IRM cement. Each of the specimens were tested for fracture resistance by instron universal testing machine.

Results: Higher fracture resistance values were observed for group 2 (Resilon & Epiphany SE sealer) followed by group 3(Guttapercha & AH Plus sealer) and group 4(Guttapercha & TubliSeal EWT) when compared to group1 (control-instrumented but not obturated).

Conclusion: filling the root canals with contemporary polymer based root canal obturating system- Resilon increased the in vitro fracture resistance of endodontically treated teeth.

Keywords: Fracture resistance, resilon, gutta-percha.

Introduction:
Endodontically treated teeth are widely considered to be more susceptible to fracture than the vital teeth. The reasons most often reported have been the loss of structural integrity¹, loss of collagen cross-linking and water loss², dehydration of the dentine after endodontic therapy, removal of tooth structure during several endodontic procedures³, such as access cavity preparation, cleaning & shaping, root canal irrigation⁴, and excessive pressure during obturation⁵. It is commonly believed that the loss of dentine results in an increased susceptibility to fracture⁶.

Obturation of the root canal system is an important step for the success of endodontically treated teeth. Currently, there are a plethora of materials and condensation techniques available that must meet the basic requirements of obturation phase. Guttapercha with a root canal sealer has widely been used for years as a root canal filling material due to its biocompatibility, dimensional stability, thermoplasticity, and ease of removal. But, its limited ability to fill and seal the root canal system has been reported for the majority of root canal failures. However, despite of their limited ability to achieve an impervious seal along the dentinal walls of the root canal, it remains the material of choice against which the other obturating materials are compared⁷.

Root canal sealers should strongly adhere to dentine.
Increased adhesiveness to dentine may lead to greater strength of the restored teeth, which may provide greater resistance to tooth fracture and clinical longitivity of an endodontically treated tooth and therefore, decreasing the chances of endodontic failure.

Although few materials have seriously challenged gutta-percha and sealer in majority of filling situations, research continues to find alternatives that may seal better and mechanically reinforce compromised roots. Resin based sealers have been used for several years to take advantage of adhesion to the dentinal walls which results in less micro leakage and is considered to provide some strengthening effect to the teeth.

Resilon a synthetic polymer based obturating material broadens the dimensions of endodontic adhesion. This system consists of a combination of primer, dual cure sealer and resin obturating material and creates a monoblock filling. This is created by the adhesion of resilon cone to resin based sealer, which adheres to the dentinal wall and penetrates into dentinal tubules. Shipper et al called it as "Resilon Monoblock system" (RMS), which has the potential to strengthen the root canal walls against the fracture and decrease the micro leakage.

The purpose of this in-vitro study was to compare the fracture resistance of endodontically treated teeth obturated with Resilon & Epiphany SE sealer with that of conventional Guttapercha using different sealers Epoxy resin based sealer-AH Plus and Zinc oxide Eugenol based sealer-TubliSeal EWT.

**Methodology:**
Sixty four human single rooted maxillary anterior teeth recently extracted for periodontal reasons, root length of at least 14mm and bucco-lingual dimensions of 5-7mm confirmed with the help of digital Vernier callipers were used. Examined under 20x magnification under a microscope to rule out any cracks, caries, and fractures or craze lines and radiographed to determine the presence of a single canal were included for the present study. The teeth were cleaned off soft tissue, calculus and stains with the help of sharp hand scalers thoroughly washed and stored in 0.9% saline at room temperature until use.

All the teeth specimens were decoronated using a double sided diamond coated disc, so that the remaining root length was 14mm and the bucco-lingual diameter of 5-7mm. In all the 64 specimens access openings were prepared using #4 round bur and working length was determined by placing a No 10 K file (Mani) in to the root canal, until it was just visible at the apical foramen and then withdrawing it by 1 mm. The teeth were instrumented using K3 .06 (SybronEndo, USA) Ni-Ti rotary instrument system in an Anthogyr gear reduction hand piece (Dentsply) at 250 rpm using a gentle in and out motion, to final apical size 30/.06.

Copious root canal irrigation using 5ml of 3 % sodium hypochlorite solution using a syringe and 27 gauge needle was performed finally flushed with 5ml of 17% EDTA solution followed by 5ml of 3 % sodium hypochlorite solution in order to remove the smear layer for 1-2 minutes. This was followed by a final irrigation with 5ml of 0.9% Normal saline. Each of the root canal specimens were dried with sterile paper points.

All the 64 specimens were randomly allocated into 4 experimental groups (n=16 per group) as follows.

- **Group 1:** (Control group) teeth were instrumented but not obturated.
- **Group 2:** Obturation was done using resilon cones and epiphany SE sealer.
- **Group 3:** Obturation was done using gutta-percha and AH plus
- **Group 4:** Obturation was done using gutta-percha cones and tubli seal EWT.

In all the groups the specimens were obturated using lateral condensation technique, the sealers were mixed according to the manufacturer’s instructions and applied using lentulo spirals. Finally 1 mm coronal seal was done using IRM cement.

**Preparation for mechanical testing:**
An acrylic block was fabricated to allow for adequate
stabilization of the specimens during testing procedures. A 20x20x25 mm aluminium mould was used. Self curing acrylic resin was introduced in to the mould in dough stage and then root ends were embedded in to resin in a vertical plane and long axis of each root was vertically aligned using a protractor. Later on the acrylic blocks were polished and allowed to set at room temperature. IRM cement is removed using carbide bur and each of the specimens were tested for fracture resistance by Instron Uniniversal testing machine.

Each of the mounted specimens was placed on a metal base under the Instron universal testing machine. A spherical tip of radius 2mm was used to apply a vertical loading force at a cross head speed of 1mm per minute until fracture occurred. Fracture resistance was defined as the point at which a sharp decline and instantaneous drop greater than 25% of the applied load was observed for each root and so the machine was adjusted to terminate the test when a 25% reduction of force applied was observed. At that time the maximum force to fracture the specimen was recorded.

The loads at which different root specimens fractured were recorded in Newton’s and the data was subjected to appropriate statistical analysis (table 1).

RESULTS:

Data were summarized as Mean ± SD. Considering this statistical situation a more detailed analysis One Way ANOVA test was done (table 2). Further this was substantiated with multiple comparisons through Post hoc Scheffe multiple comparison test (table 3). The following results were drawn from the study.

- Higher fracture resistance values were observed for group 2 (Resilon & Epiphany SE sealer) followed by group 3 (Gutta percha & AH Plus sealer) and group 4 (Gutta percha & TubliSeal EWT) when compared to group 1 (control-instrumented but not obturated).
- Significant difference between group 1 and group 2, Group 1 & group 3.
- However there was no significant difference between group 1 and group 4.
- Group 2 compared to group 1 and group 4 showed highly significant difference.
- Group 3 showed significant difference when compared to group 1 and group 4.
- No Statistically significant difference was observed between group 2 and group 3.
- Similarly no statistical difference was observed between group 1 and group 4.

Table 1: Descriptive statistics of the loads to fracture different specimens.

<table>
<thead>
<tr>
<th>Group</th>
<th>No.</th>
<th>Minimum Load</th>
<th>Maximum Load</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Std. Error of mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 Control</td>
<td>16</td>
<td>173.83</td>
<td>263.01</td>
<td>215.2975</td>
<td>22.74279</td>
<td>5.77497</td>
</tr>
<tr>
<td>Group 2 Resilon</td>
<td>16</td>
<td>344.67</td>
<td>447.95</td>
<td>399.5850</td>
<td>27.65964</td>
<td>6.66491</td>
</tr>
<tr>
<td>Group 3 AH Plus</td>
<td>16</td>
<td>346.12</td>
<td>434.78</td>
<td>378.8906</td>
<td>25.94616</td>
<td>6.48654</td>
</tr>
<tr>
<td>Group 4 TubliSeal EWT</td>
<td>16</td>
<td>193.58</td>
<td>284.75</td>
<td>224.7513</td>
<td>23.09989</td>
<td>5.68570</td>
</tr>
</tbody>
</table>

Table 2: One Way-ANOVA Analysis

<table>
<thead>
<tr>
<th>ANOVA Dependent Variable</th>
<th>Sum of squares</th>
<th>Degree of freedom</th>
<th>Mean squares</th>
<th>F value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>508933.5</td>
<td>3</td>
<td>69644.511</td>
<td>78.702</td>
<td>.000</td>
</tr>
<tr>
<td>Within groups</td>
<td>36521.686</td>
<td>60</td>
<td>608.695</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>545455.2</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F value ~ 278.702
ANOVA revealed very highly significant difference between the groups i.e., P<0.001.
Table 3: Post Hoc Scheffe multiple comparison tests for comparing the fracture loads of specimens of several test groups.

<table>
<thead>
<tr>
<th>(I) Type Of Material (groups)</th>
<th>(J) Type Of Material</th>
<th>Mean Diff. (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (Group 1)</td>
<td>Resilon</td>
<td>-184.28750*</td>
<td>8.72278</td>
<td>.000</td>
<td>-209.3785 -159.1965</td>
</tr>
<tr>
<td></td>
<td>AH Plus</td>
<td>-181.59313*</td>
<td>8.72278</td>
<td>.000</td>
<td>-206.6842 -156.5021</td>
</tr>
<tr>
<td></td>
<td>Tubliseal EWT</td>
<td>-4.5375</td>
<td>8.72278</td>
<td>.760</td>
<td>-15.6373 15.6373</td>
</tr>
<tr>
<td>Resilon (Group 2)</td>
<td>Control</td>
<td>184.28750*</td>
<td>8.72278</td>
<td>.000</td>
<td>159.1965 209.3785</td>
</tr>
<tr>
<td></td>
<td>AH Plus</td>
<td>2.69438</td>
<td>8.72278</td>
<td>.867</td>
<td>-22.3967 27.7854</td>
</tr>
<tr>
<td></td>
<td>Tubliseal EWT</td>
<td>174.83375*</td>
<td>8.72278</td>
<td>.000</td>
<td>149.7427 199.9248</td>
</tr>
<tr>
<td>AH Plus (Group 3)</td>
<td>Control</td>
<td>181.59313*</td>
<td>8.72278</td>
<td>.000</td>
<td>156.5021 206.6842</td>
</tr>
<tr>
<td></td>
<td>Resilon</td>
<td>-2.69438</td>
<td>8.72278</td>
<td>.867</td>
<td>-27.7854 22.3967</td>
</tr>
<tr>
<td></td>
<td>Tubliseal EWT</td>
<td>172.13938*</td>
<td>8.72278</td>
<td>.000</td>
<td>147.0483 197.2304</td>
</tr>
<tr>
<td>Tubliseal EWT (Group 4)</td>
<td>Control</td>
<td>9.45375</td>
<td>8.72278</td>
<td>.760</td>
<td>-15.6373 34.5448</td>
</tr>
<tr>
<td></td>
<td>Resilon</td>
<td>-174.83375*</td>
<td>8.72278</td>
<td>.000</td>
<td>-199.9248 149.7427</td>
</tr>
<tr>
<td></td>
<td>AH Plus</td>
<td>-172.13938*</td>
<td>8.72278</td>
<td>.000</td>
<td>-197.2304 -147.0483</td>
</tr>
</tbody>
</table>

*The mean difference is significant at the .05 level.
Dependent Variable (Force Newton)

Graph 1: Graphical representation of the mean load values to fracture roots.

Graph 2: Graphical representation of the mean standard deviation values to fracture resistance of the tooth decreases.\textsuperscript{3, 7} It has been reported that incidence of vertical root fractures is greater in root filled teeth than in the vital teeth.\textsuperscript{7, 9, 10, 11} Addition of wedging forces of the spreader during lateral condensation or excessive removal of dentin to facilitate pluggers for vertical condensation, enhance the potential for root fracture.\textsuperscript{12} Any material that can compensate for this weakening effect would be useful.\textsuperscript{1, 6}

The primary goal of endodontics is not only to treat the diseased pulp of a tooth, but also to increase the inherent strength of the remaining tooth structure. Resilon a synthetic polymer based obturating system has been claimed to be the most promising material as an alternative to guttapercha. Clinically, resilon appears similar to guttapercha and has the same handling characteristics, biocompatible, radio-opaque, dimensionally stable and

Discussion:

Root canal instrumentation is an essential stage in endodontic treatment. There is a perception that endodontic treatment weakens the tooth structure and predisposes teeth to fracture.\textsuperscript{2, 3, 4, 5, 6} Studies have suggested that as removal of tooth structure increases, fracture resistance of the tooth decreases.\textsuperscript{3, 7} It has been reported that incidence of vertical root fractures is greater in root filled teeth than in the vital teeth.\textsuperscript{7, 9, 10, 11} Addition of wedging forces of the spreader during lateral condensation or excessive removal of dentin to facilitate pluggers for vertical condensation, enhance the potential for root fracture.\textsuperscript{12} Any material that can compensate for this weakening effect would be useful.\textsuperscript{1, 6}

The primary goal of endodontics is not only to treat the diseased pulp of a tooth, but also to increase the inherent strength of the remaining tooth structure. Resilon a synthetic polymer based obturating system has been claimed to be the most promising material as an alternative to guttapercha. Clinically, resilon appears similar to guttapercha and has the same handling characteristics, biocompatible, radio-opaque, dimensionally stable and
has good flow properties, easily retrievable if needed, can be utilized in various obturation techniques such as lateral condensation, vertical condensation and thermoplastization techniques. It forms a superior seal to coronal & apical leakage when compared with gutta-percha techniques.

In the present study, root canal obturation was done by lateral condensation technique because it is a more widely recommended and a proven classic technique.

From the results of the present study, it was noticed that majority of the test specimens fractured in faciolingual directions which is in accordance to Lertchirakarn et al (2002).

The development of bonded obturating materials is in congruence with the efforts to provide a more effective seal apically as well as coronally. The adhesion between dental structures and resin based sealers is the result of a physicochemical interaction across the interface, allowing the union between filling material, sealer and root canal wall. Because the resin core, sealant and the dentinal wall all are "attached", it appears logical that they have the potential to strengthen the walls against fracture.

The fracture resistance of the specimens in group 1

References:

12. Epiphany soft resin Endodontic obturation system manufacturer’s instruction hand book. Pentron Clinical technologies LLC. Wallingford CT.

Keywords: Fracture resistance, resilon, gutta-percha.
CLINICAL EVALUATION OF CHEMO-MECHANICAL CARIES REMOVAL USING CARIE-CARE SYSTEM AMONG SCHOOL CHILDREN

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Abstract:
Dental caries is considered as one of the most serious dental diseases that results in localized dissolution and destruction of the calcified tooth tissues. As possible alternatives to conventional techniques of caries removal, chemo mechanical caries removal systems have emerged. AIM: To clinically observe the advantages of Chemo-mechanical method of caries removal over Conventional technique. MATERIALS AND METHODS: A total of 64 teeth of 32 children with class 1 open carious lesions were selected for the study from the school dental clinic after taking written consent. They were divided into two equal groups according to method of caries removal (32 chemomechanical and 32 conventional from both primary and permanent teeth respectively). In Group I, caries was removed using the carie-care system and in Group II, with the conventional drill and were restored equally with amalgam and ketac molar respectively. The restored teeth were followed up after 1 week, 1 month, 6 months and 1 year respectively for its clinical success. RESULTS: The results were subjected to statistical analysis using students paired t-test and chi-square tests. It showed that though Chemomechanical technique took a marginal increase in time compared to the conventional technique, it was found to be more comfortable for all the children. Amalgam restorations showed better retention compared to ketac molar restorations in both the techniques. CONCLUSION: Chemomechanical technique though time consuming is definitely superior compared to conventional technique in pediatric dentistry, provided we use a less technique sensitive restorative material which retains in the oral cavity for longer period of time. It is definitely a better treatment protocol in school based dental treatment compared to conventional technique.

Keywords: carie-care, caries, chemo-mechanical agent

Introduction:
Dental caries is considered as one of the most serious dental diseases that results in localized dissolution and destruction of the calcified tooth tissues. Neglecting the treatment of this disease, could also endanger the tooth pulp. However, caries treatment procedures are usually associated with unpleasant patients' sensation. Several approaches for removing and treating dental caries have been tried seeking for more comfort. Caries removal in decayed teeth has conventionally been performed using the mechanical cutting and drilling system. However, these methods have some major disadvantages. First, mechanical preparation often induces pain, and local anaesthesia is thus needed. Second, it is often difficult to establish how much tooth material should be removed, which often leads to overextended cavities. As possible alternatives to conventional techniques, chemo mechanical caries removal systems have emerged. It was introduced to dentistry as an alternative method of caries removal and is mainly indicated to overcome the inconvenience of using burs and local anaesthesia, hence causing less discomfort to patients and preserving healthy dental structure, there by complying the concept of the minimal invasive dentistry (MID). Caridex, carisolv are some of the chemomechanical organic caries removal agents. Latest material in this field being 'Carie-Care'
which is a gel based formulation containing a purified enzyme, derived from the plant Carica papaya (Papaya) has emerged which exhibits anti-bacterial and anti-inflammatory properties. It acts as a debris removing agent with no harmful effect on sound tissues because of the enzyme specific along with the benefits of Clove oil which is analgesic and antiseptic, was used for the noninvasive chemo-mechanical removal of dental caries in the present study. The study was conducted to do the comparative analysis of the advantages of Chemo-mechanical method of caries removal over Conventional technique in a school based programme where the conventional treatment facilities were not up to the mark.

Materials and Methods:
The study was conducted to evaluate clinically the efficiency of caries removal using a new chemo-mechanical agent (carie-care) compared to the conventional drilling method. This double blind study was done on a split mouth design. The study was carried out on children who were having two or more open asymptomatic carious lesions with intact dentine in the age group of 4-15 yrs. Informed consent was obtained from parents, guardians or teachers through the concerned authority to conduct the study. Children where only one cavity was present and children with pulparly involved teeth were excluded from the study. The study was performed on 64 class 1 primary and permanent open carious lesions (32 primary teeth and 32 permanent teeth). The children were randomly divided into two equal groups according to method of caries removal: group I and group II. Group I was further subdivided to group IA and group IB for primary teeth and permanent teeth respectively. Group II was further subdivided to group II A and group II B for primary and permanent teeth respectively. In Group I, caries was removed using the carie-care system and in Group II, caries was removed with the conventional drill. Time taken was noted. After the cavity preparation, the children were randomly divided into subgroup of eight children with bilateral cavities and were randomly restored with ketac molar and amalgam restorations. The follow up was done after 1 week, 1 month, six months and 1 year and the efficacy of the restoration was then assessed clinically.

Results:
The results were subjected to statistical analysis using students paired t-test and chi-square tests. Almost all patients found chemomechanical technique more pleasant and acceptable the average time taken for chemomechanical technique was 7 mins in primary teeth and 10.4 mins permanent teeth as in fig 1. The time taken for conventional technique was 4.9 mins in primary teeth and 7.5 mins in permanent teeth which was much lesser than the conventional technique which was statistically significant.

All the restored teeth was observed to be clinically intact and asymptomatic after 1 week. After 6 months, in Primary teeth, Amalgam showed the better retention with 100% success in conventional and was highly statistically significant and 88% success following chemomechanical technique. Ketac molar showed 38% success irrespective of the technique used which was much lower than amalgam restoration. After one year follow up, it was observed that some of the teeth had exfoliated and those that were present had the restorations intact.

Table 1: comparison of amalgam and ketac in each group separately

<table>
<thead>
<tr>
<th></th>
<th>primary/secondary</th>
<th>conventional/chemo</th>
<th>Value</th>
<th>Exact Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIMARY</td>
<td></td>
<td>CONVENTIONAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>Pearson Chi-Square</td>
<td>7.273</td>
<td>.026</td>
<td></td>
</tr>
<tr>
<td>PERMANENT</td>
<td></td>
<td>CHEMOMECHANICAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>Pearson Chi-Square</td>
<td>4.267</td>
<td>.119</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CONVENTIONAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>Pearson Chi-Square</td>
<td>5.333</td>
<td>.077</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHEMOMECHANICAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>Pearson Chi-Square</td>
<td>.410</td>
<td>1.000</td>
<td></td>
</tr>
</tbody>
</table>

Keywords: carie-care, caries, chemo-mechanical agent - Preethi V.C.
Table 2: Comparison of the conventional and chemomechanical groups in each category

<table>
<thead>
<tr>
<th>primary /secondary</th>
<th>amalgam/ketac</th>
<th>Value</th>
<th>Exact Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIMARY AMALGAM</td>
<td>Pearson Chi-Square 1.067</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N of Valid Cases 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KETAC</td>
<td>Pearson Chi-Square .000</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N of Valid Cases 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERMANENT AMALGAM</td>
<td>Pearson Chi-Square 2.286</td>
<td>.467</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N of Valid Cases 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KETAC</td>
<td>Pearson Chi-Square 2.618</td>
<td>.282</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N of Valid Cases 16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In Permanent teeth, amalgam showed 100% success in conventional technique and 75% success in chemomechanical technique. Ketac molar restorations showed 50% success in the conventional technique and 88% success in the chemomechanical technique. The same results were obtained after 1 year follow up also. However intact restorations were asymptomatic even after one month, six months. After one year follow up also the restorations were observed to be intact. Hence this proves that amalgam showed better retention compared to ketac molar restorations in both primary and permanent teeth and Ketac molar restorations were more successful in chemomechanical technique.

Graph 1 : Graph showing conventional preparation for amalgam versus ketac molar in primary teeth

Graph 2 : Graph showing chemomechanical preparation for amalgam versus ketac molar in primary teeth

Graph 3 : Graph showing conventional preparation for amalgam versus ketac molar in permanent teeth

Graph 4 : Graph showing chemomechanical preparation for amalgam versus ketac molar in permanent teeth

Discussion:
Fear and anxiety are known barriers to the receptivity of dental treatment and in detriment to oral health. In children, it is difficult to differentiate between fear and anxiety-originated behaviour problems the conventional drilling techniques are associated with discomfort, especially among children as was observed in the present study. In addition, it gets further triggered by factors like: a) local anesthesia, b) low and high speed rotary instruments, c) previous dental treatment.

The CMCR method is said to be ‘very efficient’ in soft caries
removal. In vitro studies have shown chemomechanically treated dentin to have more surface energy, greater affinity for adhesive material, and better bonding than conventionally treated dentin. Moreover, morphological studies have shown Carisolv treatment to consistently remove the carious lesion and open the dentinal tubules along with more irregular and rougher surface with modified smear layer. However in the present study, retention was poorer with adhesive material like ketac molar compared to amalgam following chemomechanical caries removal technique. It may be because of the technique sensitivity of ketac molar in a school based programme.

The time taken for chemomechanical technique in cavity preparation was found to be slightly higher than conventional drilling technique. This may be due to the multiple application of the Carie care for complete removal of caries. However the children were very comfortable compared to conventional technique.

Amalgam restorations showed better retention as compared to ketac molar restorations. They were found to be more retentive in conventional preparations than chemomechanical preparations. It may be due to the inability to comply with the retentive principles of cavity preparation for amalgam in chemomechanical preparation. Amalgam requires the cavity preparation principles like a) The parallelism or slight occlusal convergence of two or more opposing external walls, b) flat pulpal floor and 1/4th intercuspal distance provides the primary retention form. c) Undercuts and also due to larger surface area in the permanent teeth.

Ketac molar restorations were found to be dislodged equally in both the techniques in primary teeth. Ketac molar restorations require moisture proof environment during restoration for its better retention. It also fails particularly in approximal cavities where the cement is relatively unsupported. Because of the brittleness of glass ionomer cement, it require support of the surrounding tooth structure, therefore the performance is better in single-surface cavities compared to multi-surface cavities as was observed in the present study.

Conclusion:
Thus amalgam showed a better retention property in comparison with ketac molar in both the techniques. Hence chemomechanical technique though time consuming was found to be more comfortable and is definitely superior compared to conventional technique in pediatric dentistry, provided we use a lesser technique sensitive restoration which retains in the oral cavity for longer period of time.

References:
SALIVARY ELECTROLYTE AS A BIOMARKER IN CARIES ACTIVE
TYPE II DIABETES - A COMPARATIVE STUDY

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Abstract:
Background: Diabetes Mellitus and dental caries association has been determined successfully but the electrolyte imbalance responsible is still under investigation.

Aims: This study aims to evaluate the salivary electrolyte concentration in non-diabetic and diabetic patients with active dental caries.

Methods and Material: 60 diabetic individuals with active dental caries were selected fulfilling the inclusion criteria as the study group with equal number as controls. 5ml of saliva was collected from the patient, centrifuged and the supernatant obtained was subjected to subsequent analysis for Na⁺, K⁺ and Cl⁻ ions concentration in saliva.

Statistical analysis: The intergroup comparison correlating the salivary electrolyte concentration was done using student’s t’ test. A ‘p’ value of 0.05 or less was considered significant. Results are presented as mean ± standard deviation (X ± SD).

Results: The mean value of sodium, potassium and chloride ions in diabetic patients was 0.97± 0.14, 10.40±0.9 and 135.4±3.67 respectively (p<0.05). However, in non-diabetics it was 0.23±0.07, 6.87±1.86 and 96.24±4.85 respectively (p<0.05).

Conclusions: From our study it is evident that salivary levels of electrolytes show a positive relationship between diabetics and non-diabetics with active dental caries. However, a longitudinal data might help in better understanding of this association.

Keywords: Diabetes mellitus, sodium, chloride, potassium, electrolytes, active dental caries

Introduction:
Diabetes mellitus is the most routinely encountered disease among the various systemic diseases¹. Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. There are three major types of diabetes: type 1 diabetes, type 2 diabetes, and gestational diabetes¹

Type II diabetes mellitus is characterized by high blood glucose in the context of insulin resistance and relative insulin deficiency. This is in contrast to diabetes mellitus type1, in which there is an absolute insulin deficiency due to destruction of islet cells in the pancreas. Type I diabetes accounts for 5-10% and Type II diabetes accounts for 90-95% while gestational diabetes occurs in about 2%–5% of all pregnancies and may improve or disappear after delivery¹. Gestational diabetes is fully treatable, but requires careful medical supervision throughout the pregnancy². The World Health Organization has estimated that in 1995, 19.4 million individuals were affected by diabetes in India and these numbers are expected to increase to 57.2 million by the year 2025 i.e. one sixth of the world total³. The revised figures are 80.9 million by the year 2030⁴.

Dental caries has been more prevalent and even severe in diabetic patients than non diabetics¹. Diabetic patients are prone to complications such as periodontal disease (gingivitis, periodontitis), dental caries, salivary
dysfunction, dry mouth (Xerostomia), oral mucosal diseases, oral infections (candidiasis). Approximately 5% of all patients seen in dental clinics are reported to have diabetes.

Dental caries is a complex disease process that afflicts a large proportion of the world’s population, regardless of gender, age and ethnicity, although it does tend to affect more individuals with a low socioeconomic status to a greater extent. Caries is said to be a multifactorial disease. Different individuals of the same age, sex, race and geographic area sustaining on the similar diets under the same the living conditions accentuate the complexity of the caries problem.

Saliva plays an important role in maintaining the equilibrium of the oral ecosystem. Saliva is often referred to as the “mirror of the body” as it is the indicator of health not just in the oral cavity but also throughout the body. Whole saliva contains locally produced as well as serum-derived markers that have been found to be useful in the diagnosis of a variety of systemic disorders. Analysis of saliva can offer a cost-effective approach for the screening of large populations, and may represent an alternative for patients in whom blood drawing is difficult, or when compliance is a problem.

Various trace elements like sodium, magnesium, potassium, chloride, zinc etc., are present in our body fluids. These trace elements are also referred to as electrolytes since they carry electric charges. It is important to maintain the balance of electrolytes in our body. They are what our cells use to maintain voltage across their cell membranes and carry electrical impulses across themselves and to other cells.

A limited amount of study is undertaken on salivary electrolyte concentration in non-diabetic and diabetic patients. Considering this present study aims to evaluate the salivary electrolyte concentration in non-diabetic and diabetic patients with dental caries.

**Subjects and Methods:**
This study was approved by the Institutional Ethical Committee with Ethical Certificate number ABSM/EC/81/2011. 12,500 healthy adult patients coming to the OPD of Department of Conservative Dentistry and Endodontics, A.B. Shetty Memorial Institute of Dental Sciences under the age group of 25-50 years from December 2012-June 2013 were screened for active dental caries and out of which 60 patients who fulfilled the inclusion criteria with Fasting Blood Glucose >126 mg/dl were the study group and compared to 60 age and gender matched control group (non-diabetic) with a fasting blood glucose <125mg/dl. Hence, a total of 120 subjects with active dental caries were selected for the study. Their caries status was assessed according to World Health Organization “W.H.O recommendations 1997” to calculate dental caries index.

**Inclusion criteria**
- A known Type II Diabetic mellitus patient yielding positive results for fasting blood glucose (>126 mg/dl) under the age group of 25-50 years.
- Patients with active dental caries in DMFT index yielding decayed teeth > 10

**Exclusion Criteria**
- Patient with systemic condition other than diabetes.
- Patient under any reported Xerostomia, anti-psychotic, anti-cholinergic, anti-hypertensives, anti-secretogogues and thyroid medication
- Patients who have consumed alcohol or smoked in last 24 hours
- Pregnant women
- Patient on radiotherapy
- Patients with kidney malfunction or on dialysis.
- Patients taking any caries preventive regimen like fluoride tooth paste, fluoride rinses or NaF/calcium tablets.

**Calculation of DMFT**
The smooth and occlusal surfaces of teeth were cleaned with soft bristle brush, dried and examined. DMFT score was calculated.

**Collection saliva for salivary analysis**
Unstimulated whole saliva (Resting Saliva) from each
subject was expectorated, into sterile tubes, 2 hours after breakfast, after a single mouth rinse with 15 ml of distilled water to wash out exfoliated cells. 5ml of saliva was collected from the patient, centrifuged and the supernatant obtained was stored at 4° C for subsequent analysis.

Estimation of electrolytes in saliva

Na⁺, K⁺ and Cl⁻ were determined using Elyte 3 Kit (Crest Biosystems, India).

Estimation of sodium levels in saliva

Sodium is precipitated as a triple salt with magnesium and uranyl acetate. The excess of uranyl ions are reacted with ferrocyanide in an acidic medium to develop a brownish color. The intensity of the colour produced is inversely proportional to the concentration of sodium in the sample.

Estimation of potassium levels in saliva

Potassium reacts with sodium tetraphenyl boron in a specifically prepared buffer to form a colloidal suspension. The amount of turbidity produced is directly proportional to the concentration of potassium in the sample.

Estimation of chloride levels in saliva

Chloride ions combine with free mercuric ions and release thiocyanate from mercuric thiocyanate. The thiocyanate released combines with the ferric ions to form a red brown ferric thiocyanate complex. Intensity of the colour formed is directly proportional to the amount of chloride present in the sample.

Statistical analysis:

Student ‘t’ test was used to correlate the salivary electrolyte concentration in non-diabetic and diabetic patients with active dental caries. A ‘p’ value of 0.05 or less was considered significant. Results are presented as mean ± standard deviation (X ± SD). Prism 3.0 software was used to analyse the data.

Table 1: Comparison of salivary sodium, potassium and chloride levels in non-diabetic and diabetic adults with dental caries

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Groups</th>
<th>Non-diabetic</th>
<th>Diabetic</th>
<th>‘P’ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium (mmol/L)</td>
<td></td>
<td>0.23±0.07</td>
<td>0.97±0.14</td>
<td>P&lt;0.0001</td>
</tr>
<tr>
<td>Potassium (mmol/L)</td>
<td></td>
<td>6.87±1.86</td>
<td>10.40±0.98</td>
<td>P&lt;0.0001</td>
</tr>
<tr>
<td>Chloride (mmol/L)</td>
<td></td>
<td>96.24±4.85</td>
<td>135.4±3.67</td>
<td>P&lt;0.0001</td>
</tr>
</tbody>
</table>

Results:

The concentration of sodium (Na⁺), potassium (K⁺) and chloride (Cl⁻) ions in saliva was higher in diabetic patients when compared to that of non-diabetic patients with active dental caries. (Table 1) The mean value of Na⁺ ions in saliva of non-diabetic patients was 0.23±0.07 and in
diabetic patients was found to be $0.97\pm0.14$. 'p' value is statistically significant ($p<0.05$) (Figure 1). The mean value of K$^+$ ions in saliva of non-diabetic patients was $6.87\pm1.86$ and in diabetic patients was found to be $10.40\pm0.98$. 'p' value is statistically significant ($p<0.05$) (Figure 2). The mean value of Cl$^-$ ions in saliva of non-diabetic patients was $96.24\pm4.85$ and in diabetic patients was found to be $135.4\pm3.67$. 'p' value is statistically significant ($p<0.05$) (Figure 3).

**Discussion:**
Saliva represents an increasingly useful auxiliary means of diagnosis.\(^{15}\) It is a body fluid with complex composition and specific roles. Human saliva is a unique secretion of major and minor salivary glands and helps in maintaining the normal physiologic functions of orobiological structures. Dawes et al stated the importance of accuracy in saliva measurements. Presence of circadian rhythm and fasting has been reported to influence salivary flow rate, which makes time-point of the test critical. Hence saliva was collected between 9:00am and 11:00 am.\(^{16}\) The oral hygiene status and periodontium status were checked before their enrollment into the study. The patients were referred to Department of Periodontics for scaling and curettage and recruited into the study only after the reversal of their periodontal condition.

The analysis of biochemical constituents in saliva is of great help in diagnosis of diseases in oral cavity and also in monitoring general health of an organism. Dodds et al studied to determine if there were any difference in parotid saliva output and composition related to caries activity in healthy individuals and concluded that caries activity is related to salivary electrolyte alterations, but not to protein composition.\(^{17}\) Various trace elements are present in biological substances or fluids in very minute amounts i.e., in microgram per gram or less in concentration. Saliva shows the presence of various types of trace elements and electrolytes.\(^{18}\)

The frequency of dental caries in diabetic patients is correlated to its risk factor potential based on the quality and quantity of saliva,\(^{19}\) which is in turn related to salivary gland function. Salivary gland hypofunction alters the salivary composition in terms of increased protein, increased or decreased electrolytes, which reflects the salivary flow rate and acinar and ductal function. A hypofunction of salivary gland poses one to increased risk of caries.\(^{19}\)

It has been reported that there is no statistically significant difference between diabetic and non-diabetic patients regarding dental caries prevalence.\(^{20}\) However some studies show increase caries risk in diabetics and yet other show a higher prevalence in diabetics than non-diabetics. This is probably due to lack of metabolic control, increase salivary glucose, crevicular fluid and decrease salivary flow.\(^{20}\)

Potassium is a vital electrolyte. Both high and low levels are already associated with various medical conditions, including hypertension, cardiac arrhythmias, osteoporosis and nephrolithiasis in diabetic individuals. An extensive study on this salivary factor in diabetics has not been conducted yet. However, there are fairly strong associations between low serum potassium and increased diabetes risk.\(^{21}\)

Chloride is the major ion found in the fluid outside of cells and in the blood. In our study an increased level of chloride ion levels have been found in diabetic individuals than in non-diabetic individuals which may be due to hyperchloremia, one of the complications involved in diabetes.\(^{22}\)

Saliva contains large quantities of potassium and bicarbonate ions. The concentrations of both sodium and chloride ions are several times less in saliva than in plasma. Sodium ions are actively reabsorbed from all the salivary ducts and potassium ions are actively secreted in exchange for the sodium. However, there is excess sodium reabsorption over potassium secretion, and this creates electrical negativity of about -70millivolts in the salivary ducts; this in turn causes chloride ions to be reabsorbed passively. Therefore, the chloride ion concentration in the salivary fluid falls to a very low level, matching the ductal decrease in sodium ion concentration.\(^{23}\)
In the present study it is seen that salivary electrolytes, sodium, potassium and chloride ion concentrations were significantly higher in diabetic patients with dental caries than in non-diabetic individuals with dental caries.

The mechanism behind the increased level of salivary electrolytes in our study is not fully understood and still necessitates extensive research. Some studies report a significant high level of potassium and chloride ions in caries active groups. Moreover, it is well established that diabetic patients have salivary gland hypofunction which makes them prone to decreased mucosal integrity and xerostomia, eventually categorized to high caries risk.

Sodium controls our body’s fluid volume and maintains our acid-base balance or pH, nerve conduction, the passage of nutrients into our cells and our blood pressure. The increased level of sodium as a salivary modulator in diabetics has not yet been extensively studied and still requires more research. However increased levels of sodium in blood of diabetic patients have been studied, owing its probability to alteration to acid-base balance and its consequences.

Conclusion:
Diabetes mellitus increases one’s susceptibility to dental caries. Hence it is of utmost importance that patients are well educated about their condition and associated risks. Our study is a cross sectional population based data, which gives an ensuing relationship between diabetes diagnosis and subsequent risk of dental caries. It is evident from the present study that a positive relationship exists between salivary electrolyte levels and diabetes mellitus and dental caries. However, a longitudinal data might help in better understanding of this association that may prove valuable for clinical practitioners in identifying individuals at high risk of sub-optimal oral health in diabetic population.

References:
Introduction: Osteoarthritis (OA) refers to the progressive deterioration and degeneration in the structure of articular cartilage leading to formation of new bone (osteophyte) at the margins of the bone of the joint. It is a progressively disabling disease of the joints that affects up to 50% of the population with neither a clear cause nor an effective treatment. Symptoms include joint pain, tenderness, stiffness, locking, and effusion. A variety of causes are attributed as risk factors such as hereditary or familial, developmental, metabolic, and mechanical which may initiate the process leading to loss of cartilage and degeneration. When bone surfaces are devoid of protection by cartilage, the subchondral bone is exposed and damaged. The naked nerve endings in the bone are irritated leading to pain, spasm, decreased range of movement of the joint. The muscles atrophy and ligaments show destruction leading to laxity or contractures. There are no diagnostic laboratory tests to predict or confirm the disease in the early stages and radiographic evidence of osteoarthritis often occurs late in the disease course, only after a significant loss of cartilage tissue.

Pain is the most important symptom of osteoarthritis and is the reason why individuals seek medical treatment. Pain not only contributes to functional limitations and reduced quality of life but is also the leading cause of impaired mobility in the elderly population. This fact led us to select this group as subjects. There may also be either loss of

Keywords: oxidative stress of the knee, Superoxide dismutase, Total antioxidant capacity

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Abstract:
Introduction: Osteoarthritis (OA) refers to progressive degeneration of articular cartilage with gradual painful disorganisation of the joint. Lipid peroxidation mediated by free radicals is the major mechanism of cell membrane destruction and cell damage. It is a known that there is an increased oxidative stress in OA and very little is known about the relation between the pain and decreased antioxidant levels. This study aimed at understanding the relation between the level of superoxide dismutase (SOD) and total antioxidant capacity (TAC) of synovial fluid in OA knee with the intensity of pain.

Materials and Methods: 30 patients with clinicoradiologically evidence of knee OA were included in the study and pain was scored using Visual Analog Scale. 1ml synovial fluid was aspirated from the knee and superoxide dismutase (SOD) and total antioxidant capacity (TAC) was estimated. Statistical analysis between the pain score and the SOD and the TAC was done independently by Spearman's rank correlation method and correlation coefficient was obtained.

Results: It was found that SOD and the TAC values were reduced in our subjects with mean value of 0.06477 ± 0.044814 and 122.51000 ± 50.764829 respectively. The mean value of pain was 6.70 ± 1.317. A significant correlation between SOD level and pain score (p<0.05) was obtained. However, the correlation between TAC level and pain score was not significant (p>0.05).

Conclusion: The study concluded that there is a positive correlation between the intensity of pain and SOD levels in the synovial fluid in OA of knee which is due to the increased free radicals produced.

Keywords: oxidative stress of the knee, Superoxide dismutase, Total antioxidant capacity
stability and sometimes stiffness. Pain is generally described as a sharp ache, or a burning sensation in the muscle group. Osteoarthritis can cause a crackling noise ("crepitus") when the affected joint is moved or touched, and patients may experience muscle spasm.

Pain in the subjects is measured using the visual analog scale. This study may contribute in analyzing the role of oxidative stress in the joint synovial fluid in relation to pain, so as to understand the role of supplementation of antioxidants in the management of osteoarthritis.

The body is constantly utilizing oxygen for a myriad of vital functions. A by-product of oxygen uptake by the body is the creation of chemicals known as free radicals. Lipid peroxidation mediated by free radicals called reactive oxygen species (ROS), is the major mechanism of cell membrane destruction and cell damage in OA. As important as the rate of production of ROS is the scavenging capacity of the system relative to the production of ROS by means of antioxidants. Antioxidants include superoxide dismutase (SOD), catalase, glutathione peroxidase, Vitamin A, beta-carotene, Vitamins C and E, selenium and melatonin. Some antioxidant supplements or drugs with antioxidant properties have been developed to reinforce the cellular antioxidant status. However, until now, there is no consistent evidence that additional antioxidant supply is efficient to relieve OA symptoms or to prevent structural changes in OA cartilage [2].

The superoxide anion O₂⁻ is the main ROS. Increased ROS production leads to tissue damage associated with inflammation. Superoxide dismutases (SODs) convert superoxide to hydrogen peroxide, which is then removed by glutathione peroxidase or catalase. Three distinct SODs are found in the human body: SOD1, or CuZnSOD, which localizes primarily to the cytosol, SOD2, or MnSOD, which is found in the mitochondria, and SOD3, or extracellular SOD (EC-SOD). EC-SOD is a secreted tetrameric glycoprotein with a positively charged heparin-binding region. It localizes to the ECM of tissues by binding to the negatively charged proteoglycans and collagen [4, 5]. In this location, it can protect the vulnerable proteins and macromolecules of the ECM from oxidant injury. This important antioxidant has been studied in the vascular, pulmonary, and neurologic systems, but not in cartilage or joints [3, 6, 7].

We postulated that EC-SOD may be one of the major antioxidants in the cartilage, and its deficiency would lead to oxidant damage in the matrix and clinical disease. We studied human knee joint fluid samples to test whether there is an association between the increased pain in OA and the decreased EC-SOD in the joint fluid. Synovial fluid was chosen to be the sample as it is directly produced by the joints, as it would be the most accurate indicator to estimate the oxidative stress seen in OA.

Previous studies by Krishna Mohan Surapaneni et al [3] showed a higher oxygen-free radical production, and a decrease in antioxidant level in osteoarthritis. Sutipornpalangkul W et al’s [9] work showed that oxidative stress may have a role in its pathogenesis of knee osteoarthritis and Vitamin E supplementation may have a role in the management. McAlindon TE et al [10] found that high intake of antioxidant micronutrients, especially vitamin C, may reduce the risk of cartilage loss and disease progression in OA.

However, little is known about the possible interaction between decreased antioxidant levels and the pain reported in OA. Thus, this study shall attempt to estimate the level of SOD and total antioxidant capacity in synovial fluid of osteoarthritis patients and compare it with the intensity of pain, thus trying to establish a relationship between the two. The study will also provide scope for further research in this topic and help in identifying the role of the supplementation of antioxidants in the regression of pain.

**Materials and Methods:**

1. 30 patients who visited the orthopedics outpatient department of the medical college with...
Clinicoradiological evidence of knee osteoarthritis over a period of two months were included in the study.

Ethical clearance was obtained from the institutional ethical committee for the conduct of study.

Informed written consent was obtained from the patient prior to recruitment into the study.

Visual analog scale was used for scoring the pain, this is a chart used to subjectively measure the intensity of knee pain. The visual analog scale of pain is a 100 mm-long horizontal line, which contains word descriptions at each end (e.g.: no pain and worst pain on either sides of the line). The patients represent their perception of the intensity of pain they feel by marking a horizontal line. The visual analog scale score is measured in millimeters from the left hand end of the line to the point indicated by the patient.

1 ml synovial fluid was aspirated from the knee under aseptic precautions was sent to the central research laboratory.

Superoxide dismutase was estimated from the synovial fluid of the patients using the phosphomolybdenum method. The quantitative assay is based on the conversion of Molybdenum(Mo VI) by reducing agents like antioxidants to molybdenum(Mo V), which further reacts with the phosphate under acidic pH resulting in the formation of a green colored complex, the intensity of which can be read spectrophotometrically at 695nm. The standard was prepared by taking 10mg of Vitamin C in a 10mL standard flask and making it up to the mark with distilled water. 100µL of 5%TCA is added to 100µL of the sample to precipitate out the proteins in the sample; the mixture is then allowed to stand for about five minutes and centrifuged. 1mL of TAC reagent is added to100µL of the clear supernatant and the mixture is then incubated in water bath at 90°C for 90 minutes. A blank is also maintained simultaneously by substituting 100µL of water instead of sample in the reaction mixture. Following the incubation the reaction mixture is cooled and the optical density of the greenish to bluish color formed is read at 695nm against blank. The total antioxidant capacity of the sample is calculated by plotting the optical density of the test against the standard graph. The total antioxidant capacity is expressed as µg/ ml. The data obtained was analyzed for statistical significance by spearman’s rank correlation method to obtain the correlation coefficient between SOD level and the pain score, and the total antioxidant capacity and the pain score separately. A p value < 0.05 was considered significant. Scatter diagram with line of regression was plotted.

A) INCLUSION CRITERIA:
Patients with clinicoradiological confirmation of knee osteoarthritis will be included in the study.

B) EXCLUSION CRITERIA:
- Patients with surgery around the same joint in the past.
- Patients with inflammatory joint diseases.
- Patients on steroids or long term medications.
- Patients with pain following trauma.
C) EXPERIMENTAL DESIGN:

- 30 Patients with knee osteoarthritis with radiological confirmation
- The intensity of the pain was measured using the visual analog scale.
- Synovial fluid (1ml) was drawn from the diseased joint under aseptic precautions.
- Level of SOD was estimated using the nitro blue tetrazolium chloride (NBT) reduction method.
- Total antioxidant capacity was estimated using the phosphomolybdenum method.
- The data obtained was analyzed for statistical significance using spearman’s rank correlation method to obtain the correlation coefficient between SOD level and the pain score, and the total antioxidant capacity and the pain score separately.

Results:

Statistics:

Statistical analysis was performed with Statistical Package for Social Science (SPSS) version 11.0 software package. The data obtained were analyzed for statistical significance using Spearman’s rank correlation method to obtain the correlation coefficient between SOD level and the pain score, and the total antioxidant capacity and the pain score separately.

Table 1: MEAN ± SD OF AGE, SOD, TAC AND PAIN SCORE OBTAINED IN THE STUDY GROUP

<table>
<thead>
<tr>
<th>VARIABLES (n=30)</th>
<th>AGE</th>
<th>SUPEROXIDE DISMUTASE LEVEL</th>
<th>TOTAL ANTIOXIDANT CAPACITY</th>
<th>PAIN SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ± SD</td>
<td>57.933 ± 8.485</td>
<td>0.06477 ± 0.044814</td>
<td>122.51000 ± 50.764829</td>
<td>6.70 ± 1.317</td>
</tr>
</tbody>
</table>

Table 2: Correlation of SOD and TAC levels in synovial fluid with pain score using spearman’s rank coefficient method

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>Spearman’s Rho (p)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUPEROXIDE DISMUTASE LEVEL Vs PAIN SCORE</td>
<td>-0.364</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>TOTAL ANTIOXIDANT CAPACITY Vs PAIN SCORE</td>
<td>- 0.185</td>
<td>&gt;0.05 (NS)*</td>
</tr>
</tbody>
</table>

Table 2 Shows the correlation of SOD levels and TAC levels in synovial fluid with pain in OA of knee using spearman’s rank coefficient method. There is a significant correlation between SOD level and pain score indicated by \( p=0.364(p <0.05) \). Also, there is little correlation between TAC level and pain score, which is not significant, indicated by \( p=0.185(p>0.05) \).
**SEX DISTRIBUTION SEEN IN OA OF KNEE**

![Sex Distribution Graph]

Figure 1: shows there was male predominance in our study.

**AGE DISTRIBUTION SEEN IN OA OF KNEE**

![Age Distribution Graph]

Figure 2: shows the presence of a direct relationship of OA with increasing age. Majority of the OA patients included in the study are above 50 years of age. The mean value for the age distribution is 57.933 ± 8.485.

**SOD LEVELS IN OA OF KNEE (U/mg protein) EXPRESSED GRAPHICALLY**

![SOD Levels Graph]

Figure 3: OA patients tend to have a decreased level of SOD in their synovial fluid, due to the increased oxidative stress. This is illustrated in Figure 3, which shows majority of patients having reduced SOD levels with mean SOD value of 0.06477 ± 0.044814.

**TOTAL ANTIOXIDANT CAPACITY IN OA OF KNEE (µg/ml) EXPRESSED GRAPHICALLY**

![Total Antioxidant Capacity Graph]

Figure 4: The normal range of TAC is 167 ± 22.10 which is grossly reduced in the samples of synovial fluid collected from the knee of OA patients as per Figure 4. The mean TAC is 122.51000 ± 50.764829. This also indicates the increased oxidative stress presents in OA.

**TOTAL ANTIOXIDANT CAPACITY (µg/ml) V/S PAIN SCORE**

![Total Antioxidant Capacity vs Pain Score Graph]

Figure 7: Shows scatter diagram of TAC plotted against pain score which reveals an insignificant relationship between the two with ρ=-0.185 and p>0.05.
Discussion:
The present study examined the correlation between the antioxidant levels in OA knee and the intensity of pain. We demonstrated that both SOD and TAC levels were grossly reduced in majority of the patients. Similar findings were reported in previous studies by Scott JL et al [11] and Regan EA et al [12], where they demonstrated a decreased level of SOD in OA knee. Thus we have established that oxidative stress could be a major etiology of pain in OA. There is excessive production of free radicals caused by the inflammatory mediators like cytokines, proteases and phagocytes. These free radicals heavily tax the antioxidant defense system and cause oxidative stress leads to damage to the cartilage and synovial lining of the joint. When the body is unable to repair the cartilage damage efficiently the joint begins to degenerate.

The study also verified that OA is a disease of old age, and is more common in men. With aging, the water content of the cartilage increases, and the protein makeup of cartilage alters. Eventually, cartilage begins to degenerate by flaking or forming tiny crevices. In advanced cases, there is a total loss of cartilage cushion between the bones of the joints. Repetitive use of the worn joints over the years can irritate and inflame the synovium, causing joint pain and swelling. Loss of the cartilage leads to friction between the bone surfaces, leading to pain and limitation of joint mobility. Inflammation of the synovium with increased stress on the subchondral bone stimulates new bone outgrowth (osteoophytes) at the margins of the articular surface.

The study illustrated that the pain score on the VAS in majority of patients is high, and thus pain is the most important symptom in OA. In the early phase pain is predominantly experienced along with stiffness which increases with strenuous activity.

In our study, we demonstrated the existence of a correlation between the SOD and TAC levels in the synovial fluid and the pain score. The correlation between SOD levels and pain score was significant, while that between TAC levels and pain score was of little significance. Therefore, the present study hypothesized that the pain in OA patients would be associated with an increased oxidative stress. The association between TAC levels and pain score could not be established possibly because our study group consisted of only 30 OA patients, due to the short duration of the study, which was a major drawback. Another limitation of this study was that no dietary supplements of antioxidants were used to analyze the response following supplementation.

Thus SOD levels in synovial fluid could be a reliable marker to detect early stages of OA. The SOD values can be monitored to attenuate the pain symptoms present in the patients, and thus decrease their disability.

Conclusion:
The results indicate that there is a positive correlation between the intensity of pain symptoms and SOD levels in the synovial fluid of OA of knee. This significant decrease in the SOD levels in patients with OA is due to the increased free radicals produced by them, which are known mediators of pain. Effective management of SOD levels in the synovial fluid could help in the intervention of pain.

With a thorough study on many other oxidative stress markers and antioxidants among OA patients, the oxidative stress in the synovial fluid can be monitored in the elderly population prone to develop OA.

Also, they can be used as an early marker among the elderly patients and thus by supplementing antioxidants in the diet, future occurrences and complications of OA can be prevented. The study also concludes that further research with the assessment of the effect of antioxidant supplementation in the diet in the regression of pain is required for better understanding of the association between the oxidative stress and pain.

Acknowledgements:
The authors are grateful to Dr. Sucheta Kumari, Professor in Department of Biochemistry, K.S. Hegde Medical Academy, and the Department of Orthopaedics for providing the necessary facility and full co-operation to carry out the work. We are also grateful to ICMR, for funding the research.
References:
**SPECTRAL ANALYSIS OF RESONANT SOUNDS OF CHEST PERCUSSION**

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**Abstract:**

General clinical examination, in the consulting room or in the out-patient department determines not only a provisional diagnosis but also provides the clinician information whether the patient needs hospitalisation and further investigation. Inspection, auscultation, palpation and percussion forms the basis of clinical examination.

Whilst much has been described and discussed on the first three procedures, inspection, auscultation and palpation, far less attention has been focused on the correct method and diagnostic significance of percussion.

In this brief communication we discuss the results obtained through a computerized spectral analysis of percussion sounds. It is suggested that, noting the high accuracy and reliability of spectral percussion sound read-out analysis, medical equipment designers manufacturers could well bring out a simple hand-held device which could analyse the percussion sounds to yield the most prominent of amplitude and frequency; such ready and reliable information that could be of much diagnostic and prognostic significance.

**Keywords**: chest percussion, spectral analysis, amplitude, frequency

**Introduction:**

Percussion is a well-known clinical method to diagnose the underlying pathology at various sites, using the principles of resonance of sound by a hollow cavity. However no effort has been made to quantify these resonance characteristics which may enhance the tool. This paper throws light on the possibility of this idea and the ways and means to make it happen¹.

**Materials and Methods:**

Standard percussion procedure detailed in the basic clinical method texts is followed. Healthy individuals of same age group are selected randomly. A standard microphone to record the sounds of percussion is placed on the sternum at the angle of Louis. For simplicity sake only the right side of the chest starting from the 1st intercostal space to 5th intercostal space are percussed through standard methods. The amount of force exerted for each attempt was kept fairly constant. Each intercostal space was percussed ten times to dilute the experimental errors.

The sounds were directly recorded on to the hard disk of a computer using the standard methods of sounds capturing. The gain was kept constant for all the subjects. Sounds thus captured were analyzed with Sony® Sound Forge® Version 7.0 software using spectral analysis to yield most prominent amplitude, frequency and note for each resonant sound. To standardize the accuracy of percussion technique, the experiment is repeated for five attempts percussing each intercostal space for two times from top to bottom. Results thus obtained were tabulated and conclusions were drawn.

**Results:**

The average amplitude and frequency of resonance for each intercostal space of each subject are shown in Graphs I & II.
Discussion:
Average amplitude distribution and frequency distribution reflects the dullness encountered in the 5th intercostal due to the presence of liver. It was also observed that the amplitude of resonance progressively from 1st intercostal space to 4th and then it fell steeply over the 5th intercostal space. Although the individual values varied for each subject, the pattern of rise and fall is common in all healthy individuals.

Any deviation from this would signify the underlying pathology and restoration to this pattern would tell about the remission. If the patterns of deviation are studied in each disease, it should be possible to use to use the amplitude variation and frequency variation as a diagnostic tool.

A simple hand held device which can analyse the sounds and yield the most prominent amplitude and frequency will be of great importance to physicians in diagnosing the disease conditions where dullness is abnormally present in 1st to 4th intercostal space and also in conditions where there is a pathological increase in resonance in these areas.

It is our inference that a handy portable computerized electronic device designed to evaluate frequency and amplitude of resonant percussion sounds accurately and reliably, will negate any subjective physician bias in interpreting the results of standard percussion sounds, which presently at best, is totally based on aural acuity of the examiner/s.

Acknowledgement:
This article is a part of a paper presented at a biomedical devices conference in Manipal

Reference:

Keywords: chest percussion, spectral analysis, amplitude, frequency - Arunachalam Kumar
Introduction:
The spleen develops from the mesoderm and during its development, different lobules are formed, which fuses with each other later on which is indicated in the form of the lobulations in adult spleen that can be seen on the superior as well as on the inferior borders (2). The number of notches varies from zero to six, but commonly, only one or two notches were seen. During the development of the spleen, small masses of the splenic tissue may become detached from the main mass and may develop into accessory spleens (3). Awareness on the possible presence of the accessory spleen is important as their exclusion during splenectomy, may result in the persistence of the symptoms which indicated it. In this case report, we are presenting a partially fused splenic lobule which may present interpretation errors in diagnostic imaging. The knowledge of this variation is important anatomically, radiologically and surgically.

Case Report:
During routine dissection of medical undergraduates in Yenepoya Medical College, Mangalore, Karnataka; a spleen with an unusual presentation of a partially fused lobule is noted in a male cadaver of about 60 years of age. The superior aspect of the anterior end presents a lobule which is clearly separated from the main mass in its diaphragmatic surface, superior and inferior borders by a deep fissure of 16.8 mm depth but connected inferiorly in the visceral surface through a stalk of splenic tissue. (FIGURE 1) A leash of splenic vessels from hilum is noted to enter into this lobule through its postero-inferior aspect. The lobule is 22.1 mm in length, 24.8 mm in breadth and 11.3 mm in thickness. The spleen as a whole is 101.5 mm in length, 62.6 mm in breadth and 20.7 mm width. Its superior border presents 2 notches extending into the diaphragmatic surface. No other visible anomalies were found in other viscera of the cadaver. (FIGURE 2)

Discussion:
There is a wide range of congenital anomalies of the spleen. Some are common, such as splenic lobulations and accessory spleen. Other less common conditions, such as wandering spleen and polysplenia, have particular clinical significance. In fetal life, although spleen occurs in a lobulated form, lobules disappear prior to the child birth. In adult spleen, notches are considered as remnants of the grooves from where the fetal lobules have undergone separation (7). In the present case, a lobule in the anterior end had failed to completely fuse with the main mass.
Presence of splenic notches in the same spleen, extending more towards diaphragmatic surface as fissures also points out to defective development of the viscera. Hakk Maummer Karakas et al 2005[11] studied splenic abnormalities on CT scan and MRI. They found the congenital variations of spleen like asplenia and polysplenia syndrome. Both anomalies were associated with multiple system and organ anomalies including the liver and heart (8). Some research workers [4, 5, 6] reported that the incidence of the accessory spleen to vary from 10 to 35% and they were found at the hilum of the spleen, in the gastro splenic ligament, in the greater omentum, along the pancreas, along the splenic vessels, and in the scrotum also. These congenital variations are important in surgical as well as radiological point of view. Accessory spleen and splenic lobulations can be misinterpreted as neoplasm by endoscopic ultrasound. Although homogenous, they can be hyper echoic or hypoechoic (9). The present variation may be misinterpreted as a traumatic injury by the radiologist and it may create confusion in clinical palpation of the enlarged spleen in splenomegaly as it may be misdiagnosed as a growth from the anterior end. Also, it may pose a problem during planning of surgeries and also in laparoscopic interventions. In this modern era of imaging and minimally-invasive approaches, it is imperative on the side of both the radiologists and operating surgeons to have a thorough knowledge of the anatomy and the commonly-occurring variations in this organ.

Conclusion:
This case report presents a rare congenital variation of spleen, the awareness of which would be helpful for imaging specialists and surgeons, to avoid possible errors in interpretations and subsequent misdiagnosis, and also in planning appropriate surgical approaches.

References:
CAVERNOUS HAEMANGIOMA IN THE GASTROCNEMIUS MUSCLE: A RARE PRESENTATION IN THE GERIATRIC AGE GROUP

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Abstract:
Intramuscular haemangiomas are believed to be hamartomatous and are a distinctive type of haemangioma occurring within skeletal muscle. They account for less than 1% of all haemangiomas. They occur more often in trunk and extremity muscles.

A sixty five year old lady presented with swelling and pain from the back of the left knee for two years.

On clinical examination, a mass of about 10x10 cms in size was noted in the left popliteal fossa. The swelling was tender with well defined borders but fixed to the muscle. She had a flexion deformity of knee of ten degrees.

MRI revealed a large encapsulated cystic lesion in the posterior aspect of the muscular compartment of the knee.

She underwent excision of the mass, intraoperatively the mass was noted to be arising from the gastrocnemius. Histopathology revealed large cavernous filled spaces filled with blood which indicated a cavernous haemangioma.

Most of the literature suggest the occurrence of capillary haemangioma to be a commoner one. Occurrence of a cavernous haemangioma is usually before the third decade and is congenital in most times. Most of the authors emphasize that radiological methods are generally insufficient for the correct diagnosis of intramuscular hemangiomas, and surgery is the treatment of choice to exclude malignancy and for adequate treatment of these lesions.

Hence, the present case which we are reporting here is a rare occurrence of a cavernous haemangioma of the gastrocnemius in a 65 year old lady, which was managed by surgical methods.

Keywords : cavernous haemangioma, gastrocnemius, popliteal fossa, intramuscular haemangiomas, blood filled spaces

Introduction:
Haemangiomas are benign vascular neoplasms characterized by an abnormal proliferation of blood vessels that most often occur in the skin or subcutaneous tissue. Haemangiomas are the most common benign soft tissue tumour of infancy and childhood comprising 7% of all soft tissue tumours. Intramuscular haemangiomas account for 0.8% of all haemangiomas. Capillary haemangiomas are more common in muscle than cavernous and compound types.

Capillary haemangiomas are commonly occur in the skin or subcutaneous tissues followed by the deep tissues, occasionally are intramuscular and rarely within bone.

It has been estimated that 90% of intra-muscular haemangiomas occur before the third decade of life. There is a general agreement that females are more commonly affected than males.

Hemangiomas in muscle tissue can develop at any age, but most often occur in young adults. Capillary hemangiomas are more common in muscle than cavernous and compound types. Any muscle can be involved. Because they are located within the muscle, these hemangiomas often show no visible signs, although some may cause swelling in the area of the tumor that increases with activity.
Case Report:
A sixty five year old lady presented to us with complaints of pain and swelling over the posterior aspect of the left calf muscle since two years. She also complained to have difficulty in climbing stairs and walking uphill due to the pain and swelling.

The pain was insidious in onset and progressive in nature and aching type. There was no history of any trauma or fall. No history suggestive of any sickness in the past or present. No history of any medical complaints. She also had no history suggestive of any neurovascular deficits over the limb.

On examination: The swelling measured about 10X10 cms over the popliteal fossa and the proximal calf muscles of the left leg. The skin over the swelling was shiny looked normal. No visible scars or sinuses were present (Figure: 1).

The swelling was firm in consistency, non-mobile. The swelling was not attached to the skin, but attached to the muscle. The range of motion was 10-60 degrees flexion. No abnormalities were detected in the tests for the patella, the menisci and the cruciate ligaments.

Radiologically: the X-rays revealed a mass over the posterior aspect of the knee with minimal calcifications and osteophytes [Figures 2(A), (B)].

The MRI reported as a large cystic lesion in the posterior aspect of the knee with minimal solidifications and fluid areas which is isosyointense. [Figure: 3(A), (B)]

The patient underwent an FNAC of the mass whose reports were inconclusive. This was followed by a biopsy which revealed large areas of coagulative necrosis, fibro-cartilagenous adipose tissue and haemorrhage. Repeat biopsy was suggested.

The patient then underwent an excision biopsy of the mass at a later date. On surgical exposure (Figure 4) a brownish mass arising from the medial head of gastrocnemius measuring around 20X20 cms (Figure 5) separate from all attachments with fluid. The biopsy reported large cavernous spaces filled with blood, lined by flattened endothelial cells and intercommunicating channels. [Figures 6 (A), (B)]

Post operatively she was started on antibiotics and knee exercises. Slowly her range of motion of knee improved and reached almost full range at six weeks review with normal radiography.

Discussion:
The term “haemangioma” is commonly misused to describe any type of vascular abnormality, including vascular malformation, in both medical and surgical fields. Hassanein et al. revealed in a study that the term was incorrectly used in 71.3 percent of publications on the Pubmed database.

Venous malformation can occur in every muscle group with pain and swelling being the usual complaints. Vascular malformations are usually present at birth, grows proportionally with the child and never involutes. They can be classified as arterial, arteriovenous, venous, capillary or lymphatic. Haemangiomas are distinguished by endothelial hyperplasia, multilaminated basement membrane formation beneath the endothelium and clinical history of rapid growth during infancy. Additionally, intramuscular venous malformation can be distinguished from cavernous haemangiomas the former has no regression phase and certain MRI characteristics.

Histologically, haemangiomas are classified based on the pre-dominant type of vascular channel as follows:
1. Capillary haemangioma, which are composed of small vessels lined by flattened endothelium. It is the commonest type and subdivided into juvenile, verrucous and senile type.
2. Cavernous haemangioma, which are composed of dilated, blood filled spaces, lined by flattened endothelium. There is abundant adipose tissue and they do not involute as the capillary haemangioma.
3. Arteriovenous haemangioma, which is characterized by the presence of fetal capillary bed with abnormal communication of the arteries and veins.
4. Venous haemangioma, which is composed of thick walled vessels containing muscle.
Keywords: cavernous haemangioma, gastrocnemius, popliteal fossa, intramuscular haemangiomas, blood filled spaces - Arjun Ballal

FIGURE 1: Approximately 10X10 cm swelling over the popliteal fossa of the left leg. The puncture wound is from the biopsy.

FIGURE 2(A), (B): X-ray left knee AP and lateral views showing thin posterior calcifications.

FIGURE 3(A): Axial section of MRI left knee showing the fluid filled cystic lesion.

FIGURE 3(B): Coronal section of MRI showing the cystic lesion in the posterior compartment of knee.

FIGURE 4: Surgical exposure of the mass

FIGURE 5: Mass measuring 20X20 cms over the medial head of gastrocnemius

FIGURE 6(A): Histopathology showing large cavernous spaces filled with blood (H&E, X100)

FIGURE 6(B): Histopathology showing cavernous spaces lined by flattened endothelial cells and intercommunicating channels (H&E, X400)
The latter occur most commonly in young adults with 80–90% presenting in individuals younger than 30 years. Pain is a cardinal symptom in 60% of the cases, with the lower extremity being the commonest site of involvement. The quadriceps is the most frequently affected muscle.

Haemangioma confined to the calf muscle can cause wasting and contracture. Intramuscular haemangiomas progressively enlarge but never metastasize. There is a 9% recurrence rate after surgical excision. Periosteal reaction adjacent to the haemangioma may mimic osteomyelitis or bone tumour. The plain radiograph may show flecks of calcification which are uncommon but highly suggestive of haemangioma.

MRI is important for further characterization of the substance and extent of the soft tissue haemangioma. On T1-weighted images, a haemangioma appears a slow-to-intermediate signal intensity mass with peripheral high signal intensity due to fat overgrowth. On T2-weighted images, it shows areas of high signal intensity due to vascular tissue and intermediate signal intensity due to fat. MRI shows venous malformations to be isotense to surrounding muscle on T1-weighted and hyperintense on T2-weighted images.

T Bucci et al reported a case of cavernous haemangioma of the temporalis muscle in 2008.

Hristov N, Atanasov Z, Zafirovski G, Mitrev Z reported a case of Intramuscular cavernous hemangioma in the left soleus muscle which underwent a successful surgical resection.

Dong Hwee Kim et al, reported a case of an intramuscular cavernous haemangioma which mimicked a case of myofascial pain syndrome.

Hence, a clear knowledge and understanding of these conditions are very much essential to understand and manage such conditions.

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GLENOID LABRAL CYST PRESENTING WITH SUPRASCAPULAR NERVE PALSY

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Abstract:
Introduction: Glenoid labral cyst in shoulder is an entity akin to meniscal cysts in knee. It usually manifests with features similar to impingement syndrome or rotator cuff weakness.

Clinical Picture: A 42yr old male patient with complaints of left shoulder pain and restriction of movement for 2 months with muscle wasting in left supraspinatus and infraspinatus region. MRI left shoulder showed partial tear of supraspinatus tendon, glenoid labral cyst in closed proximity and causing compression to suprascapular nerve with atrophy of infraspinatus muscle.

Treatment: Left shoulder diagnostic arthroscopy was done and followed with ganglion excision done through a posterior approach and suprascapular nerve was decompressed. Histopathology report showed features of an inflammatory cystic lesion.

Outcome: Patient experienced resolution of symptoms within 4 months of surgery with significant restoration of rotator function and bulk.

Conclusion: Suprascapular nerve compressive neuropathy secondary to glenoid labral cyst is a rare entity but easily recognizable on a MRI scan and responds quickly to decompression.

Keywords: impingement, Suprascapular Nerve Compression

Introduction:
Shoulder pain is among the most common musculoskeletal complaints in the general population. Often, it is due to rotator cuff pathologies such as tendonitis and/or tears, labral pathologies such as superior labral anterior to posterior (SLAP) lesions or instability, capsular pathologies such as adhesive capsulitis, or articular pathologies such as acromioclavicular or glenohumeral arthritis. On rare occasions, suprascapular nerve compression may be the cause of such shoulder pain or weakness. Because of its rarity, this condition is unfortunately often not diagnosed until a magnetic resonance imaging (MRI) scan is performed on the patient who fails to respond to therapy.

Case Report:
A 42yr old male shopkeeper presented to us with complaints of left shoulder pain with restriction of movement on overhead activity for 2 months. Pain was insidious in onset and progressive dull in nature and moderate intensity it was noted around the back of the shoulder and extending to the proximal third of the arm over the lateral aspect. There was no history of tingling sensation or radiation to the forearm and there was no history of trauma.

On examination there was hollowing of the supraspinatus and infraspinatus fossa with deltoid wasting. No local rise of temperature, non-tender, no swelling, scars or sinuses. Full range of motion of the shoulder passively but active abduction was up to 90 degree. The external rotators of the shoulder were weak O’Brien’s test was negative.

Keywords: impingement, Suprascapular Nerve Compression

- Rajsankar N.R.
Routine haematological and biochemical investigation were normal. MRI left shoulder- cyst encroaching on the supraglenoid fossa with arising in close proximity to superior glenoid labral margin. Glenoid labral cyst in closed proximity and causing compression to suprascapular nerve with atrophy of infraspinatus muscle, with signal intensity changes noted in the supraspinatus tendon suggesting a partial tear. (Figure 1)

Patient underwent shoulder arthroscopy in right lateral position and it revealed fraying of the under surface of the supraspinatus tendon and no tears, there was no evidence of any labral tears and the cyst was not clearly visualized. (FIGURE: 2A, 2B)

A transverse incision was placed over the spine of the scapula and elevating the deltoid at the insertion and dissecting the infraspinatus of the scapula the mucinous cyst was identified and its extent dissected and freed from the suprascapular nerve and the vascular pedicle. The cyst was excised along with the root as it was arising from the labrum. (Figure 3)

Histopathology:
The gross specimen showed greyish white mucinous content and the histopathological specimen showed inflammatory cystic lesion suggestive of a ganglion. (Figure 4)

Postoperatively, she had slow resolution of symptoms over 4 months. By 6 months, he had complete resolution of symptoms and the muscle wasting had resolved. The operated shoulder was supported in a sling for 10 days and they were encouraged to perform full range of active and passive movements immediately.
Discussion:
The suprascapular nerve is a mixed peripheral nerve that arises from C5 and C6 roots with variable contribution from C4. The nerve runs to the suprascapular notch and lies in close relation to the posterior border of the clavicle. The suprascapular ligament forms the roof of the suprascapular notch, under which the nerve runs. The nerve then innervates the supraspinatus muscle as it enters the supraspinatus fossa, and receives sensory and proprioceptive branches from the glenohumeral and acromioclavicular joints, as well as the subacromial bursa and posterior aspect of the capsule. In up to 15% of individuals, the nerve also receives cutaneous afferents from the lateral deltoid. The nerve then runs inferolaterally where it wraps around the lateral margin of the scapular spine to pass through the spinoglenoid notch into the infraspinatus fossa, where it is a pure motor nerve supplying the infraspinatus muscle.

Suprascapular nerve entrapment as a case of shoulder dysfunction was first published in 1959 by Kopell HP. Suprascapular nerve neuropathy was due to traction, trauma, infection or extrinsic compression by a space-occupying lesion, any space occupying lesion in and around spinoglenoid notch causes significant space constraints and compressive load of the nerve during overhead activities and throwing action.

The suprascapular nerve can be compressed by ganglion cysts, tumours or haematomas. As mentioned earlier, these ganglia are believed to develop when capsulolabral injuries create a valve-like effect and force synovial fluid into the surrounding tissues, similar to the way meniscal tears of the knee are believed to lead to meniscal cysts. Several authors have noted the high incidence of labral injuries with the presence of adjacent cysts.

Patients with suprascapular neuropathy frequently present with pain and symptoms mimicking rotator cuff pathology. The pain is usually worse with overhead activities and it is also more common if the pathology is at the suprascapular notch rather than at the spinoglenoid notch. Muscle weakness usually manifests as weak external rotation and abduction of the arm. In chronic disease, there is often wasting of the infraspinatus as well as the supraspinatus if the pathology is at the suprascapular notch.

Treatment of suprascapular nerve entrapment of the shoulder consists of conservative or surgical options. Conservative management usually entails physiotherapy focused on range of motion and muscle strengthening exercises. The patients who fail to respond to conservative measures will need to be evaluated through MRI scan and confirm the diagnosis.

Surgical options include image guided decompression, but causes a risk of recurrence of up to 48% . Arthroscopy of shoulder will be used to evaluate the state of labrum, rotator cuff, which can be combined with labral repair, decompression of cyst with cuff repair if required. Risk of recurrence when cyst decompression is combined with labral repair.

Open decompression is also a procedure of choice, direct visualization of the lesion and nerve decompression can be performed.

Conclusion:
Glenoid labral cyst in shoulder is an entity akin to meniscal cysts in knee. It usually manifests with features similar to impingement syndrome or rotator cuff weakness. Patients with failure of recovery of rotator cuff weakness when managed conservatively should be evaluated for suprascapular nerve neuropathy. Arthroscopic decompression is method of managing such lesions especially if associated with SLAP, combined with repair of SLAP. Excision of the cyst and decompression of the nerve by open procedure is a good alternative.
References:
ABSENCE OF SUPERFICIAL PALMAR ARCH WITH PERSISTENT MEDIAN ARTERY - A CASE REPORT

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Abstract:
The anatomical variations in the arterial supply of the palm are frequently reported. One such variation reported during routine dissection for undergraduate medical students in our college is the absence of superficial palmar arch and presence of persistent median artery. The arterial supply to the palm is in the form of superficial and deep palmar arches. In the present case the median artery and ulnar artery supplies the palm without forming an arch on the left extremity. Awareness of variations in the vascular pattern of the palm is clinically important in case of angiographic procedures and surgical emergencies.

Keywords : Superficial palmar arch, median artery, ulnar artery.

Introduction:
The knowledge of different anatomical patterns of the superficial palmar arch is very important. The arterial supply to the palm is arranged into superficial palmar and deep palmar arches. The superficial palmar arch is of 2 types complete and incomplete. The median artery is the axis artery of the superior extremity during early embryonic life. If it persists in adults then it is referred as persistent median artery, which exists in 2 different patterns, palmar and antebrachial, based on their extent of supply.

The superficial palmar arch is formed by superficial terminal branch of the ulnar artery and can be completed on lateral side either by superficial palmar branch of the radial artery or the princeps pollicis artery or the radialis indicis artery or the median artery which accompanies the median nerve. From the convexity of superficial palmar arch three common palmar digital arteries will arise and each one divides into two proper palmar digital arteries. These run along the contiguous sides of all four medial fingers to supply them. The palmar digital artery for the medial side of the little finger leaves the arch under palmaris brevis. The radial side of the index finger is supplied by the radialis indicis artery and the thumb is supplied by the princeps pollicis artery both of these are branches of the radial artery\textsuperscript{[1]}. 

Case report:
The body of a 45-year old, formalin-fixed male cadaver was dissected as instructed in Cunningham’s Manual of Practical Anatomy in the Department of Anatomy of our institution. The variation encountered is the absence of superficial palmar arch and persistent median artery which originated from the caudal angle between the ulnar artery and common interosseous trunk (Figure 1). In the upper third of the forearm, median artery pierced the median nerve from posterior to anterior. The superficial branch of radial artery was absent (Figure 2, 3).

The median artery coursed distally to lie alongside the median nerve in the upper third of the forearm and then continued its distal course between the anterior surface of the median nerve and the deep surface of flexor digitorum superficialis. In the upper third of the forearm, the median artery passed in front of the anterior interosseous nerve. The artery pierced the median nerve from posterior to anterior.
In the distal third of the forearm the median artery emerged between the tendon of flexor carpi radialis and the middle finger tendon of flexor digitorum superficialis. At the wrist it passed deep to the flexor retinaculum, passed through the carpal tunnel and entered the palm.

**Discussion:**

The superficial palmar arch is situated beneath the palmar aponeurosis and it is superficial to the branches of the median nerve and to the long flexor tendons.

Gellman et al, classified the superficial palmar arch into two categories as complete and incomplete[^1]. In complete arch, there will be an anastomosis between vessels constituting it. In incomplete arch there won’t be any communication or anastomosis between the constituting vessels. In this case report, the ulnar artery gave one proper palmar digital artery to the medial side of little finger and two common palmar digital arteries which passed to the medial two interdigital clefts. The persistent median artery gave two common palmar digital arteries which passed to the lateral two interdigital clefts. The radial artery from the forearm was passing through anatomical snuff box to dip into first intermetacarpal space to take part in the formation of deep palmar arch. No superficial palmar branch, arteria princeps pollicis or arteria indices was arising from it. Since ulnar artery does not anastomose with the median artery, the superficial palmar arch is not formed.

Adachi has described 3 types of superficial palmar arch. Type A, B and C. The superficial palmar arch observed in the present case is Adachi’s Type C (Median-ulnar type - in which arch is formed by the median artery and the larger ulnar artery[^3]).

Ikeda et al, demonstrated 96.4% complete and 3.6% incomplete forms. In this series, complete arches were seen in 75% and incomplete in 25% subjects[^4].

Coleman and Anson observed the complete form in 78.5% and incomplete form in 21.5% of 650 hands[^5]. According to their classification, superficial palmar arch seen in the present case can be categorised to Group II (Incomplete...
palmar arch) and Type C (both median and ulnar arteries present but without anastomosis).

The incidence of median artery is between 1.5%-27.1% [6,7,8,9,10]. The origin of the median artery has been previously described as arising from the ulnar, interosseous, radial or brachial arteries [7, 10]. Two patterns of median artery termination have been described based on their vascular territory. The palmar type, which represents the embryonic pattern, is large, long and reaches the palm. The antebrachial type, which represents a partial regression of the embryonic artery is slender, short and terminates before reaching the wrist. The incidence of palmar type is 1.5-50% and the origin most common is common interosseous trunk (59%). The incidence of antebrachial type is 70-100% and the origin most frequently is anterior interosseous artery (55%). It is more frequent in females.

The median artery (MA) is the axis artery of the superior extremity during early embryonic life. It maintains the superficial palmar arch while the radial and ulnar arteries are developing [11]. The persistence of the median artery in the human adult has been considered as the retention of a primitive arterial pattern while the antebrachial pattern represents its partial regression [11, 12, 13].

The clinical importance of the persistence of median artery at wrist level is well documented as a cause of the carpal tunnel syndrome [14]. The incidence in which persistent median artery was apparent cause of carpal tunnel syndrome has been reported as 1.8%-6% [15].

The other important relationship is the piercing of the median nerve by the median artery in the upper third of the forearm which has been reported. This vasculo-nervous relationship has been described in anatomical studies as an occasional finding [14, 4, 16] or with a markedly different incidence, ranging from 11% to 23% [6, 9, 17, 18]. This perforation of the nerve has been implicated in the pronator syndrome.

**Conclusion:**

The present case report has provided details about one of the variant of superficial palmar arch in humans. The knowledge of median-ulnar pattern of superficial palmar arch helps in accurate planning and better performance of surgical procedures in the forearm. Association of a persistent median artery with the median nerve should be considered in the evaluation of all patients with carpal tunnel syndrome. It is mandatory to conduct the investigations like Allen test, angiography and colour doppler studies of the hand before starting any invasive procedures including the vascular surgeries.

**Reference:**

Corticotomy-assisted orthodontic treatment involves selective alveolar decortication in the form of decortication lines and dots performed around the teeth that are to be moved. It is done to induce a state of increased tissue turnover and a transient osteopenia, which is followed by a faster rate of orthodontic tooth movement. This technique has several advantages, including faster tooth movement, shorter treatment time, safer expansion of constricted arches, enhanced post-orthodontic treatment stability and extended envelope of tooth movement. This case report describes a surgical technique and case report involving periodontally accelerated osteogenic orthodontics.

Keywords: periodontally accelerated corticotomy, case report, orthodontics.

Abstract:
Corticotomy-assisted orthodontic treatment involves selective alveolar decortication in the form of decortication lines and dots performed around the teeth that are to be moved. It is done to induce a state of increased tissue turnover and a transient osteopenia, which is followed by a faster rate of orthodontic tooth movement. This technique has several advantages, including faster tooth movement, shorter treatment time, safer expansion of constricted arches, enhanced post-orthodontic treatment stability and extended envelope of tooth movement. This case report describes a surgical technique and case report involving periodontally accelerated osteogenic orthodontics.

Keywords: periodontally accelerated corticotomy, case report, orthodontics.

Introduction:
Now days, increasing number of adult patients are seeking orthodontic treatment. When you compare, there are several psychological, biological and clinical differences between the orthodontic treatment of adults and adolescents. Adults have more specific objectives and concerns related to aesthetics, the type of orthodontic appliance and the duration of treatment. Growth is insignificant in adults compared to children, and there is a chance that hyalinization will occur during treatment, which is followed by a faster rate of orthodontic tooth movement. This technique has several advantages, including faster tooth movement, shorter treatment time, safer expansion of constricted arches, enhanced post-orthodontic treatment stability and extended envelope of tooth movement. This case report describes a surgical technique and case report involving periodontally accelerated osteogenic orthodontics.

Advantages of corticotomy assisted orthodontics include a reduced treatment time, enhanced expansion, differential tooth movement, increased traction of impacted teeth and post-orthodontic stability. This case report describes the corticotomy surgical technique used in conjunction with orthodontic therapy and its effect on the periodontal status of the involved teeth.

Case Report:
A 26 year old female patient had a complaint of forwardly placed upper and lower front teeth with spacing between the teeth. The case was diagnosed as Angles Class I malocclusion with proclination and spacing of upper and lower anterior teeth. Appropriate treatment plan was made through an interdisciplinary approach and PAOO was opted for the correction of spacing and proclination, in consideration with all the clinical and biological conditions.

Surgical procedure was described to the patient. Other orthodontic treatment options available were also explained to the patient including orthognathic surgery. The patient consented to the PAOO. Prior to surgical and orthodontic treatment, periodontal health of the patient...
was restored by phase I periodontal therapy including plaque control measures and scaling and root planing. The results obtained by this phase of therapy were monitored monthly during the treatment period.

**Surgical procedure**

The surgical procedures were performed under local anaesthesia. First, corticotomy was done for mandibular anterior teeth followed by maxillary anterior teeth. Vertical releasing incisions were placed extending from gingival margin toward level apical to the apices of mandibular anterior teeth. The vertical incisions were connected by buccal and lingual intracrevicular incisions. Mucoperiosteal flaps were reflected beyond the level of the apices of the teeth. Vertical buccal and lingual grooves were made through the cortical layer of the exposed bone with a round fissure bur mounted on a micromotor hand piece with concomitant saline irrigation, starting 1.5 mm below the interdental crest. A horizontal groove penetrating the cortical bone connected all vertical grooves 2-3 mm apical to the apices of the teeth. Adequate bio absorbable grafting material was placed over the decortication site. The surgical sites were vigorously irrigated with saline prior to flap repositioning and sutured. Analgesics and adjunctive antibiotics were prescribed for 1 week.

After a period of 1 week, procedure was performed on the maxillary arch. Full thickness mucoperiosteal flaps were reflected beyond the level of the apices of the maxillary
anterior teeth. Vertical buccal and palatal grooves were made through the cortical layer of the exposed bone, starting 1.5 mm below the interdental crest. A horizontal groove penetrating the cortical bone connected all vertical grooves 2 to 3 mm apical to the apices of the teeth. Adequate bio absorbable grafting material was placed over the decortication site. The surgical sites were vigorously irrigated with saline prior to flap repositioning and sutured. Analgesics and adjunctive antibiotics were prescribed for 1 week. Follow up was done after 1 week. Presently patient is undergoing orthodontic treatment.

**Conclusion:**
Periodontally accelerated osteogenic orthodontics is a technique that has many applications in the orthodontic treatment. This technique helps to overcome many of the current limitations, including lengthy duration, potential for periodontal complications, lack of growth and the limited envelope of tooth movement. The mechanism can be summarized as the induction of bone metabolism via decortication lines and points around the teeth to be moved to enhance bone and periodontal turnover, resulting in a transient stage of osteopenia during treatment. This increases the rate of tooth movement if followed by a short period of orthodontic appliance treatment. This method its effects and mechanism were confirmed by recent well designed histological studies. However, further randomized testing in humans is needed to confirm the claimed advantages of this technique and to evaluate the long term effects.

**References:**
Introduction:
The brachial artery (BA) is a continuation of the axillary artery. It begins at the distal border of tendon of teres major muscle and ends about a centimetre distal to the elbow joint at the level of neck of radius, by dividing into two branches lateral one is called radial artery (RA) and medial one is ulnar artery (UA). Frequently the artery divides more proximally into radial, ulnar and common interosseous arteries. Most often radial arises more proximally, leaving a common trunk for ulnar and common interosseous. Proximal division of BA is due to the failure to disappear proximal origin of RA and the RA does not establish new connection with main trunk near the origin of UA.

Brachial artery is used in routine procedures like, blood pressure recordings and arteriography of different parts of body. Variation in the branching pattern of brachial artery is noteworthy for vascular surgeons particularly in cases involving traumatic injuries. Radiologists also must be aware of these kinds of variations during various imaging studies. Distal part of brachial artery is chosen for pulsed dopler sonographic measurements.

The aim of our case study is to discuss the anatomy, embryological reasons for these kinds of variation and clinical significances along with relevant review of literature.

Case Report:
During routine dissection of upper limb for medical students in our medical academy we detected a case of higher division of brachial artery on the right side in a middle aged male cadaver. (Figure.1)

The brachial artery bifurcated into a medial and lateral branch 9.5 cm distal to the lower border of teres major muscle (Figure.1). After origin both branches runs inferiorly. The medial branch crosses superficial to the lateral branch and median nerve from medial to lateral side in the arm. (Figure.1) The lateral branch runs deep to medial branch and lateral to median nerve in the arm.

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Keywords: development, radial artery, ulnar artery, high-up division.
In the forearm the lateral branch runs superficially as radial artery. (Figure.1).

The medial branch runs deep to pronator teres muscle in cubital fossa and trifurcated at the proximal border of pronator teres muscle. One branch continued as similar course as that of ulnar artery forming the superficial palmar arch. The other two branches were muscular and common interosseous arteries (Figure.1).

![Figure 1](image)

**Figure 1**: High division of brachial artery and crossing branches. (inset figures showing enlarged view). HB- High division of brachial artery, R- Radial artery, M- Median nerve, U- Ulnar artery, a - common interosseus artery, b - muscular branch, c - terminal ulnar artery.

**Discussion**

Arterial variation in the upper limb was noted for the first time by von Haller in 1813. It is not uncommon to find variation in the branching pattern of arteries of the upper limb.

The anomalies of various blood vessels of upper extremity can be explained on the basis of embryological development of the vascular plexus of limb buds. The early limb bud receives blood via intersegmental arteries, which contribute to a primitive capillary plexus. At the tip of the limb bud there is a terminal plexus that is constantly renewed in a distal direction as the limb grows. Later one main vessel supplies the limb and the terminal plexus; it is termed the axis artery.

Arey and Jurjus mentioned six explanations for the variations in the blood vessels of upper limb:

1. The choice of unusual paths in the primitive vascular plexus.
2. The persistence of vessels which are normally obliterated.
3. The disappearance of vessels which are normally retained.
4. An incomplete development.
5. The fusion and absorption of parts which are normally distinct.
6. A combination of factors leading to an atypical pattern normally encountered.

Thus, persistence of the upper portion of the radial artery arising from the brachial artery proximal to the origin of ulnar artery followed by failure of development of the new connection of the radial artery with the brachial artery at the level of origin of ulnar artery.

Alteration of any factor leads to deviation from the usual way. These are important from clinical and surgical point of view.

Serial sections of human embryos (224 upper limbs) are studied and then three-dimensional computer-aided reconstruction was performed to establish the normal pattern of development of the arteries of the upper limb of human embryos between stages 12 and 23, and to establish when and how variations occur. Ozcan et al. classified arterial variations in the arm.

The brachial artery is the proximal part of this axis artery while the distal portion, beyond the cubital fossa, is the interosseous artery. The radial and ulnar arteries arise relatively late in development as new vessels branch from brachial and interosseous arteries respectively.

Treves and Rogers described a type of variant of brachial artery as presence of two arteries instead of one brachial artery. These two arteries may be a) radial and ulnar b) 2nd branch may be interosseous which has originated high up.

There is a case reporting division of the brachial artery in the upper third of the arm into radial and ulnar arteries, about 4 cm distal to the lower border of teres major.

**Keywords**: development, radial artery, ulnar artery, high-up division. - Vishal Kumar
An unusually short segment brachial artery with high up division of brachial artery at the level of insertion of coracobrachialis in the middle of the right arm was observed by Satynarayana N. The brachial artery was 11.5 cm in length and having slightly less calibre than usual. However it bifurcated normally into radial and ulnar arteries.

Shewale noted in the left upper limb of a male cadaver, bifurcation of brachial artery into radial and ulnar arteries at the lower border of teres major. Both the arteries had superficial course.

In another case which is almost similar to our findings the brachial artery divided into radial and ulnar arteries after a short course in the upper half of the arm. The radial artery was located medially and the ulnar artery laterally. In its further course the radial artery, was located laterally after crossing the ulnar artery. Further course of the ulnar artery was as usual. Higher division of the brachial artery is noted in 2 cases, where brachial artery bifurcated in the middle of the arm into radial and ulnar artery and in another case high origin of radial artery was observed.

The brachial artery divided into radial and ulnar arteries, about 1.5 cm distal to the lower border of teres major muscle, in the upper third of arm. Which course superficial to forearm flexors. High origin of radial and ulnar artery forms the highest percentage of variations of brachial artery. High origin of radial artery occurrence is 3 to 15 %, as reported by different authors. Bilateral high division of brachial artery were observed during routine dissection by Harbans Singh.

A case of bilateral high division of brachial artery was reported by Puspalata M. Radial artery passes downwards and laterally. Ulnar artery passes downwards and medially. In cubital fossa it passes deep to the ulnar head of pronator teres muscle.

The high division of the brachial artery observed in an individual, situated 20 cm above the cubital fossa and 8.5 cm below the axilla, in the right arm and 21.5 cm above the cubital fossa and 7.0 cm below the axilla in the left arm by Rossi et al. Radial artery has been used for harvesting in cardiovascular diseases especially in coronary artery bypass grafting. In recent advances the radial artery is used in reconstructive micro vascular surgeries and also in plastic surgeries.

Conclusion:
Thus any of the factors affecting during development of limb vessels will lead to anomalies in the level of division of major arteries. These variations are having practical importance for the radiologists, cardiologists and orthopedic and vascular surgeons. Last but not the least, knowledge of this variation is important for the clinicians in day to day practice for measurement of blood pressure using sphygmomanometer cuff in the arm. Any patient visiting to causality full imaging of this branching pattern is neither feasible, nor cost-effective. Hence it is important to keep in mind possibility of this kind of variation before initiating any procedure.

References:
Keywords: development, radial artery, ulnar artery, high-up division - Vishal Kumar

ANOMALOUS COMMUNICATION BETWEEN RIGHT INTERNAL ILIAC VEIN AND LEFT COMMON ILIAC VEIN - A CASE REPORT

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Abstract:
Inferior vena cava (IVC) is formed by the union of the common iliac veins anterior to the body of the fifth lumbar vertebra, a little to its right side. It conveys blood to the right atrium from all the structures below the diaphragm. During routine educational dissection for medical undergraduates, we have come across a case of an anomalous communication between right internal iliac vein and left common iliac vein and a variation in the formation of inferior vena cava in a 55-year-old male cadaver. Due to its complex embryogenesis and relationship with other abdominal and thoracic structures, IVC may develop abnormally. These anatomical variations are often clinically silent and discovered incidentally. Knowledge of these variations may be helpful to clinicians and anatomists during surgical exploration, atypical clinical presentations and cadaveric findings.

Keywords: Inferior vena cava, common iliac veins, internal iliac vein

Introduction:
The internal iliac vein (hypogastric vein) begins near the upper part of the greater sciatic foramen, passes upward behind and slightly medial to the Internal iliac artery and, at the brim of the pelvis, joins with the external iliac vein to form the common iliac vein.

The common iliac veins are formed by the union of external and internal iliac veins. The left and right common iliac veins come together in the abdomen at the level of the fifth lumbar vertebra, forming the inferior vena cava. They drain blood from the pelvis and lower limbs.

The inferior vena cava (IVC) is the large vein that carries deoxygenated blood from the lower half of the body into the right atrium of the heart. It is formed by the union of the common iliac veins anterior to the body of the fifth lumbar vertebra, a little to its right side. It is posterior to the abdominal cavity and runs along the right side of the vertebral column (i.e. it is a retroperitoneal structure). It enters the right atrium at the lower right, back side of the heart.

Case Presentation:
During routine educational dissection for medical undergraduates, we have come across a case of an anomalous communication between right internal iliac vein and left common iliac vein in a 55-year-old male cadaver. Formation of the IVC is also contributed by this anomalous communication between right internal iliac vein and left common iliac vein. Due to its complex embryogenesis and relationship with other abdominal and thoracic structures, IVC may develop abnormally.

Discussion:
Anatomical variation of the inferior vena cava occurs in 0.4-4% of the population.

Anomalies of the inferior vena cava and renal veins occur infrequently but if unidentified can lead to significant morbidity during surgical exploration. Embryogenesis of the IVC is a complicated process involving development, regression, anastomosis and replacement of three pairs of venous channels: posterior cardinal, subcardinal and supracardinal veins.
The normal IVC converts to unilateral right sided system consisting of four segments, namely of hepatic, prerenal, renal and post renal segments. The hepatic IVC develops by coalescence of hepatic sinusoids, which are derived from the vitelline vein. The right sub cardinal vein develops into the suprarenal segment of IVC thus forming an anastomosis with the hepatic segment. The renal segment develops from anastomoses between the sub cardinal and supra cardinal veins. The post renal IVC is formed by confluence of the common iliac veins, the caudal extremity of the right post cardinal vein, the right post cardinal-supra cardinal anastomosis, a part of the right supracardinal vein, and the right supra cardinal-sub cardinal anastomosis. The aberrant development of these venous systems, for unknown reasons, causes anomalies of the IVC system.

Most of these variations are found via radiology or during post-mortem, dissection of cadavers in university anatomy classes, their identification is important in the clinical realm because it may reduce misdiagnoses. It has been reported that these variants can be confused with lymphadenopathy, aortic aneurysm, and retroperitoneal cysts, which often leads to unnecessary interventions.

**Conclusion:**
A high index of suspicion on the part of the surgeon is required to prevent inadvertent injury to these anomalous veins and to avoid significant hemorrhage during retroperitoneal surgery. Preoperative assessment and intra operative awareness are important to prevent unexpected venous injuries. Anomalous communication between right internal iliac vein and left common iliac vein is not been reported in the literature.

**References:**
Introduction:
Pediatric cataracts occur in isolation or in association with intra uterine infections, large number of metabolic diseases and genetic syndromes. Most present within infancy and only about one-fourth present in the second year of life or later. Bilateral cataracts in comparison with unilateral are especially associated with a systemic aetiology even if there are no discerning features. Marinesco-Sjögren Syndrome (MSS), inherited as an autosomal recessive disorder, is rare and is characterised by early onset cataract, psychomotor delay, cerebellar hypoplasia and myopathy. We report on a child with MSS, where the diagnosis was initially overlooked as the psychomotor delay was attributed to visual handicap and psychosocial deprivation.

Case Report:
A five year old male was seen as emergency consult for respiratory distress following reversal of general anaesthesia for cataract aspiration and intra-ocular lens implantation. A medical clearance had been obtained prior surgery. He was the first born of third degree consanguinity. In addition to progressive diminution of vision and bilateral white reflex in the eyes since six months, he had global developmental delay which was not evaluated. Head control was achieved at eight months of age and sitting without support at three years. Presently he was able to bring himself to standing position and walk with support. His fine motor and social skills were delayed and speech unclear. There was no history of seizures. Pregnancy and birth history were normal. Though his birth weight was at the 75th centile, his present growth parameters were below third centiles suggesting a post natal growth failure. Cataract was noted in the left eye and an intra-ocular lens in the right. There was no facial dysmorphism. Child had generalised hypotonia with diminished power and deep tendon reflexes. A detailed neuro-developmental evaluation was done after recovery. There was truncal ataxia, past pointing and dysarthria. His developmental age was one year and he walked with support with a waddling gait. Gower sign was negative and there was no calf muscle hypertrophy. Magnetic Resonance Imaging (MRI) of the brain showed cerebellar hypoplasia with small cerebellar hemispheres and prominent folia (Figure 1A, B and C). A literature search guided us in further neuromuscular evaluation. Muscle enzymes, serum aspartate aminotransferase (37IU/l) and creatine phosphokinase (92 IU/l) were within reference ranges; electromyogram demonstrated myopathic pattern. Nerve conduction studies, electro and echocardiogram.

Keywords: Cerebellar hypoplasia; Growth failure; Hypotonia; Myopathy - Rathika D. Shenoy
were normal. Histological features of muscle biopsy under light microscopy suggested myopathy with minimal dystrophic changes (Figure 2A, B and C). Skeletal muscle was fairly preserved in architecture with focal adipose tissue infiltration. Variation in myofibre size with atrophic and hypertrophic fibres, focal myophagocytosis and polyfocal regenerating fibres were seen. Foci of endo and perimyseal perivascular lymphocytic infiltration with mild creeping fibrosis were present. The two year old younger sibling had global delay and hypotonia with no cataract. Parents were not willing for her evaluation.

Figure 1: MRI Brain A. Sagittal midline T1 weighted image shows small cerebellar hemispheres with prominent fourth ventricle, prepontine and cerebello pontine cisterns. B. Hyperintense cerebellar hemispheres on T2 with prominent folia C. Hyperintense left lens on T2 image

Figure 2: Muscle Biopsy showing: A. Variations in muscle fibre size B. Focal myophagocytosis C. Regenerating fibres with lymphocytic infiltration

Discussion:
In a child with developmental delay and bilateral cataract a careful history and examination will assist in etiological diagnosis. The differential diagnosis in a child with cataract, developmental delay, hypotonia and cerebellar signs is limited. MSS as originally described by Marinesco in 1931 and Sjögren in 1950 included the triad of early onset cataracts, slowly progressive cerebellar ataxia and mental deficiency. Additional features subsequently described include growth failure, muscular hypotonia in early infancy, myopathy and skeletal abnormalities. Congenital Cataract, Facial Dysmorphism, and Neuropathy syndrome (CCFDN) is a distinct genetic entity but with clinical overlap. Major differences between the two include marked cerebellar atrophy and myopathy in MSS and facial dysmorphism, micro cornea and demyelinating neuropathy in CCFDN. The molecular basis of MSS was established only in 2005 and SIL1 is the only gene known to be associated with it. In MSS muscular hypotonia and psychomotor delay precede cerebellar signs and cataract development. Myopathy is the most important cause of delayed motor development in these children and may remain largely unrecognised because of the cerebellar involvement. Progressive myopathy involving posterior thoracic, pelvic, thigh and leg muscles with severe clinical disability has been demonstrated in homozygous patients by muscle computed tomography. Our child was investigated for myopathy in spite of normal muscle enzymes following literature search. The dystrophic changes seen in the muscle biopsy in our case has been reported by others also. In young patients auto phagocytosis is minimal, resembling the findings in progressive muscular dystrophy. The cataract is usually early onset by second year of life and not necessarily congenital. Most children require surgery for cataract by end of first decade. Problems during anaesthesia have been described with both MSS and CCFDN and need to be anticipated. Current data indicate that patients survive well into adulthood with motor function stabilising at an unpredictable age and degree of severity.

References:
Dapsone is widely used for a variety of infectious, immune and hypersensitivity disorders. However, the use of dapsone may be associated with a plethora of adverse effects.

We are reporting a 6 year old who was treated with dapsone for one month. He presented to us with low grade fever and skin lesions all over body with normal systemic examination. He was evaluated and was diagnosed as having Dapsone Hypersensitivity Syndrome (DHS) and treated with steroids.

The incidence of DHS ranges from 0.5% to 3%. DHS can present as early as 7–10 days after administration of the drug until 6 months into therapy. DHS must be promptly identified, as untreated the disorder could be fatal. This syndrome is best approached with the immediate discontinuation of the offending drug and prompt administration of oral or intravenous glucocorticoids. Since dapsone is used for various indications, the salient features about the syndrome and its management should be familiarized.

Keywords: Dapsone, Hypersensitivity, DHS, DRESS.

Introduction:
Dapsone has been the drug of choice for the treatment of leprosy but it is also used for the treatment of many dermatologic indications like dermatitis herpetiformis, vesicobullous dermatoses, cutaneous vasculitis, polyarteritis nodosa, nodulocystic acne and cutaneous mycetoma. It has antibiotic and anti-inflammatory property that makes it suitable drug of choice for the above mentioned conditions. Dapsone has been increasingly utilized in the chemoprophylaxis of Pneumocystis carinii infection in combination with trimethoprim/sulfamethoxazole in HIV patients. This has led to increasing incidence of dapsone-related complications. The, various adverse effects include dapsone hypersensitivity syndrome (DHS), which is characterized by fever, skin eruption and internal organ involvement several weeks to as late as 6 months after patients are given this drug. This case report emphasizes effects associated with DHS and the discussion provide an overview of pathogenesis, clinical feature, diagnosis and management of DHS.

Case Report:
A six year old previously healthy boy diagnosed with lichen planus was treated with dapsone for one month (100mg quarter tablet once a day). He presented to us with low grade fever and skin lesions all over body due to which he discontinued the medication one week back. Initially the lesions were skin coloured and nonpruritic which soon became reddish pruritic lesions. Patient had loss of appetite and lethargy. There was no history of abdominal pain, vomiting, pallor, bleeding diathesis or cardiorespiratory symptoms.

On examination, he had normal vitals and oxygen saturation. There were no pallor, jaundice, lymphadenopathy or cyanosis. There was no oral ulcers. There were multiple maculo papular rashes over the trunk, both upper and lower limbs in addition to few hyperpigmented plaque with scaling on bilateral knees, elbows and legs. Systemic examination was normal.
Investigations revealed elevated transaminases (SGOT-386IU/L, SGPT-336IU/L), elevated alkaline phosphatase, mildly elevated Prothrombin time/INR and Renal function test was normal. Blood routine showed lymphocytic leucocytosis with normocytic anemia. The child was diagnosed as having Dapsone Hypersensitivity Syndrome and given treatment with oral steroids (1mg/kg/day) and supportive measures. Vitamin K was given for 3 days. Child was discharged on oral steroids. He was reviewed after two weeks. Rashes had reduced and there were no new lesions or systemic symptoms. The clinical presentation of our patient along with the clinical response to glucocorticoids strongly suggest a drug induced hypersensitivity.

Discussion:
The incidence of DHS ranges from 0.5% to 3%. DHS is characterized by a hypersensitivity response to dapsone. Dapsone (4, 4’-Diaminodiphenylsulphone) is a sulphone used mainly as an anti-inflammatory and anti-bacterial agent for the treatment of skin diseases. Many mechanisms explain the anti-inflammatory effects of dapsone. They are its interference with neutrophil chemotactic migration and adherence, suppression of neutrophil recruitment, inhibition of local production of toxic secretory products, and inhibition of prostaglandins and leukotrienes release by blocking their inflammatory effects. The side effects of dapsone are less if plasma concentration is below 5mg/l.

Molecular and Immunopathogenesis of DHS might be a combination of type I, type IV and type III hypersensitivity reactions and also a modified graft versus host disease mediated by activated T-lymphocytes.

After absorption from the gastrointestinal tract it is transported through the portal circulation to the liver where it is metabolized primarily via two pathways: N-acetylation and N-hydroxylation. N-hydroxylation is shown to be the initial step in the formation of toxic intermediate metabolites, such as nitrosamines and possibly other compounds, which can induce hemolytic anemia and methemoglobinemia. It is presumed that these molecules are also important in the pathogenesis of DHS. A reduction in either quantity or activity of N-hydroxylation reduced the total clearance of dapsone.

The classic triad of DHS consists of fever, skin eruption, and internal organ involvement. Fever, hepatitis, exfoliative dermatitis, lymphadenopathy and hemolytic anemia might be seen in varying combinations. DHS can present as early as 7–10 days after administration of the drug until 6 months into therapy. Skin lesions can present as erythematous papules, plaques, pustules, and eczematous lesions. Steven Johnson Syndrome (SJS) or Toxic Epidermal Necrolysis (TEN). Usually these lesion begin to resolve within 2 weeks of stopping dapsone. The severity of the cutaneous changes does not correlate with the extent of internal organ involvement. Some of the systemic findings are Infiltrative lung disease, hepatobiliary involvement, splenomegaly, pulmonary eosinophilia, photosensitivity, peripheral neuropathy, psychosis, pancreatitis, renal involvement (in the form of nephrotic syndrome and renal papillary necrosis).

The differential diagnosis include DRESS syndrome (drug rash, eosinophilia and systemic symptoms) and its variants, Churg Strauss syndrome, Hypereosinophilic syndrome, TEN, SJS, Still’s disease, hematological and lymphoreticular malignancy and certain connective tissue disorders.

The main treatment for DHS is immediate discontinuation of the drug with initiation of oral or parenteral glucocorticoids, depending on severity. Dapsone is found to persist in the body for up to 35 days hence, the glucocorticoids should be tapered gradually over a period of more than one month. Patients with viral hepatitis are at increased risk for the development of DHS, suggesting the need to perform a screening test for hepatitis B before starting dapsone.

There is also a higher risk for the development of hypothyroidism after three months, considering thyroid replacement therapy if the patient develops clinical hypothyroidism as a delayed complication. Supportive measures like nutritional support, meticulous fluid and electrolyte balance, control and prevention of infectious
complications (cellulitis, sepsis) and skin care if necrotizing disease (TENS or SJS). For patients with dapsone-induced hemolysis, Vitamin E supplementation might be beneficial while in patients with methemoglobinemia coadministration of cimetidine can have an ameliorative effect. Other therapeutic options that could be tried are methotrexate, azathioprine, cyclosporine or hydroxychloroquin, though not extensively studied. In some patients, in spite of drug withdrawal and steroid therapy, a relapsing and chronic course might ensue.

A high index of suspicion is needed for early diagnosis and prompt treatment of DHS.

References:
Introduction:
Posterolateral dislocation of the elbow joint is the most common acute traumatic elbow instability and occurs secondary to a traumatic elbow injury due to axial loading in supinated forearm with valgus stress. Such trauma will induce damage to the radial collateral ligament complex extending to the capsule and up to the ulnar collateral ligament compartment. Early treatment will affect the overall outcome. Dislocation of the elbow joint is often associated with ligament injury, fracture of radial head, coronoid process, olecranon process or humeral epicondyles. The “terrible triad injury” of the elbow, as described by Hotchkiss, consists of a combination of 3 lesions.a) Fracture of the radial head. b) Fracture of the coronoid process of ulna. c) Humero-ulnar dislocation (generally posterior or posterolateral). The objective in the management of such injuries is to restore anatomical relations of bony structures of the elbow and stability of ligament complex so as to convert an unstable dislocated joint into an anatomically reduced and stable one. Early intervention result in a favourable outcome. The principles of this treatment were detailed by McKee et al., as well as Ring et al., however relatively few clinical reports are available in the literature.

Case Report:
A 43 year old lady presented to us after a fall on outstretched dominant hand with severe pain and swelling around elbow. On clinical evaluation, there was raised local temperature over the elbow, there was tenderness and crepitus with loss of three point bony relation of elbow without any neurovascular injury. Radiologically, fracture of the radial neck, fracture of the coronoid process with posterior humero-ulnar dislocation were noted. Immediate Closed reduction of the dislocation was performed under GA and elbow was immobilised in a plaster of Paris slab for 3 weeks. She underwent operative procedure of open reduction and internal fixation of the radial head with a titanium plate and the coronoid process with a 4mm screw and washer after 10 days. After 3 weeks elbow rehabilitation was begun and at one year post surgery there was signs of fracture healing with full range of motion of the elbow.
(Figure 3) showed fracture coronoid process and radial neck and head in a displaced position. There was no incarceration of loose fragments in the joint. She was operatively treated after ten days when the swelling had subsided and an open reduction and internal fixation of the radial head and neck with a titanium plate with 2.5 mm screws through the Kocher’s approach and the coronoid process was fixed with a 4mm titanium cannulated cancellous screw with washer through an antero-medial approach under general anaesthesia and following fixation.

Fig 1(A/B): AP/Lateral views of the elbow showing posterior dislocation of the elbow with fracture of the radial neck and coronoid process

Fig 2(A/B): AP/Lateral views after closed reduction and POP slab application of the elbow dislocation with displaced fracture fragments.

Fig 3(A/B): CT scan of the elbow after reduction, showing displaced radial neck and head and coronoid process fractures, (B) 3-dimensional reconstruction CT.

Fig 4: Post surgery X-ray of the elbow after open reduction and fixation with Titanium screws and plate with above elbow slab (Lateral view)

Fig 5(A/B): AP/Lateral views three months Post surgery showingsigns of healing of fracture with implant insitu

Fig 6(A/B): AP/Lateral views at one year radiological union is noted at the fracture site
stability of the elbow was assessed. The immobilisation was continued for a total period of three weeks to allow soft tissue healing. The post-surgery X-ray showed anatomical reduction (Figure 4). At the end of 3 weeks plaster slab and sutures were removed elbow rehabilitation was instituted with gentle active and active assisted flexion and extension and prono-supination movements. She was continued on arm sling support for another three weeks. Patient recovered full range of motion by 3 months with satisfactory radiological progress of union (Figure 5). She was reviewed one year later with full range of motion with no subjective or objective evidence of instability and with radiological feature of fracture union. (Figures 6,7).

Discussion:
The terrible triad of the elbow presents a challenge to surgeons and usually has poor outcomes, with frequent redislocation, arthrosis, loss of movement or.2, 5,9,10 The most common injury mechanism is a simple fall on the outstretched hand, with axial transfer of the force on the hyper-extended elbow in supination and a position of elbow valgus. Despite the severity of the injury, the causative mechanism is not a high-energy trauma.8,9 The forces producing elbow luxation affect the joint by injuring structures sequentially from a lateral to medial direction.8 In the first phase, the lateral collateral complex is affected, which produces rotational instability of the elbow in varus. In the second phase, if the force continues to act, the radial head collides with the humeral condyle and fractures. In the third phase, the rotating instability produced by injury of the lateral complex enables the axial force to dislocate the elbow, usually in a posterior or postero-lateral direction, and occurs together with fracture of the coronoid process.11 The coronoid can also be affected at the beginning by rupture of the lateral ligament complex or by a direct impact of the humeral trochlea, although the second and third phases occur almost simultaneously. The medial ligament complex is also affected in most patients, but its injury is not an essential prerequisite for the terrible triad to occur.11 B. Chemama et al conducted a study, concluded that: The principle of the surgical management is based on two main objectives: restoration of bony stabilizing structures (radial head and coronoid process) and lateral collateral ligament reconstruction. A medial surgical approach is recommended in the case of persistent postero-lateral instability following lateral collateral ligament reconstruction or when fixation of a large coronoid process...
fragment is indicated. The use of an external fixator is only advocated in case of persistent instability following the reconstruction of bony and ligamentous structures.12. Roberto Seijas et al conducted a study on 18 cases of the terrible triad of the elbow on whom he performed various surgical treatment approaches and concluded that patients had better recovery of range of motion than those reported in other studies, the terrible triad of the elbow can lead to joint instability, arthrosis, and joint stiffness, and may resort to total elbow arthroplasty in some cases.

Our patient presented with a similar mode of injury and underwent the aforementioned management. She recovered with full range of motion and no instability or stiffness.

**Conclusion:**
Hence, we conclude that planned staged surgical intervention, anatomical restoration of the bony and ligamentous structures of the elbow with aggressive rehabilitation will possibly yield best possible outcome.

**References:**

**Keywords:** Terrible triad of elbow, humeroulnar dislocation, radial head fracture, coronoid fracture. - Arjun Ballal
Introduction:
From the time of invention of dental implants by Branemark in 1952, field of prosthodontics is witnessing a sea of changes in treating edentulous patients. Ever since, implant dentistry is undergoing continuous modifications and invention of newer techniques. Recently, it has reached greater heights in the form of placing implants immediately after extraction which not only gives better aesthetic outcome but also preserves the soft and hard tissue.

Several techniques of immediate implant placement with flap elevation have been described earlier. In a technique described by Schwartz et al in 1997 for immediate implant placement a mucoperiosteal flap was reflected. However, they observed that there is increased bone loss and collapse of interproximal papilla. According to Cardarapoli et al, reflecting a flap can lead to remodeling of the exposed bone surface. Mahmood et al in their article, they described immediate implant placement in interforamina area of mandible. Here implants were bilaterally splinted & retained over denture & fixed bridges. According to Campelo et al and Covani et al, reflecting a flap induces gingival recession, papilla destruction & crestal bone resorption. Hence, the immediate implant placement procedure was thought of without reflecting a mucoperiosteal flap by Al-Ansari et al in 1998. They had noticed reduced bleeding, maintenance of tissue contour & reduced post-operative patient discomfort with flapless immediate implant placement. Moreover maintenance of available anatomical structure is much easier than to reconstruct the new one.
This paper reviews the advantages, disadvantages, indications, contraindications, case selection and the procedural aspects of this technique in detail.

**Indications:**
Being esthetic zone, maxillary anterior regions are the most common indications for placing implant immediately after extraction. Flapless immediate implant placement is preferred as the amount of recession through this method is only 1-1.5 mm after 1 yr which is considered negligible.²

Patients with high demand for esthetics are a definitive indication for flapless procedure as the ultimate outcome with this procedure is excellent.²⁷

Intact gingiva without recession and socket walls without any bony defects at the time of implant placement are another indication for this procedure. Absence of any periodontal diseases is also a positive sign.⁸

Fractured tooth at the gingival margin with non-vitality and root length less than 13 mm is indicative of proceeding with immediate implant placement without flap elevation rather than post & core treatment.⁷

Endodontic failure, radicular caries and non-restorable crowns are indications for immediate implant placement without flap elevation.⁹

**Contraindications:**
Past history of involvement of the tooth with periodontal disease is a definite contraindication of flapless procedure, as there is insufficient hard and soft tissue in this area.¹⁰⁻¹²
Since flapless procedure is a "blind" procedure, implant placement is difficult.³

Many a times the tooth in the site of implant placement would have unhealthy periapical hard and soft tissues with loss of vascular supply. Placement of implant without flap in such areas is deemed to be a failure.¹⁰ A flap procedure facilitating curettage of the infection site would be more suitable for such situations.⁴ As per described by Mahmood et al¹⁰, Nemcovsky et al has recommended delayed implant placement at least after 4-6 weeks in such cases.

Presence of soft tissue recession, dehiscence and fenestrations are a positive contraindication for flapless technique.⁹

Insufficient bony walls especially the facial wall cannot be managed with a flapless procedure for implant placement.⁴ This condition requires grafting procedure and hence cannot be carried out without good vision of the surgical site.⁹

All the relative contraindications for any surgical procedures like, smoking and presence of systemic disease are contraindications for this procedure also.⁸

**Procedure:**

**Patient Selection Criteria:**
A) Level of gingival margin- It is important to have a gingival margin at the Cemento-Enamel Junction level. Gingival recession prior to the extraction indicates periodontally compromised patient which leads to recession after healing and gives poor aesthetic result. These situations lead to failure of implant due to compromised healing as vascular supply will be poor.²

B) Condition of socket wall- Extraction of the tooth should be atraumatic. Intact socket walls indicate good vascular supply which induces rapid healing and increase initial stability. During extraction or prior to extraction if any of the socket wall is damaged, bone grafts are necessary to complete the procedure and to induce bone healing.²

C) Absence of bony defects- If any bony defects like dehiscence or fenestration are present, it needs special approach for placing implant. Hence such patients should not be taken up for this procedure.²

D) Tissue bio type- Thick tissue bio type is always preferred over thin tissue bio type. Thick tissue bio type will be more resilient where as thin bio type increase the chances of recession.⁷,⁸

E) Age of the patient and history of systemic diseases- Young patients with no history of any systemic diseases respond well to surgical procedures and osseointegration will be quicker.²
Surgical Procedure:\textsuperscript{6,12}
1. Routine pre surgical procedure of rinsing with chlorhexidine for 1 minute is carried out.
2. Under Local anesthesia, the tooth is extracted as atraumatically as possible. The supracrestal fibres are severed atraumatically using a no.15 blade with 360° intrasulcular incision prior to extraction. Socket walls can be explored using periodontal probe for integrity. (Fig. 1, 2 & 3)
3. Socket walls are debrided and good curettage is done of extraction socket.\textsuperscript{4}
4. Implant site is prepared with standard drills using bony walls as guide to 3-4 mm beyond the socket level. It was proven in the study done by Mahmood et al\textsuperscript{4} that this procedure protects the bone from excessive heat generation as suggested by Schwartz et al\textsuperscript{1} & it reduces edema & excessive post operative pain as suggested by Garber et al \textsuperscript{4} & Locante et al.\textsuperscript{6}
5. Bony walls are used as a guide for placement of implant and fingers are placed over buccal mucosa while drilling for implant in order to prevent bone perforation.\textsuperscript{6}
6. Implants are placed and soft tissue edges are sutured
(Fig. 4). Attaining primary stability of >30Ncm is crucial if implant has to be immediately loaded. Primary stability can be checked through torque wrench or Periotest. According to Juodzbalys, minimum of 30% of implant surface in terms of length, width and depth of insertion has to be fixed in bone to achieve & maintain primary stability.

7. Antibiotics and Anti-inflammatory medicines are prescribed for 7 days.

8. Second stage is performed after 4-6 months.

9. Incision is made only to remove the surgical screw and to place the healing abutment.

10. Prosthesis is fabricated. (Fig. 5 & 6)

Factors Affecting Procedure:
A) Tissue bio type - Thick tissue gives better result as recession will be less. Average facial crestal bone loss with thick tissue bio type is usually less than 1 mm whereas with thin tissue bio type it is 1-1.5 mm.

B) Condition and thickness of the facial wall - Overall aesthetic outcome and gingival margin level depends on the condition of the facial wall of the socket. Before tooth extraction condition of the facial wall has to be probed. Width of 4-5 mm and height of 10 mm are essential for immediate implant placement.

C) Position of the Implant shoulder - Implant should be placed more lingually in order to prevent facial bone loss. This position is decided by drawing an imaginary line connecting mesial and distal adjacent tooth. Implant shoulder should always lie lingual to this imaginary line.

D) Vascular supply of the socket wall - This factor affects healing part of the implant placement. Good vascular supply helps in achieving rapid primary stability and osseointegration. Poor vascular supply increases risk of implant failure as bone formation will be affected which directly affects the stability of the implant.

E) Implant design – Grit blasted and acid etched implants are most suitable for immediate implant placement without flap elevation & early loading. They achieve faster osseointegration, better bone implant interface, higher removal torque value & greater primary stability.

In addition to, Implant has to be greater in length & diameter than that of extraction socket to increase bone implant contact (BIC).

F) Maintenance of primary stability - Primary implant stability basically depends on type of implant used and surgical procedure followed for placement. Cavalchia & Bravi suggested that implant has to be firmly anchored to the bone to maintain primary stability as during healing of necrotic bone it can reduce. Primary implant stability is of more significance esp. in case of immediate loading.

G) Connection of the provisional crown - Insertion of temporary crown immediately after implant placement helps in achieving primary stability and also prevents the overgrowth of the papilla. This temporary crown is always kept out of occlusion at least 1-2 mm as suggested by Block et also that healing process does not get affected by occlusal forces. There are significant effects of immediate provisionalization on interdental papilla level and interdental bone level. It not only provides support but also reduces bone loss and as a result maintenance of bone level minimizes collapse of the soft tissue. As described by Mahmood et al, Garber et al has reported excellent results of immediate provisionalization.

Advantages - Disadvantages of the Procedure:

<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
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<tr>
<td>Avoids additional surgical procedure</td>
<td>Technique sensitive</td>
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<tr>
<td>Rapid primary stability</td>
<td>Bone grafts/membranes are often required</td>
</tr>
<tr>
<td>Psychological benefit as edentulous period is reduced</td>
<td>Do not allow clinician to modify mucosal position</td>
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<tr>
<td>Preserves hard &amp; soft tissue – (maximum recession of 1-1.5 mm)</td>
<td>Unpredictable soft &amp; hard tissue loss – blind procedure</td>
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<tr>
<td>Good aesthetic outcome - black triangles are omitted</td>
<td>Risk of implant failure is high due to incorrect position &amp; sometimes due to facial wall perforation</td>
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Keywords: Dental implants, Immediate placement, Flapless technique etc. - Mahek R. Bangawala

nitte institue of higher education
Evaluation of the Treatment Outcome with Flapless Technique:
Albrektsson et al 1986 & Buser et al 1990 has given criteria for determining success of the implant treatment. In order to measure the overall outcome of immediate implant placement with this procedure clinical indices like pain, mobility, crestal bone loss, aesthetic outcome and condition of periodontium have been used.

Percussion and forces upto 500g is used to evaluate pain and discomfort. However, this force does not indicate integration of implant with bone but only measure the impact force. Presence of pain indicates inflamed tissue surrounding implant or fixture impinging on nerve or implant is mobile.

Primary stability of 30-35 Ncm is important for successful osseointegration especially in case of immediate implant placement without flap elevation. The other method of assessing implant stability is by resonance frequency analysis (RFA). Healthy implants have an average mobility of around 75 microns, which is invisible clinically. Brunski has considered micromovements of more than 150 microns adversely affects healing & leads to fibrous interface. Mobility of the implant can be checked by applying vertical or horizontal forces upto 500gm. Presence of clinical mobility indicates failure of osseointegration.

The flapless procedure for immediate implant placement prevent alveolar bone loss both in height and width. Crestal bone loss after healing is measured by radiographic evaluation. Several studies have shown that marginal bone loss after 1 year usually lies between 0.5-1 mm.

Correct clinical, surgical and prosthetic procedure for replacing missing teeth using immediate implant placement without flap elevation helps clinician to achieve and maintain good aesthetic results. Aesthetics Outcome of Immediate Implant Placement Without Flap Elevation is measured by using two indices: modified SES and PES. According to Jemt et al 1997 & Caradarpoli et al Papilla Index Score (PIS) is used for assessing the integrity & size of interproximal papilla adjacent to implant. In PIS evaluation also, Immediate implant placement without flap elevation gives excellent aesthetic results as it leaves the periosteum intact on the bone & thus preserves the blood supply. Maximum cases treated by this technique and measured by these two indices during follow up shows good aesthetic result. But as the vertical distance increases between the contact point of crown and implant there will be significant loss of Papilla over period of time. Moreover implant should be 3-4 mm apical to the free gingival margin to optimize aesthetics.

Condition of periodontium can be evaluated by probing depth which is used if pathological signs like radiolucencies, purulent exudate or bleeding are present. Few cases shows peri-implant mucositis with or without facial mucosa recession. One of the reason for the recession of facial mucosa is that immediate implant placement without flap elevation doesn’t prevent facial crestal bone loss. Moreover recession is seen in higher proportion in thin tissue bio-type cases. However good maintenance of Oral hygiene and regular check up under supervision reduces the chances peri-implant mucositis and failure of implant.

Immediate implant placement without flap elevation has been found to be a safe and successful treatment showing success rate of more than 90%(94.5%-100%) over 12 months with maximum patient satisfaction in terms of aesthetics, phonetics and psychological.

Special Considerations & Present Approach:
Nowadays in order to achieve rapid primary stability and moreover strengthening socket walls bone grafts and barrier membranes are used. Deproteinized Bovine Bone Material(DBBM) are the most commonly used either alone or in conjunction with expanded barrier membrane. Connective tissue graft taken from palate has also shown promising result when used along with barrier membrane. However this discrepancy within 2 mm does not require any type of bone regenerative procedure. And moreover...
use of barrier membrane is associated with clinical complications like bacterial infection and impaired bone healing. Various studies have shown that these bone augmentation procedures reduce horizontal resorption of facial bone but do not produce any significant reduction in vertical resorption. Thus, bone grafts and barrier membrane are useful in relieving geometric discrepancy and accelerating bone formation.

A recent article by Aranjo et al suggested that a xenograft material can be incorporated into soft tissue without any inflammatory reaction which provide substance to improve the soft tissue profile.

In order to achieve predictable aesthetics by minimizing buccal contour change & to induce the thickness of peri-implant soft tissue, the following matter has to be kept in mind:

a) Atraumatic removal of tooth without flap elevation
b) Placement of bone graft in residual gap and
c) Provisionalization of screw retained provisional restoration which serves as a socket seal device.

The other method follow to achieve good bone healing and to overcome gap discrepancy is to use conical implants or implants with rough surface and larger than extraction socket in terms of length and diameter.

In this way, present approach in this procedure conveys that Flaps and implants are the trends of dentistry.

Conclusion:
In the modern era of aesthetics, significant modifications are being carried out to achieve good results in all spheres of dentistry. Field of implant dentistry has been undergoing several changes in its techniques and materials ever since it was identified as the most aesthetic treatment choice in the anterior region. From delayed placement to immediate placement of implants, it has moved to soft tissue concerns regarding aesthetics. The prevalence of recession that occurs upon placement “with flap” elevation has given way to the innovative technique of placing the fixtures “without” elevating the flap.

Recently, this procedure is being implemented in both, delayed as well as immediate placement of dental implants in achieving the increased demand for aesthetics. However, this procedure has its own disadvantages and contraindications which have to be kept in mind prior to selecting the patients. In this review paper all aspects of this procedure have been explained. Diligent case selection and the procedural aspects are critical factors in achieving success with this technique of implant placement.

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Lasers have revolutionised dental treatment since three and a half decades of the twentieth century. Theodore Maiman in 1960 invented the ruby laser, since then laser is one of the most captivating technologies in dental practice. Lasers have been used in initial periodontal therapy, surgery, and also in implant treatment. Further research is necessary so that laser can become a part of the dental armamentarium. This paper gives an insight to laser in Periodontics.

Keywords: Laser, periodontics, periodontology.

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Introduction:
In the past 100 years there has been extensive development of the mechanical cutting devices used in dentistry. However, while considerable progress has been made in this area of mechanical cutting, dental patients are still afraid of the noise and vibration produced by the mechanical action of the air turbine and ultrasonic scalers. From the end of the 20th century until now, there has been a continuous upsurge in the development of laser-based dental devices based on photomechanical interactions.

The dental lasers of today have benefited from decades of laser research and have their basis in certain theories from the field of quantum mechanics, initially formulated during the early 1900s by Danish physicist Bohr, among others. Nearly 40 years later, American physicist Townes first amplified microwave frequencies by the stimulated emission process, and the acronym MASER (Microwave Amplification by Stimulated Emission of Radiation) came into use. In 1958, Schawlow and Townes discussed extending the maser principle to the optical portion of the electromagnetic field; hence, LASER (Light Amplification by Stimulated Emission of Radiation) was invented.

Lasers designed for surgery deliver concentrated and controllable energy to tissue. For a laser to have a biological effect, the energy must be absorbed. The degree of absorption in tissue will vary as a function of the wavelength and optical characteristics of the target tissue. If the peak emission of the laser matches the absorption spectrum of one or more components of the target tissue, a predictable and specific interactive effect will occur. Since tissues all have more than one component, the overall effect will be a combination of the effects, on each tissue component.

Laser Effects on Tissue
The light energy from a laser can have four different interactions with the target tissue, and these interactions will depend on the optical properties of that tissue.

When radiant energy is absorbed by tissue, four basic types of interactions or responses may occur.
1. Photochemical interaction.
2. Photo thermal interaction
3. Photo mechanical interaction
4. Photo electrical interaction

Photo chemical interaction include
Bio-stimulation, which describes the stimulatory effects of
laser light on biochemical and molecular processes that normally occur in tissues such as healing and repair.

**Photo thermal interactions include**

Photo ablation, or the removal of tissue by vaporization and superheating of tissue fluids, coagulation and hemostasis.

**Photomechanical interaction include**

Photo-disruption or photo-disassociation, which is the breaking apart of structures by laser light.

**Photoelectrical interactions include**

Photo plasmolysis which describes how tissue is removed through the formation of electrically charged ions and particles that exist in a semi-gaseous high energy state.

**Applications in Dentistry**

I. Intra oral soft tissue surgery
   a. Ablating, incising, excising, coagulating
   b. Laser – assisted uvulophlatoplasty
   c. Treatment of pathologic condition.
   d. Sulcular debridement

II. Hard tissue application
   a. Caries removal, inhibition, detection
   b. Cavity preparation
   c. Surface modification
   d. Tooth bleaching
   e. Calculus removal
   f. Bone ablation and cartilage reshaping
   g. Dentin desensitization
   h. Analgesia

III. Dental Materials
    1. Composite curing, bracket bonding
    2. Alloy welding

IV. Endodontics

V. Other application
   a. Laser diagnostic
   b. Instrument sterilization
   c. Holography
   d. Bio-stimulation

**Uses of Lasers In Periodontics**

**Treatment of Dentine Hypersensitivity With Lasers:**

Dentine hypersensitivity is characterized by short, sharp, pain arising from exposed dentine in response to stimuli typically thermal evaporative tactile, osmotic or chemical and which can not be ascribed to any other form of dental defect or pathology.

The lasers used for the treatment of dentine hypersensitivity are divided in to two groups: Low level lasers like He-Ne, GaAlAs, and Middle output lasers like Nd: YAG and CO₂ lasers. The mechanism of laser effects on dentine hypersensitivity is thought to be the laser induced occlusion or narrowing of dentinal tubules (Lan & Liu 1995), as well as direct nerve analgesia, via pulpal nerve system. It has been hypothesized that the laser energy interferes with the sodium pump mechanism changes the cell membrane permeability and / or temporarily alters the endings of the sensory axons.

**Laser Deepithelization For Enhanced GTR:**

Successful treatment of periodontal defects to obtain new attachment continues to represent a serious therapeutic challenge for predictable result in periodontics.

Historically, many techniques have been tried to retard epithelial down growth. The CO₂ laser creates a rather unique wound in the gingival tissue. It is not a burn, rather an instantaneous vaporization of the intercellular fluid and a resulted disintegration of the cell structure.

The laser wound on skin and gingiva causes a delay in re-epithlization because of factors such as reduced inflammatory response and less wound contraction. Rossman et al did a 28 day study on monkeys and evaluated the correlation of interproximal defects using CO₂ treated sites with control sites; the study indicated a greater amount of connective tissue rather then epithelial attachment.

**Depigmentation With Laser:**

Gingival and cutaneous melanin pigmentation is often a source of an aesthetic problem. The intensity and extent of
pigmentation varies widely among individuals. Various methods suitable for the removal of pigmentation from the gingiva have been described. Among them are cryotherapy, gingivectomy and argon laser irradiation. In addition several lasers are used for ablation of cutaneous pigmented lesions and oral lesions, among them are ruby, dyed pulsed, Nd:YAG, CO
dioxide and eximer laser.

Peri Implant Care with Laser:
Implant maintenance has included methods that mimic the care of periodontium after periodontic manipulations or surgery. With objective in mind of avoiding deleterious alteration of the surface of implant during routine maintenance procedures or in the treatment of failing implants, the Nd:YAG laser was studies a possible modality for detoxifying, debriding and sterilizing the surface of HA-coated and titanium plasma-sprayed (TPS) implants.

Soft Tissue Applications:
Traditional use of lasers for soft tissue ablation includes gingivectomy, frenectomy, removal of muco-cutaneous lesions (both benign and malignant) and gingival sculpting techniques associated with implant therapy and muco-cutaneous surgery.

Laser Bleaching
The objective of laser bleaching is to achieve the ultimate power bleaching process using the most efficient energy source, while avoiding any adverse effects. Using the 488-nm argon laser as an energy source to excite the hydrogen peroxide molecule offers more advantages than other heating instruments. Argon lasers emit fairly short wavelengths (488 nm) with higher-energy photons; conversely, plasma-arc lamps, halogen lamps, and other heat lamps emit short wavelengths as well as longer invisible infrared thermal wavelengths (750 nm to 1 mm) with lower-energy photons and predictable high thermal character. This high thermal energy can create unfavorable pulpal responses.

The argon laser rapidly excites the already unstable and reactive hydrogen peroxide molecule; the energy then is absorbed into all intramolecular and intermolecular bonds and reaches eigenstate vibrations. The hydrogen peroxide molecule falls apart into different, extremely reactive ionic fragments that swiftly combine with the chromophilic structure of the organic molecules, altering them and producing simpler chemical chains. The result is a visually whitened tooth surface.

Esthetic gingival procedures
Lasers can be applied in esthetic procedures such as recontouring or reshaping of gingiva and in crown Lengthening. With the use of some lasers, the depth and amount of soft tissue ablation is more precisely and delicately controlled than with mechanical instruments. In particular, the Er:YAG laser is very safe and useful for esthetic periodontal soft tissue management because this laser is capable of precisely ablating soft tissues using various fine contact tips, and the wound healing is fast and favorable owing to the minimal thermal alteration of the treated surface.

Nonsurgical pocket therapy
Conventional root debridement
In periodontal pockets the exposed root surfaces are contaminated with an accumulation of plaque and calculus, as well as infiltration of bacterial endotoxins into the cementum. Usually, in the Initial phase of periodontal therapy, debridement of the diseased root surface is nonsurgically treated by mechanical scaling and root planing, primarily by using manual or power-driven instruments.

However, complete removal of bacterial deposits and their toxins from the root surface within the periodontal packets is not always achieved with only the use of conventional mechanical therapy. In addition, access to areas such as furcations and grooves is limited owing to the complicated root anatomy. Further conventional mechanical debridement using curettes is still technically demanding and time-consuming, and power scalers sometimes cause discomfort and stress in patients as a result of noise and vibration. Recently, the benefits of lasers, such as ablation, bactericidal and detoxification effects, as well as photo-biomodification, have been reported to be useful for
periodontal pocket treatment, and the application of lasers has been suggested as an adjunctive or alternative tool to conventional periodontal mechanical therapy.

**Removal of subgingival calculus**
The CO₂ laser cannot be used for calculus removal because this laser readily causes melting and carbonization on the dental calculus. The Nd:YAG laser is also basically ineffective for calculus removal when the clinically suitable energy is employed. Unlike these lasers, the Er:YAG laser is capable of easily removing subgingival calculus without a major thermal change of the root surface. The level of calculus removal by this laser is similar to ultrasonic scaling, and the depth of cementum ablation has been reported generally to be 15-30 µm when the contact tip is applied obliquely to the root surface. Furthermore, Er:YAG laser treatment in vivo might provide selective subgingival calculus removal to a level equivalent to that provided by scaling and root planing. Recently, a similar performance for calculus removal has been reported with the Er:Cr:YSGG laser. However, a lower degree of calculus removal with the Er:YAG laser than with scaling and root planing has also been noted in another in vivo study.

**Root surface alterations:**
The CO₂ laser readily carbonizes the root cementum, and cyan- derived toxic products, such as cyanamid and cyanate ions, have been clearly detected on the carbonized layer by chemical analysis using Fourier transform infrared spectroscopy. The residual char layer has been demonstrated to inhibit periodontal soft tissue attachment in vivo, and thus focused CO₂ laser irradiation is contraindicated for root surface treatment.

**Bactericidal and detoxification effects**
Conventional methods for the treatment of periodontal disease are not completely effective in eliminating all types of bacteria. Although systemic and local administration of antibiotics into periodontal pockets is occasionally-effective for disinfection, the frequent usage of antibiotics bears the potential risk of producing various resistant microorganisms. These limitations have led to a shift in emphasis from a purely mechanical approach to the use of novel technical modalities having additional bactericidal effects, such as lasers.

**Periodontal pocket treatment**
One of the possible advantages of laser treatment of periodontal pockets is the debridement of the soft tissue wall. Conventional mechanical tools are not effective for the complete curettage of the soft tissue. Gold & Vilardi reported the safe application of the Nd:YAG laser (1.25 and 1.75 W, 20 Hz) for removal of the pocket-lining epithelium in periodontal pockets without causing necrosis or carbonization of the underlying connective tissue in vivo. Recently, use of an Nd:YAG laser in a laser-assisted new attachment procedure has been advocated to remove the diseased soft tissue on the inner gingival surface of periodontal pockets,(Food and Drug Administration 510 k clearance k030290). Quite recently, a case series by Yukna et al. reported that the laser-assisted new attachment procedure could be associated with cementum-mediated new connective tissue attachment and apparent periodontal regeneration on previously diseased root surface in humans.

**Surgical pocket therapy**
In order for a periodontal surgical procedure to be successful with optimal tissue regeneration, it is necessary for the root surface and bone defect to be completely debrided and decontaminated. Laser application is effective in debriding areas of limited accessibility, such as deep intrabony defects and furcation areas where mechanical instruments cannot eliminate microbiological etiologic factors. Laser irradiation can facilitate complete debridement of the defect as a result of its ablation effect as well as improved accessibility when there is contact of the tip of the laser.

**The Advantages and Disadvantages of Laser Application In Periodontal Therapy**

**Advantages:**
Because of the photo-physical characteristics of lasers, laser irradiation exhibits strong ablation, hemostasis, detoxification and bactericidal effects on the human body.
These effects could be beneficial during periodontal treatment, especially for the fine cutting of soft tissue as well as in the debridement of diseased tissue. This, in periodontal therapy, laser treatment may serve as an alternative or adjunctive therapy to mechanical approaches. Previously introduced laser systems showed strong side effects, causing melting, cracking and carbonization of hard tissues, such as root and bone. The recently developed Er: YAG and Er,Cr:YSGG lasers, however, can ablate both soft and hard tissues safely with water irrigation and are applicable to periodontal treatments such as scaling, debridement and bone surgery, and have minimal thermal effect. Thus, the erbium laser group has shown promise as a laser system for periodontal treatment approaches on hard tissues.9

Disadvantages:
First, the high financial cost of a laser apparatus is a significant barrier for laser utilization by periodontal practitioners. Second, each laser has different characteristics because of their different wavelengths. Thus, laser users should know the fundamental characteristics of each laser. However, only a few academic institutions provide proper and systematic education of the use of lasers in dentistry. For this reason, it is difficult for the users to learn all aspects of the techniques and precautions required for the newer technologies. Improper irradiation of teeth and periodontal pockets by lasers can damage the tooth and root surfaces as well as the attachment apparatus at the bottom of the pocket. Possible damage to the underlying bone and dental pulp should also be considered.7

Conclusion:
In summary, laser treatment is expected to serve as an alternative or adjunctive to conventional mechanical periodontal treatment. Currently, among the different types of lasers available, Nd:YAG,Er:YAG and Er,Cr:YSGG laser possess characteristics suitable for dental treatment, due to its dual ability to ablate soft and hard tissues with minimal damage. In addition, its bactericidal effect with elimination of lipopolysaccharide, ability to remove bacterial plaque and calculus, irradiation effect limited to an ultra-thin layer of tissue, faster bone and soft tissue repair, make it a promising tool for periodontal treatment including scaling and root surface debridement.

Finally, in order to have a successful periodontal treatment in long term, patients need to be motivated. It is not so much the technology but the motivation and psychology that matter when it comes to practice of oral hygiene before, during and after the periodontal treatment to maintain a good and stable periodontal condition.

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Keywords: Laser, periodontics, periodontology - Sheehan R. Dsouza
INSTRUCTIONS TO AUTHORS

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5. Results
6. Discussion
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