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From the Patron's Desk .......

With great fervor we bring forth this issue of Indian Journal Of Comprehensive Dental Care. Our institute this year celebrates 25 glorious years of providing excellent dental education and care. The institute would be hosting a great extravaganza from nov 3rd -5th this year celebrating the 25th anniversary along with alumni meet, comprising of scientific and cultural events. This event is a matter of great pride for the entire institute and we welcome all for the same.

It has been our constant endeavor to upgrade scientific content and bring forth the recent and clinically oriented research to the readers. Our constant effort at the editorial board is to include scientific content that is of help to not only academicians but equally relevant to practitioners as well.

We hope to continue the tradition and would like to invite all readers to interact and advice us regarding any specific topics they would like us to include in the forthcoming issues. This shall enable us to get better with each issue and bond well with our readers.

Regards.

Dr. Kavipal Singh
Patron IJCDC,
Principal, SGRDIDSR
Editorial

Greetings to all the readers. This issue brings with it the 25th anniversary celebrations of our glorious institute and we take pride in celebrating the same from nov 3rd to 5th this year. It is going to be a great scientific and cultural extravaganza and we are enthralled for the event.

Today dentistry is encountering a host of problems. Criteria such as dental education, research direction and government policies are vital to the clinical dental practice. In a bid to provide solution, dentistry needs to reinvent itself. Focus of dentists should be realigned as oral physicians with more emphasis on preventive aspect of dental maladies and early curative interventions that is independent of financial remuneration and following best evidence-based dental practices.

Also inequalities in dental treatment between “rich and poor” as well as that of the “structural adjustment programs. There is an overproduction of dentists, most of whom provide services only in the main urban centers where private practice is more lucrative and services often fail to reach those in more remote areas of the country. In some cases, overproduction results in unemployment.

There is no doubt that the profession needs to discuss the concept of redefining and reinventing dentistry as “oral physicians” so that we do not disassociate ourselves from “overall oral health” like we did it with “general health.”

Regards

Dr. Shantun Malhotra

Editor-in-chief IJCDC
COMPARATIVE EFFICACY OF TEA TREE OIL NANOEMULGEL AND TEA TREE OIL GEL AGAINST CANDIDA ALBICANS.

ABSTRACTS:
Fungal skin infections are caused by different types of fungi, including dermatophytes and yeasts. Increased use of antibiotics and immunosuppressive drugs such as corticosteroids are major factors contributing to higher frequency of fungal infections. Fungi can infect almost any part of the body including skin, nails, respiratory tract, urogenital tract, alimentary tract, or can be systemic. Anyone can acquire a fungal infection, but the elderly, critically ill, and individuals with weakened immunity, due to diseases such as HIV/AIDS or use of immunosuppressive medications, have a higher risk. Nanoemulsion based gel is a promising approach. The present study was aimed to compare an in vitro efficacy of nanoemulgel, tea tree oil gel and placebo carbopol 934 P gel by cup-plate method. Tea tree oil loaded nanoemulgel was formulated using 1% w/w carbopol 934P in optimized nanoemulsion formulation. The antifungal study was carried out using Candida albicans strain (MTCC NO: 227). The zone of inhibition for tea tree oil nanoemulgel (37±1.3 mm) was found to be significantly higher ($p \leq 0.05$) as compared to tea tree oil gel (19±1.5 mm) and placebo carbopol 934P gel (00±1.1 mm). Based on the observations, it was concluded that tea tree oil in nanoemulgel formulations due to its nanosize is able to inhibit the growth of candida albicans more efficiently as compared to tea tree oil normal gel.

Keywords: Tea tree oil gel, nanoemulgel, carbopol 934 P, cup plate method, C. albicans

Introduction
Fungi are identified to be a cause of serious infection with increased frequency during the past two decades. Over 40 million people have suffered from fungal infections. Progression of infections can be rapid and serious due to compromise with immune function.

Fungal infections can range in severity from superficial to life-threatening. For example, fungal infections affecting only the top layers of the skin are readily treatable and have a relatively limited impact on quality of life. However, if a fungal infection enters systemic circulation, consequences can be deadly. Although several species of fungi are potentially pathogenic in humans, Candida (esp. Candida albicans) is the organism responsible for most fungal infections. Candida, which is normally present within the human body, is usually harmless. Candida is a type of fungus that can cause an infection in skin also. In normal conditions, skin may host...
small amounts of this fungus, but problems arise when it begins to multiply and creates an overgrowth. Candida skin infections can occur on almost any area of the body, but are more commonly found in intertriginous regions—where two skin areas may touch or rub together—such as armpits, the groin, skin folds, and the area between the fingers and toes. The fungus thrives in warm, moist, and sweaty conditions. Normally, the skin acts as an effective barrier against infection, but any cuts or breakdown in the superficial layers of the skin may allow the fungus to cause infection. The prognosis for candidal infections is often very good. Generally, the condition isn't serious and can be easily

<table>
<thead>
<tr>
<th>Strain No.</th>
<th>Formulation</th>
<th>Zone of Inhibition (mm) Mean ± S.D (n=3)</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTCC No.</td>
<td>Tea tree oil Nanoemulgel</td>
<td>37± 1.3 36.5± 1.3 36±1.4</td>
<td>Fungicidal action</td>
</tr>
<tr>
<td>227</td>
<td>Tea tree oil gel</td>
<td>19± 1.5 18.5±1.3 17.8±1.6</td>
<td>Fungicidal action</td>
</tr>
<tr>
<td>MTCC No.</td>
<td>Placebo carbopol 934 P gel</td>
<td>00 00 00</td>
<td>No action</td>
</tr>
<tr>
<td>227</td>
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</table>

Table 1: Zone of inhibition for different formulations against Candida albicans strain

![Graph showing zone of inhibition for different formulations against Candida albicans strain]
Fungal Infections can also invade deeper tissues as well as blood causing life threatening systemic infections. Therefore, it is very necessary to treat not only the superficial infections, but also the deeper ones. 

Tea tree oil has been used medicinally in Australia for more than 80 years, with uses relating primarily to its antimicrobial and anti-inflammatory properties. The oil is obtained by steam distillation from the Australian native plant Melaleuca alternifolia, and contains ~ 100 components, which are mostly monoterpenes, sesquiterpenes and related alcohols. Compositional ranges for 14 of the major components are stipulated in the International Standard (ISO 4730) and as such, oils compliant with the standard vary little in chemical composition. Tea tree oil shows promise as a topical antifungal agent, with recent clinical data indicating efficacy in the treatment of dandruff and oral candidiasis. Data from an animal model also indicate that it may be effective in the treatment of vaginal candidiasis. These clinical uses are supported by a wealth of in vitro susceptibility data. Further in vitro work has shown that tea tree oil and its components cause the leakage of intracellular compounds and inhibit respiration in bacteria. In the present study, the efficacy of tea tree oil loaded nanoemulgel is compared with tea tree oil loaded gel and placebo carbopol 934 P gel using cup and plate microbiological assay method.

Materials and Methods

Nanoemulsion and Nanoemulgel components

Where, N.E.G = Nanoemulsion Gel, P.C.G = Placebo carbopol 934 P Gel, T.T.O.G= Tea tree oil Gel

<table>
<thead>
<tr>
<th>Incubation Time (hrs)</th>
<th>Observations of Zone of Inhibition for different formulations</th>
</tr>
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<tbody>
<tr>
<td>24</td>
<td><img src="image1.png" alt="Image" /></td>
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<td>48</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>72</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
</tbody>
</table>

Table 2: Observations of Zones of Inhibition for different formulations evaluated against strain of Candida albicans at different time intervals

Figure 1: Comparison of zones of inhibition for different formulations during in vitro anti-fungal activity against Candida albicans (MTCC No: 227)
Tea tree oil was procured from Sigma Aldrich Pvt Ltd (Bangalore, India). Carbopol 934P was purchased from Sigma Aldrich Pvt Ltd (Bangalore, India). Transcutol P was obtained as a gift sample from Gattefosse (Saint Priest, Cedex, France). Tween 20 was purchased from Central Drug House, New Delhi, India. All other chemicals and reagents were of analytical grade and procured from Merck (Mumbai, India) and S.D. Fine Chem. (Mumbai, India).

**Strain, growth media and culture conditions**

*Candida albicans* MTCC No. 227 was procured from IMTECH (Institute of microbial technology, Chandigarh). *Candida albicans* was grown in suspension of YME (Yeast Malt Extract) and incubated at 28°C in B.O.D incubator shaker. Where necessary, the concentrations of viable cells in suspensions were confirmed by viable counts.

**Preparation of nanoemulgel, tea tree oil gel and placebo carbopol 934 P gel**

The tea tree oil nanoemulgel was prepared by using aqueous titration method by incorporating carbopol 934 P as a gelling agent. Tea tree oil gel and placebo carbopol 934 P gel were also prepared at Khalsa College of Pharmacy, Amritsar.

**In vitro antifungal activity using cup and plate method**

This study was done as per the procedure given by Maebashi et al 1995 and Vijayaet al 2014. From the candida albicans suspension (1x10^6 cfu/ml), 50 µl suspension was taken and spread on Sabouraud dextrose agar (SDA) plates aseptically with the help of sterile cotton swab. The plates were rotated through an angle of 60° after each application. Finally the swab was pressed round the edge of the agar surface. It was allowed to dry at room temperature with the lid closed. Then, three wells of about 3mm diameter were punched using sterile core borer into the agar medium and filled with tea tree oil nanoemulgel (1g), tea tree oil normal gel (1g) and placebo carbopol 934 P gel (1g) respectively. The plates were kept in refrigerator for 2 hours to facilitate uniform diffusion of the drug. Then the plates were incubated at 28°C for 18-24hrs. Observation was made for zone of inhibition around the well. The zones of inhibition obtained for tea tree oil nanoemulgel, Tea tree oil gel and placebo carbopol 934 P gel were compared.

**Statistics**

Results were expressed as mean± standard deviation (S.D). The data obtained from various groups were statistically analysed using Graph Pad Instat 3, using two tailed paired t-test. Values at p ≤ 0.05 were considered significant.

**Result and Discussion**

**In vitro anti-fungal activity by using cup and plate method**

*In vitro* anti-fungal activity was evaluated by using cup and plate method.

**Determination of zones of inhibition by using cup and plate method**

The zones of inhibition that appeared around the formulations evaluated on the S.D.A plate were measured. The zone of inhibition for tea tree oil nanoemulgel (37±1.3 mm) was found to be significantly higher (p≤ 0.05) as compared to tea tree oil gel (19±1.5 mm) and placebo carbopol 934 P gel (00mm). The larger zone of inhibition for tea tree oil loaded nanoemulgel could be attributed to the presence of tea tree oil in nanosize in the gel, which resulted in a greater diffusion of tea tree oil through S.D.A which ultimately resulted in higher fungicidal effect due to greater inhibition of synthesis of ergosterol, a sterol, which is required for maintaining the integrity of cell wall of fungi. The results are given in table 1, table 2 and figure 1.

**Inference:** The zone of inhibition for tea tree oil nanoemulgel (37±1.3 mm) was found to be significantly higher (p≤ 0.05) as compared to tea tree oil gel (19±1.5 mm) and placebo carbopol 934 P gel (00 mm). It can thus be concluded that nanoemulgel of tea tree oil significantly increases the antifungal activity of tea tree oil against Candida Albicans as compared to tea tree oil gel and placebo carbopol gel.

**References**


15. Vijaya R, Kumar SS, Kamalakannan S. Preparation and in vitro evaluation of miconazole nitrate nanoemulsion using tween 20 as surfactant for effective topical / transdermal delivery. Journal of Chemical and Pharmaceutical Sciences 2014;8(1);92-98.
ABSTRACT:
Aim: The aim of this study was to compare the canal transportation, canal centering ability, change in curvature and loss of working length after instrumentation with Revo S and K3XF file system by using cone beam computed tomography (CBCT).

Materials and Methods: Hundred mesiobuccal canals of first and second molars with an angle of curvature ranging from 15 to 45 degrees were divided according to the instrument used in canal preparation into two groups of fifty samples each: Revo S (group I) and K3XF (group II). The teeth were instrumented according to manufacturer’s guidelines, with all groups being prepared to size 25, 0.06 taper master apical file. Canals were scanned using CBCT scanner before and after preparation to evaluate the transportation, centering ratio at 3 mm, 6 mm and 9 mm from the apex and change in canal curvature. The change in working length was measured with Apex ID (Sybron Endo) apex locator in thirty patients after instrumentation with Revo S (group III) and K3XF (group IV) file system. The data collected were evaluated using student ‘t’ and Mann-whitney test.

Results: K3XF file system showed less mean canal transportation, better canal centering ability values and maintained the original canal curvature well as compared to Revo S file system but the results were statistically insignificant (p > 0.05). There was no significant difference between two groups regarding change in working length after instrumentation.

Conclusion: Although the canal transportation, centring ability, change in canal curvature and loss of working length was less for K3XF file system but the results were statistically insignificant.

INTRODUCTION
Thorough cleaning and shaping of the root canal is a prime criterion for successful endodontics. Variations of canal sections, canal irregularities and associated curvature diversity render procedure failures almost inevitable. The goal of instrumentation is to produce a continuously tapered preparation that maintains the canal anatomy without any deviation from original canal curvature.\(^1\)

The mechanical preparation of curved canals remains a challenge for both novices and skilled clinicians. The Glossary of Endodontic Terms of American Association of Endodontists defines transportation as "the removal of canal wall structure on the outside curve in the apical half of the canal due to tendency of files to restore themselves to their original linear shape during canal preparation."\(^2\)

Canal centring ability is defined as the ability of the
instrument to stay centred in the canal. Various parameters that affect the canal centring ability include the alloys used in manufacturing instruments and instrument design which further include cross-section, taper and tip of instrument.\(^3\) The advent of nickel-titanium rotary file system has revolutionized root canal treatment by reducing time required to finish preparation and other procedural errors associated with root canal instrumentation. Revo-S (Micromega, Besancon, France) is one such recently introduced rotary file system. These files have asymmetrical cross-section, taper and tip of instrument.

TABLE I shows the statistical analysis of intergroup comparison of canal transportation.

<table>
<thead>
<tr>
<th>Canal Transportation</th>
<th>Group I Mean ± SD</th>
<th>Group II Mean ± SD</th>
<th>Z value(^#)</th>
<th>P value(^#)</th>
<th>(t) value(^$)</th>
<th>P value(^$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At 3 mm</td>
<td>0.054 ± 0.155</td>
<td>0.014 ± 0.109</td>
<td>1.555</td>
<td>0.120(^{NS})</td>
<td>1.491</td>
<td>0.139(^{NS})</td>
</tr>
<tr>
<td>At 6 mm</td>
<td>0.042 ± 0.149</td>
<td>0.034 ± 0.167</td>
<td>0.215</td>
<td>0.945(^{NS})</td>
<td>0.247</td>
<td>0.806(^{NS})</td>
</tr>
<tr>
<td>At 9 mm</td>
<td>0.022 ± 0.153</td>
<td>0.010 ± 0.202</td>
<td>0.346</td>
<td>0.729(^{NS})</td>
<td>0.335</td>
<td>0.739(^{NS})</td>
</tr>
</tbody>
</table>

#Mann-Whitney test; $ Student \(t\) test; NS; p > 0.05; Not Significant; *p < 0.05; Significant

TABLE II shows the statistical analysis of intergroup comparison of canal centring ability.

<table>
<thead>
<tr>
<th>Canal Centring Ratio</th>
<th>Group I Mean ± SD</th>
<th>Group II Mean ± SD</th>
<th>Z value(^#)</th>
<th>P value(^#)</th>
<th>(t) value(^$)</th>
<th>P value(^$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At 3 mm</td>
<td>1.3332 ± 0.758</td>
<td>1.2826 ± 0.705</td>
<td>0.242</td>
<td>0.809(^{NS})</td>
<td>0.346</td>
<td>0.730(^{NS})</td>
</tr>
<tr>
<td>At 6 mm</td>
<td>1.5280 ± 0.806</td>
<td>1.4052 ± 0.979</td>
<td>0.945</td>
<td>0.345(^{NS})</td>
<td>0.685</td>
<td>0.495(^{NS})</td>
</tr>
<tr>
<td>At 9 mm</td>
<td>1.3592 ± 0.749</td>
<td>1.2452 ± 0.765</td>
<td>0.346</td>
<td>0.729(^{NS})</td>
<td>0.753</td>
<td>0.453(^{NS})</td>
</tr>
</tbody>
</table>

#Mann-Whitney test; $ Student \(t\) test; NS; p > 0.05; Not Significant; *p < 0.05; Significant

TABLE III shows statistical analysis of intergroup comparison of change in canal curvature.

<table>
<thead>
<tr>
<th>Group</th>
<th>Change in Canal Curvature Mean ± SD</th>
<th>Z value(^#)</th>
<th>P value(^#)</th>
<th>(t) value(^$)</th>
<th>P value(^$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>2.320 ± 1.203</td>
<td>0.463</td>
<td>0.643(^{NS})</td>
<td>0.487</td>
<td>0.627(^{NS})</td>
</tr>
<tr>
<td>Group II</td>
<td>2.200 ± 1.262</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#Mann-Whitney test; $ Student \(t\) test; NS; p > 0.05; Not Significant; *p < 0.05; Significant
cross section with three sharp cutting edges. The K3XF rotary file system has been developed in 2011 by Sybron Endo (Orange, CA). These files were designed with a wide radial land to make the instrument more resistant to torsional stresses.

Several methodologies have been used to evaluate the efficacy of nickel-titanium instruments in remaining centred during preparation. These include radiographic imaging, cross-sectioning, longitudinal cleavage of teeth. More recently the use of cone beam computed tomography has been suggested for this purpose with good results because it is a non-destructive method. 1

The aim of this study was to evaluate the efficacy of two new nickel-titanium rotary instruments in maintaining canal centring ability, root canal transportation and canal curvature in mesiobuccal canals of extracted molars with the help of cone beam computed tomography and to evaluate change in working length by using apex locator in patients undergoing root canal treatment.

MATERIALS AND METHODS:

In vitro study:

The in-vitro study was conducted on freshly extracted one hundred molars collected from the Department of Oral and Maxillofacial Surgery, Sri Guru Ram Das Institute of Dental Sciences and Research, Amritsar. The selected teeth were cleaned and washed off all debris and were stored in 10% formalin.

Occlusal surfaces of all the teeth were flattened up to roof of pulp chamber using diamond disc and straight handpiece (NSK, Japan). The selected teeth had root curvatures between 15 degree to 45 degree. In case of maxillary molars distobuccal and palatal roots and in mandibular molars distal roots were sectioned at furcation level and discarded. The specimen were embedded in acrylic. Cone Beam Computed Tomographic (CBCT) images for all prepared teeth were obtained before instrumentation, with CS9300 equipment (Carestream Healthcare India (P) Ltd) in the high resolution dental mode at 84 kV, 5mA and 20s. Image assessment was performed by using the CBCT software tools (DICOM software).

The coronal access was made using round bur under water spray cooling high speed handpiece (NSK, Japan) followed by the straight line access of the walls with an Endo-Z bur (Dentsply Maillefer, Switzerland). The working length was determined by inserting #10 K file (Dentsply Maillefer, Switzerland) in mesiobuccal canal until it was visible through apical foramen and then 1mm was subtracted from the recorded length. Sample of hundred teeth were randomly divided into two groups with fifty teeth in each group:

Group I: Fifty teeth were instrumented using Revo-S (MicroMega, Besancon, France) rotary file system in the sequence of: SC1 (25/0.06) was taken into canal upto 2/3rd of working length, SC2 (25/0.04) and SU (25/0.06) was taken up to working length.

Group II: Fifty teeth were instrumented using K3XF (SybronEndo, Orange, CA) rotary file system in a given sequence: # 25/0.12 followed by # 25/0.10 and # 25/0.08 was taken into canal until resistance and # 25/0.06 was taken upto working length.

All the mesiobuccal canals were instrumented with crown down technique at a speed of 350rpm and a torque control level of 2.5Ncm by using 16:1 reduction handpiece powered by an endodontic motor (Endo-Mate DT; NSK, Japan). After the use of each file the root canals was irrigated with 5% sodium hypochlorite.

The postoperative scan was done using same parameters as in preoperative scan. Canal curvature was evaluated by using Schneider’s technique and the comparison was made between canal curvature before and after instrumentation with two different rotary file systems. Canal centring ability and canal transportation was evaluated at three sections of root canal: at 3mm (apical third), 4mm (middle third), 9mm (coronal third) from the root apex.

The following formula was used for the calculation of canal transportation:

\[ \frac{[(M_1 - M_2) - (D_1 - D_2)]}{(M_1 - M_2) / (D_1 - D_2) or (D_1 - D_2) / (M_1 - M_2)} \]

And centring ability was calculated by using following ratio:

\[ \frac{[(M_1 - M_2) - (D_1 - D_2)]}{(M_1 - M_2) / (D_1 - D_2) or (D_1 - D_2) / (M_1 - M_2)} \]

where, M1 is the shortest distance from the mesial edge of
the root to the mesial edge of the uninstrumented canal, D1 is the shortest distance from distal edge of the root to the distal edge of the uninstrumented canal, M2 is the shortest distance from the mesial edge of the root to the mesial edge of the instrumented canal, D2 is the shortest distance from distal edge of the root to the distal edge of the instrumented canal.

According to this formula, a result other than 0 indicates that transportation has occurred in the canal. According to this formula, a result of 1 indicates perfect centralization capacity and closer the result to zero the worse the ability of the instrument to keep itself in the canal central axis.

**In vivo study:**

The in-vivo part of study was conducted on patients visiting the Department of Conservative Dentistry and Endodontics of Sri Guru Ram Das Institute of Dental Sciences and Research, Sri Amritsar for root canal treatment of molars. The study was undertaken to further evaluate change in working length with Apex ID apex locator (SybronEndo) in clinical conditions. The coronal access was made under local anesthesia with rubber dam isolation using round bur under water spray cooling high speed handpiece followed by the straight line access of the walls with an Endo-Z bur (Dentsply Maillefer, Switzerland). Before instrumentation working length was taken with #10 K file (Dentsply Maillefer, Switzerland) using Apex ID (SybronEndo) apex locator. According to rotary file system used two groups were taken with fifteen teeth in each group:

- **Group III:** Fifteen teeth were instrumented using Revo-S (MicroMega, Besancon, France) rotary file system in the sequence of: SC1 (25/0.06) was taken into canal upto 2/3rd of working length, SC2 (25/0.04) and SU (25/0.06) was taken to working length.
- **Group IV:** Fifteen teeth were instrumented using K3XF (SybronEndo, Orange, CA) rotary file system in a given sequence: # 25/0.12 followed by # 25/0.10 and # 25/0.08 was taken into canal until resistance and # 25/0.06 was taken upto working length.

Canals were prepared with rotary file systems using crown down technique at a speed of 350rpm and a torque control level of 2.5Ncm by using 16:1 reduction handpiece powered by an endodontic motor (Endo-Mate DT; NSK, Japan). After the use of each file the root canals were irrigated with 5% sodium hypochlorite. The second measurement of working length was recorded and difference between it and the initial measurement was calculated.

**RESULTS:**

The mean value of canal transportation was greater for group I than that in group II as summarized in table I but the results were statistically insignificant (p>0.05). The mean centring ability of group II was better than group I as shown in table II but the results were statistically insignificant (p>0.05).

The mean value of change in canal curvature as tabulated in table III was more for group I than group II but insignificant results were found. The mean value of loss of working length was less for group IV than group III as summarized in table IV but the results were statistically insignificant (p>0.05).

**DISCUSSION:**

Successful endodontic therapy is based on the classical triad of diagnosis, adequate biomechanical preparation and obturation. The second stage of the endodontic triad, i.e. biomechanical preparation, is one of the most important aspects of endodontics. In straight root canals, it is relatively simple to achieve this but in curved canals, maintaining the original canal anatomy constitutes a great challenge, especially with traditional hand instruments made of stainless steel. Studies have shown that nickel–titanium instruments have two to three times higher elastic flexibility, shape memory property as compared to conventional stainless steel instruments.

Table 1 shows the statistical analysis of intergroup comparison of canal transportation. The findings of present study are in concurrence to Hashem AA, et al. (2012) who found that the mean value canal transportation of Revo S at apical third was 0.044 ± 0.015mm which is almost similar to the findings of present study. The results of present study are in contrary to Jain D, et al. (2015) who reported that the mean canal transportation value of Revo S at apical third was 0.024mm which is less as compared to present study (0.054mm). This could be attributed to the reason that the instruments of this system except SC2 has asymmetrical cutting edges thus providing more flexibility through decreasing core diameter and thus working by fitting to the original canal.

According to present study the mean value of apical transportation for K3XF (group II) was 0.014 ± 0.109mm which was less than the Revo S (group I), although the results were statistically insignificant. This was in concurrence with the study by Maitin N, et al. (2013) who reported that the mean value of canal transportation by K3 rotary file system at apical level was less than other instruments used for preparation in their study. This may be related to the fact that K3XF is manufactured using R-phase technology. The manufacturer states that the R-phase heat treatment improves the flexibility and cyclic fatigue resistance of K3XF instruments.

Although the mean canal transportation at middle third was more for Revo S but the results were non significant (p>0.05). The findings of present study are contrary to Jain D, et al. (2015) who found that the mean value of canal transportation of Revo S file at middle third was 0.022mm which is less as compared to the findings of present study. This could be attributed to the fact that Revo S file has...
asymmetrical cross section which increases its flexibility.

The mean canal transportation at cervical third was more for Revo S but the result was statistically non significant (p>0.05). The findings of present study are in concurrence with study by Elsherief SM, et al. 11 (2013) who concluded that the canal transportation was more for Revo S file system when compared with individual file systems. In present study, the mean canal transportation at cervical third was less for K3XF file system (0.010 ± 0.202mm). The results are in concurrence with Maitin N, et al. 12 (2013) who reported that the mean value of canal transportation by K3 rotary file system at coronal level was less than the other instruments used for preparation in their study. The results of present study are in contrary to Zhao D, et al. 13 (2013) who reported that the mean value of canal transportation by K3 at cervical third was more (0.056 ± 0.055mm) in comparison to our findings (0.010 ± 0.202mm).

TABLE II shows the statistical analysis of intergroup comparison of canal centring ability. The centring ability is less for Revo S group than for K3XF but the results were statistically non significant (p>0.05). The above findings are in concurrence with Aguiar CM, et al. 9 (2012) who reported similar value of centring ratio for Revo S at apical third as in present study. The results are contrary to Fayyad DM, et al. 7 (2012) who found that the centring ability of Revo S was better than the other file system with which it was compared. The mean centring ability of Revo S is less than K3XF (1.4052 ± 0.979). The findings of present study are in concurrence with Arora A, et al. 14 (2014) who found that the centring ability of Revo S at 6mm was less than other file systems used for instrumentation in their study. The results are not in concurrence with Jain D, et al. 15 (2015) who reported that the centring ability of Revo S file system at middle third was best when compared to individual file systems. This could be attributed to the fact that Revo S has the progressive pitch which avoids screwing effects while working in canal as stated by manufacturers.

The mean value of centring ratio for Revo S at 9mm was 1.3592 ± 0.749 and for K3XF was 1.2452 ± 0.765. The above findings are in concurrence with Aguiar CM, et al. 9 (2012) who reported almost same value of centring ratio for Revo S at cervical third as in present study. Observing the results of present study, the centring ability of K3XF file system was better as compared to other system. These results are in concurrence with Al-Sudani D and Al-Shahrani S. 5 (2006) who found that the centring ability of K3 was more as compared to individual file systems of their study. This could be attributed to the fact that K3 has three radial lands. The third radial land helps to prevent instrument from threading itself into the canal.

TABLE III shows statistical analysis of intergroup comparisson of change in canal curvature. K3XF maintained canal curvature well as compared to Revo S but the results were statistically insignificant (p>0.05). The findings of present study are in concurrence with Cai HX, et al. 16 (2014) who compared the root canal shaping ability of K3 with other file system. The above findings are contrary to Batouty KM and Elmallah WE. 7 (2011) who evaluated that K3 showed higher value of mean change in canal curvature than Twisted file. This may be related to the fact that K3 has 45 degree rake angle. Because dentin is a dense and resilient material, instrument having a positive rake angle actually works like a shaver on dentin surface.

The findings of present study are in concurrence with Burklein S, et al. 17 (2014) who found that Revo S showed highest mean value of canal straightening after instrumentation in comparison with other two file systems. This could be attributed to the fact that Revo S file has extended cutting part in coronal region. The results are contrary to Jain D, et al. 18 (2015) who evaluated that mean change in canal curvature with Revo S was 1.68 ± 0.53 degrees which is less as compared to present study.

TABLE IV shows statistical analysis of intergroup comparison of loss of working length.

The mean loss of working length was less for K3XF file system in comparison to Revo S file system but the results are statistically non significant (p>0.05). This may be related to fact that K3XF is manufactured using R- phase technology. The findings of present study are in concurrence with Martin-Mico M, et al. 19 (2009) who found that the mean loss of working length after preparation with K3 was significantly less when compared with ProTaper, Mtwo and RaCe file systems. The results are contrary to Olivieri JG, et al. 20 (2014) who evaluated that the mean change of working length with K3XF file system was zero. This could be attributed to the fact that in above study, they evaluated working length change in manikin model using digital radiography. The results of present study are accordingly to Burklein S, et al. 17 (2014) who found that Revo S showed significantly more loss of working length than Hyflex CM. The findings of present study are in contrary to Celik D, et al. 1 (2013) who reported that the mean loss of working length by Revo S was 0.1933 ± 0.171mm. This finding might be attributed to the difference of methodology, especially evaluation technique.

CONCLUSION:

Within the limitation of the present study, the following conclusions can be drawn:

Both K3XF and Revo S file systems showed canal transportation. Although the mean value of canal transportation by K3XF file system was less as compared to Revo S but the result was statistically insignificant.

The centring ability of K3XF file system was better...
than Revo S file system but the difference was statistically insignificant.

K3XF file system maintained the original canal curvature well as compared to Revo S file system but insignificant results were found.

Although the mean value of loss of working length after instrumentation with K3XF file system was less as compared to Revo S file system but the results were statistically insignificant.

REFERENCES:


AN ANALYSIS OF KNOWLEDGE REGARDING, ORAL HEALTH OF CHILDREN THROUGH PRE AND POST EDUCATION QUESTIONNAIRE SURVEY AMONG THE CARE GIVERS

ABSTRACT
Aim. The study was carried out to assess (or scrutinize) the knowledge regarding child's oral health among the caregivers and to uplift their awareness regarding the same, through education sessions.

Material and methods: A questionnaire based survey was conducted among 100 caregivers. A pre-education questionnaire survey was conducted to evaluate initial knowledge, followed by education session, thereafter a post education questionnaire survey was conducted to assess the knowledge and awareness acquired through the session.

Results: The difference in percentage of caregivers answering the questionnaire correctly before and after the education session was significant implying considerable gain in knowledge and awareness about children's oral health.

Discussion: In our study, care-givers showed some degree of knowledge about child's oral health before the education session, but increase in awareness as implied in post-education sessions points to the importance of educating the mothers in preventing the childhood caries and maintaining good oral health.

INTRODUCTION
It is widely acknowledged that the attitudes and behaviour of parents, and in particular, mothers, affects their children's health. The adoption of good oral health habits in childhood often takes place with parents, especially with mothers. Childhood caries is more prevalent in low-income populations due to their lack of knowledge about the caries and its consequences. Such parents often wait until caries in primary teeth become symptomatic and then subsequent visit to dentist. Management of such conditions are invasive and parents tend to avoid subsequent treatment until their children's need again become extreme. The etiology of the condition is a combination of frequent consumption of fermentable carbohydrates as drinks, with on-demand breast- or bottle-feeding, oral colonization by cariogenic
Prevention of nursing caries can be achieved mainly by education of parents and by identification of "high-risk" children. The common approach in caries prevention is educating the parents, however, traditional health education may be insufficient to change parents' behaviour in relation to their high-risk children, as parents do not go to health professionals in a state of readiness to change patterns of oral health and various methods to promote their wards healthy lifestyles from birth. They are also said to undervalue the importance of continuing consistency in action in child rearing. Maternal attitudes are likely to modify behaviours and thus, play an important part in the uptake of favourable dental health practices. Mothers low education level, her age, rural domicile of the mother and infrequent tooth cleaning, the presence of plaque on the child’s teeth, and frequent sugar consumption by the children have been associated with poor oral health of the children.²

Studies indicating an increase in severity of dental caries also suggest that mothers neither stress upon teaching their children, healthy lifestyles from birth. They are also said to undervalue the importance of continuing consistency in action in child rearing. Maternal attitudes are likely to modify behaviours and thus, play an important part in the uptake of favourable dental health practices. Mothers low education level, her age, rural domicile of the mother and infrequent tooth cleaning, the presence of plaque on the child’s teeth, and frequent sugar consumption by the children have been associated with poor oral health of the children.²

Hence, the present study is undertaken to know the education level of the caregivers and to evaluate the effectiveness of educating caregivers and their role in identification and prevention of dental diseases in children.

**MATERIALS AND METHOD**

This research was a survey study designed to explore mothers /guardians/caregivers knowledge about dental or oral health and various methods to promote their wards health and to evaluate the efficacy of education given to them..

This study was conducted in the department of Pedodontics and Preventive dentistry at SGRD Dental college, Amritsar. Data was collected from 100 mothers /female guardians. Two structured formats consisting of 15 (same) questions, titled , pre-education and post education formats were prepared for face to face interview. All the interviews were conducted by one female interviewer who had been carefully trained to avoid leading questions and to use the exact wording of the questions. The data collection was

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**Table 1-PRE-EDUCATION SESSION QUESTIONNAIRE**

<table>
<thead>
<tr>
<th>S.No</th>
<th>QUESTIONS</th>
<th>TRUE</th>
<th>FALSE</th>
<th>DON'T KNOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pregnant women should not wait until, after giving birth to see dentist</td>
<td>69</td>
<td>31</td>
<td>00</td>
</tr>
<tr>
<td>2</td>
<td>Caregivers should wipe infant’s gums with soft clothes</td>
<td>80</td>
<td>20</td>
<td>00</td>
</tr>
<tr>
<td>3</td>
<td>Brushing should be started as soon as first tooth erupts</td>
<td>20</td>
<td>80</td>
<td>00</td>
</tr>
<tr>
<td>4</td>
<td>Hard Brush should be used for cleaning teeth</td>
<td>22</td>
<td>78</td>
<td>00</td>
</tr>
<tr>
<td>5</td>
<td>Children need help brushing teeth even after age 2</td>
<td>92</td>
<td>08</td>
<td>00</td>
</tr>
<tr>
<td>6</td>
<td>Dental Caries are caused by Bacteria</td>
<td>84</td>
<td>16</td>
<td>00</td>
</tr>
<tr>
<td>7</td>
<td>Adults should help children brushing teeth until age 8</td>
<td>64</td>
<td>32</td>
<td>00</td>
</tr>
<tr>
<td>8</td>
<td>Mouth Rinsing should be done after eating sweet things</td>
<td>94</td>
<td>06</td>
<td>00</td>
</tr>
<tr>
<td>9</td>
<td>Brushing should be done once a day</td>
<td>78</td>
<td>22</td>
<td>00</td>
</tr>
<tr>
<td>10</td>
<td>Brushing should be done after heavy meals</td>
<td>83</td>
<td>17</td>
<td>00</td>
</tr>
<tr>
<td>11</td>
<td>Babies should not be put to bed with bottles</td>
<td>76</td>
<td>24</td>
<td>00</td>
</tr>
<tr>
<td>12</td>
<td>Putting Children to bed with milk/formula/juice harm their teeth</td>
<td>69</td>
<td>31</td>
<td>00</td>
</tr>
<tr>
<td>13</td>
<td>Deciduous Teeth to be prevented from decay</td>
<td>81</td>
<td>19</td>
<td>00</td>
</tr>
<tr>
<td>14</td>
<td>Children with high tooth decay risk can use fluoride toothpaste</td>
<td>22</td>
<td>17</td>
<td>61</td>
</tr>
<tr>
<td>15</td>
<td>Community water Fluoridation reduce tooth decay</td>
<td>15</td>
<td>16</td>
<td>69</td>
</tr>
</tbody>
</table>
conducted in the waiting area while the children received dental treatment. No names or other identifying information was collected.

For each respondent, first pre-education questionnaire was filled, and then a small education lecture was given after which, second that is post education questionnaire consisting of same questions was given to evaluate the difference between pre-education and post-education questionnaire.

RESULTS

A total of 200 questionnaires were distributed for 100 subjects, one each before the education session and one after the session.

The results of the study as implied from pre education session questionnaire (Table 1) are discussed first. 69% of the caregivers responded positively with the statement that pregnant women should not wait until, after giving birth to see a dentist whereas the other 31% responded negatively.

80% of the caretakers thought that infant’s gums should be wiped with soft clothes and other 20% disagreed. Only 20% of the subjects agreed that brushing should be started as soon as first tooth erupts, rest 80% do not share the same opinion. Also, 22% of the care-givers favoured the use of hard brush to clean teeth, but rest 78% were aware to not use which, second that is post-education questionnaire.

Table 2 -POST EDUCATION-SESSION QUESTIONNAIRE

<table>
<thead>
<tr>
<th>S.No</th>
<th>QUESTIONS</th>
<th>TRUE</th>
<th>FALSE</th>
<th>DON'T KNOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pregnant women should not wait until after giving birth to see dentist</td>
<td>97</td>
<td>03</td>
<td>00</td>
</tr>
<tr>
<td>2</td>
<td>Caregivers should wipe infant's gums with soft clothes</td>
<td>100</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>3</td>
<td>Brushing should be started as soon as first tooth erupts</td>
<td>98</td>
<td>02</td>
<td>00</td>
</tr>
<tr>
<td>4</td>
<td>Hard Brush should be used for cleaning teeth</td>
<td>04</td>
<td>96</td>
<td>00</td>
</tr>
<tr>
<td>5</td>
<td>Children need help brushing teeth even after age 2</td>
<td>100</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>6</td>
<td>Dental Caries are caused by Bacteria</td>
<td>99</td>
<td>01</td>
<td>00</td>
</tr>
<tr>
<td>7</td>
<td>Adults should help children brushing teeth until age 8</td>
<td>100</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>8</td>
<td>Mouth Rinsing should be done after eating sweet things</td>
<td>100</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>9</td>
<td>Brushing should be done once a day</td>
<td>54</td>
<td>46</td>
<td>00</td>
</tr>
<tr>
<td>10</td>
<td>Brushing should be done after heavy meals</td>
<td>97</td>
<td>03</td>
<td>00</td>
</tr>
<tr>
<td>11</td>
<td>Babies should not be put to bed with bottles</td>
<td>92</td>
<td>08</td>
<td>00</td>
</tr>
<tr>
<td>12</td>
<td>Putting Children to bed with milk/formula/juice harm their teeth</td>
<td>98</td>
<td>02</td>
<td>00</td>
</tr>
<tr>
<td>13</td>
<td>Deciduous Teeth to be prevented from decay</td>
<td>100</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>14</td>
<td>Children with high tooth decay risk can use fluoride toothpaste</td>
<td>99</td>
<td>01</td>
<td>00</td>
</tr>
<tr>
<td>15</td>
<td>Community water Fluoridation reduces tooth decay</td>
<td>99</td>
<td>01</td>
<td>00</td>
</tr>
</tbody>
</table>
takers did not favour the use of bottle while sleeping but the rest 24% favoured the same. 69% agreed with harmful
effects of putting children to bed with milk/formula/juice while 31% disagreed. 81% of the care-givers were
affirmative, when asked whether healthy milk teeth are important and 19% disagreed. 22% of care-takers agreed to
the benefits of fluoridated tooth pastes in preventing tooth decay, 17% disagreed whereas 61% knew nothing about
fluoride tooth pastes. 15% of the care-takers believed that community water fluoridation helps in reducing tooth decay,
16% disagreed whereas 69% were not aware of community water fluoridation.

Results, as alluded from the post-education session questionnaire (Table 2) are as follows. Surprisingly, 100% of the
care-takers answered in favour of:

1. Care-givers should wipe infant’s gums with soft clothes
2. Children need help while brushing teeth even after age 2
3. Adults should help children brushing teeth until age 8
4. Mouth rinsing should be done after eating sweet things
5. Deciduous teeth need to be prevented from decay. 99%
of the care-takers agreed with following statements:
   1. Dental caries are caused by bacteria
   2. Fluoridated tooth pastes are beneficial in children with high risk of tooth decay
   3. Community water fluoridation reduces tooth decay

98% of the subjects, conceded with the fact that brushing should be started as soon as the first tooth erupts and also
admitted that putting children to bed with milk/formula/juice can harm their teeth. 97% of the respondents answered in favour that pregnant women should not wait until after giving birth to see the dentist and
with the fact that brushing should be done after every meal. 96% became aware that hard brush should not be used for
cleaning teeth and 92% apprehended that babies should not be put to bed with bottles. 46% of the subjects conceded that
brushing only once a day is not sufficient but 54% still denied the fact.

Discussion

Oral diseases particularly early childhood caries can be prevented to a great extent, if parents are adequately informed and motivated. Lack of awareness is one of the important factors affecting oral health. Poor health knowledge is associated with poorer opinions of health, decreased utilisation of services and poorer understanding of verbal and written instructions of self care. Maternal attitude towards oral health is significantly correlated to the oral health of their children.

This study has focused on assessing the knowledge of care-givers based on sequential questionnaire regarding oral health of children followed by thorough discussion and delivery of knowledge on aspects which were lacking in care-providers after which a post-education session questionnaire was held, to know the differences in the level of awareness.

Oral health measures are to be taken right from the time when a mother is pregnant. As depicted in various studies, there is a strong co-relation of a pregnant mother’s oral health and the unborn child. When first asked, only 69% of the care-takers believe that during pregnancy, there should be no delay in visiting a dentist if one encounters a dental problem whereas rest 31% were in the favor of delaying. This implies lack of knowledge regarding importance of mother’s oral health on unborn child’s oral health. However after elaborated discussion, 97% care-takers replied in affirmative of the same statement. Following this knowledge regarding cleaning infant’s gums was assessed, 80% of the subjects were aware that gums are to be wiped with wet soft cloth which was lower than Akpabioetal and lower than reported by Tagoetal. Brushing should be started as soon as first tooth erupts but only 20% of care-givers were aware of this fact before they were told for the first time about this during tour education session. 22% of the respondents didn’t knew that hard brushes should be avoided for cleaning the teeth. The effects of using hard brush and using brush in wrong way were discussed with the care-givers after which number favoring use of hard brush reduced to 4. It was not less than a surprise that 92% of the respondents were in favor of helping children in cleaning teeth even after age 2. This indicates the awareness and knowledge of respondents that even after 2 years of age children are not able to properly maintain their oral hygiene and need assistance. 84% of the subjects believed that causative agent for caries was bacteria whereas rest has no clue that caries itself is a disease caused by bacteria. Following education session 99% population got to know about the causative agent.

Following this, knowledge about the causative aspects of caries was assessed. The finding that 94% of the respondents correctly knew that rinsing should be done after eating sweet things was encouraging. There is a positive relationship between the mother’s own tooth brushing frequency and the child’s brushing frequency. 78% of the respondents answered in favour that brushing should be done only once a day, rest 22% considered brushing twice as the right answer. The recommended frequency of brushing is twice daily and subjects were made aware of the same. In our study 83% of the subjects agreed to the fact of cleaning teeth after every meal. Knowing that putting children to bed with milk/juice /
formula is a big predisposing factor for early childhood caries, the fact that only 69% of care givers were aware about it which was found to be less than as reported by Akpabio, which was alarming and required elaborated discussion with mothers. Parents did show good degree of knowledge about role of deciduous teeth with regards to effect on permanent teeth with 81% favouring prevention of deciduous teeth from decay, (which was found to be lower than as reported by Togoo) and not only permanent teeth before education session and response was 100% after education session.

In the end, an important preventive aspect was analyzed, the importance of fluoride tooth paste and community water fluoridation in preventing tooth decay but 69% of subjects had no clue of any of these (which was found to be less than as reported by Akpabio etal) whereas 22% of subjects favoured use of fluoridated tooth paste in preventing decay (which was found to be less than as reported by Togoo etal). Following this, a session regarding role of fluoride, amount to be used and how to be used was held with each subject, following which 99% of the subjects responded correctly post session questionnaire.

This study was an attempt to understand the knowledge about the oral health of children among caregivers and to know the aspects which require awareness nationwide. The study implied a positive correlation of education session and increased awareness about oral health of children among care givers as majority of the statements were answered correctly with a percentage of >90 following the education session. As proved in the previous studies as well on the same topic, the oral health behavior and knowledge of care givers effects the children's oral health and are positively related, regular and frequent oral health sessions must be held to ensure active role of care givers in maintaining good oral health of younger generation.

References


TO EVALUATE THE APPLICABILITY OF HOLDAWAY'S SOFT TISSUE NORMS AMONGST DIFFERENT MALOCCLUSIONS IN AMRITSAR POPULATION

ABSTRACT:
Soft tissue paradigm determines the goals and limitations of modern orthodontic treatment. The study of soft tissue norms becomes imperative for achieving aesthetic goals. The racial variations play a key role for applicability of norms in different populations. Since Angle's Class II Division 2 and Division 1 are commonly reported in Amritsar population, present study focuses on studying soft tissue norms in Amritsar population among Class I and Class II (div1 and div2) malocclusions.

INTRODUCTION
In twentieth century, orthodontic treatment plan was primarily based on Angle's paradigm, in which primary goal was achieving ideal occlusion and the ideal jaw relationship was secondary. According to Angle's paradigm, achieving ideal hard tissues proportions would produce ideal soft tissues.¹

However, in modern orthodontics, this concept has been replaced by soft tissue paradigm, which states that both the goals and limitation of modern orthodontics and orthognathic treatment are determined by the soft tissues of the face and not by the teeth or bones and ideal soft tissues proportions define ideal hard tissue.

Most people seek orthodontic treatment with aesthetics as a prime consideration, which has led to a shift of focus to achieve balanced soft tissue relationship and adjust teeth and jaws accordingly.

For comprehensive diagnosis and treatment planning, cephalometric soft tissue analysis is essential.² Orthodontists may not reach all the desired soft tissue goals but the adaptation of facial tissues to underlying skeletal discrepancy holds significance among different races. The cephalometric values for soft tissue keep varying from one ethnic group to other. The racial groups must be treated according to their own characteristics. The goals and adaptation for soft tissue also varies as per the underlying skeletal pattern and on basis of based on gender.

Based on ethnic and racial variations, cephalometric soft
Tissue norms have been studied in different populations in many studies. However, ideal occlusion has been taken as a standard criteria in most studies. A higher frequency of Angle’s Class II Division 2 followed by Division 1 has been reported in the region as per a previous study, thus an evaluation for soft tissue norms in these malocclusions was essential. In view of lack of many studies in different malocclusions in north Indian population, the present study focuses on studying soft tissue norms in Amritsar population among Class I and Class II (div1 and div2) malocclusions. The proportions of soft tissue integument of the face and relationship of the dentition to the lips and face are the major determinants of ideal facial appearance, which is the prime orthodontic goal.

<table>
<thead>
<tr>
<th>CEPH VALVE</th>
<th>CLASS 1</th>
<th>CLASS II DIV 1</th>
<th>CLASS II DIV 2</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>MEAN</td>
<td>SD</td>
<td>MEAN</td>
</tr>
<tr>
<td>SNA</td>
<td>82</td>
<td>1.89</td>
<td>82.03</td>
</tr>
<tr>
<td>SNB</td>
<td>79.78</td>
<td>1.65</td>
<td>76.11</td>
</tr>
<tr>
<td>ANB</td>
<td>2.22</td>
<td>1.38</td>
<td>5.76</td>
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Table 1: Skeletal Cephalometric values

<table>
<thead>
<tr>
<th>CLASS 1</th>
<th>MAXIMUM</th>
<th>MINIMUM</th>
<th>MEAN</th>
<th>SD</th>
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<tr>
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<td>77</td>
<td>90.4</td>
<td>45.9</td>
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<td>NOSE PROMINENCE</td>
<td>19</td>
<td>9</td>
<td>12.08</td>
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<td>1</td>
<td>2.84</td>
<td>33.2</td>
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<tr>
<td>SOFT TISSUE SUB NASALE TO H LINE</td>
<td>8</td>
<td>1</td>
<td>4.76</td>
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<tr>
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<td>19</td>
<td>11</td>
<td>15.2</td>
<td>26.9</td>
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<tr>
<td>UPPER LIP STRAIN MEASUREMENT</td>
<td>15</td>
<td>1</td>
<td>4.32</td>
<td>25.6</td>
</tr>
<tr>
<td>H ANGLE</td>
<td>24</td>
<td>7</td>
<td>15.12</td>
<td>24.6</td>
</tr>
<tr>
<td>LOWER LIP TO H LINE</td>
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<td>-5</td>
<td>0.16</td>
<td>23.8</td>
</tr>
<tr>
<td>INFERIOR SULCUS TO H LINE</td>
<td>10</td>
<td>0</td>
<td>5.56</td>
<td>23.04</td>
</tr>
<tr>
<td>SOFT TISSUE CHIN THICKNESS</td>
<td>15</td>
<td>8</td>
<td>12.32</td>
<td>22.38</td>
</tr>
</tbody>
</table>

Table 2: Holdaway soft tissue variables of Angle’s Class I Malocclusion
MATERIAL AND METHOD

The study was carried out in the department of Orthodontics and Dentofacial Orthopaedics, Sri Guru Ram Das Institute of Dental Sciences and Research, Sri Amritsar. A sample consisting of 75 cephalometric radiographs from both genders and age group 15 to 30 years with pleasing profile from records. These included 25 with Angle’s Class I, 25 with Angle’s Class II Division 1 and 25 with Angle’s Class II Division 2 malocclusion. During sample selection, the radiographs of Class III, cleft lip/cleft palate and syndrome teeth were excluded from the study.

The selection criteria for Class I included pleasing soft tissue profile, bilateral Angle’s Class I molar relationship, normal overjet and overbite, well aligned maxillary and mandibular arches with <2mm crowding or spacing, no congenitally missing teeth, congenital anomalies or facial asymmetry, no missing teeth (except third molars).

The selection criteria for Class II Division 1 included bilateral Class II molar relationship with proclined maxillary incisor teeth (atleast two incisors), ANB>4°, no congenitally missing teeth, congenital anomalies or facial asymmetry, no missing teeth (except third molars).

The selection criteria for Class II Division 2 included bilateral Class II molar relationship with retroclined maxillary incisor teeth (atleast two incisors), ANB>4°, no congenitally missing teeth, congenital anomalies or facial asymmetry, no missing teeth (except third molars).

Analysis: Each cephalogram was traced and soft tissue values were recorded.

RESULTS

The various measurements made on the sample are compiled in Table 1, 2, 3 and 4.
DISCUSSION

The first impact of any face is the soft tissue, which is the primary consideration in present day diagnosis and treatment planning. The facial skeleton and its overlying soft tissues determine facial harmony and balance.

For the assessment of patient, only cephalometric dento-skeletal analysis is not sufficient and often leads to aesthetic problems. Therefore, profile analysis for soft tissue structures and their proportions becomes imperative as a part of routine diagnosis. There have been studies done on soft tissue for different populations but the consideration of ethnic variations is important for the applicability of standard measurements in any population. Due to higher frequency of Angle’s Class II in the region as reported in previous study, the study for soft tissue norms in various malocclusions in Amritsar population was essential. Thus, the present study was carried out on 75 patients with equal distribution of skeletal class I and skeletal class II div 1, div 2 to assess the soft tissue proportion in Amritsar region.

The mean values for SNA, SNB and ANB of class I patients were 82, 79.78, 2.22 degrees respectively, for class II division 1 malocclusion SNA SNB and ANB were 82.03, 76.11 and 5.76 degrees respectively and for Angle’s Class II division 2 angles were 80.7, 76.29 and 4.41 degrees respectively.

A decrease of facial angle is suggestive of Class II dental and skeletal pattern. For angular measurements, the mean facial angle was found to be 90.4, 88.8 and 89.08 respectively for Angles Class 1, Class II Division 1 and Angle’s Class II Division 2 respectively. This was comparable to the values reported by Holdaway analysis, which was originally carried out for Caucasian population and in previous study on Indian population.4

For linear measurements, nose prominence is measured from the most prominent nasal point to the H-Line and this came out to be average 12.08mm in Class I, 9.19mm in Class II division1 and 12.58 in Class II division2. Upper lip thickness was found to be 15.2mm for Class I, 15.73 mm for Class II Division 1 and 15.12mm for Class II division 2. Inferior sulcus depth was found to be came out to be 5.56mm in Class I,

Table 4: Holdaway soft tissue variables of Angle’s Class II Division 2 Malocclusion

<table>
<thead>
<tr>
<th>CLASS II DIV 2</th>
<th>MAXIMUM</th>
<th>MINIMUM</th>
<th>MEAN</th>
<th>SD</th>
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<tr>
<td>SOFT TISSUE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FACIAL ANGLE</td>
<td>93</td>
<td>85</td>
<td>89.08</td>
<td>41.6</td>
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<tr>
<td>NOSE PROMINENCE</td>
<td>19</td>
<td>6</td>
<td>12.58</td>
<td>36.05</td>
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<td>SUPERIOR SULCUS</td>
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<td>2.875</td>
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<td>SOFT TISSUE SUB</td>
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<td>2</td>
<td>5.33</td>
<td>29.5</td>
</tr>
<tr>
<td>NASALE TO H LINE</td>
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<td></td>
</tr>
<tr>
<td>SKELETAL PROFILE</td>
<td>6</td>
<td>0</td>
<td>3.04</td>
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<td>BASIC UPPER LIP</td>
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<td>25.9</td>
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<tr>
<td>THICKNESS</td>
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<tr>
<td>UPPER LIP STRAIN</td>
<td>16</td>
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<td>0.54</td>
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<td>MEASUREMENT</td>
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<td>28</td>
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<tr>
<td>LOWER LIP TO H</td>
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<td>1.79</td>
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<tr>
<td>CHIN THICKNESS</td>
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6.76mm in Class II division1 and 7.33mm in Class II division2. Basic upper lip thickness was reported as 15.2mm in Class I, 15.73mm in Class II division1 and 15.12mm in Class division2. The values were in normal ranges of Holdaway (14-24 mm for nasal prominence, 15mm for upper lip thickness and 5±2mm for inferior sulcus depth respectively) suggesting that lip and nasal soft tissue prominence and their esthetic acceptance is similar in the population studied when compared with the results obtained in previous studies in different population groups.

Superior sulcus depth was found to be 2.84mm in Class I, 3.57mm in Class II division1 and 2.8mm in Class II division2, which was lesser than the normal values reported in Holdaway’s analysis (5±2mm). The values of Lip Strain was reported as 4.32mm in Class I, -4.96mm in Class II division 1 and 0.54mm in Class II division 2. This value was reportedly higher for the Class I malocclusion group than the average values reported by Holdaway’s. These are suggestive relative prominence of hard tissue with reduced sulcular depth and increased lip strain in presently studied population. The Angle’s Class II Division 1 population group reported the maximum strain conferring to the integral proclination of maxillary anterior teeth.

Skeletal Profile convexity is suggestive of the skeletal relationships of the jaws. In the present study, the value for convexity was found to be 1.72 in Class I, 4.19 in Class II division1 and 3.04 in Class division2. These are suggestive of comparative profile in the present population in comparison to the standards laid for Caucasian population (-2 to 2mm by Holdaway’s analysis). Profile convexity reported was comparative lesser in Angle’s Class II Division 2 in comparison to Division 1 suggestive of compensation by retroclination of anterior teeth and treatment plan must take this into account.

When recording the relation of upper lip to chin, H angle was recorded as 15.12° in Class I, 23.84° in Class II division1 and 19.29° in Class division 2 suggestive of a relative prominence of lip to chin in the present population. The value of lower lip to H-Line was 0.16mm in Class I, -0.34mm in Class II Division 1 and 1.79mm of Class II Division 2 malocclusion and soft tissue subnasale to H-Line value of 4.76mm for Class I, 5.69mm for Class II Division 1 and 5.33 for Class II division 2 were in average soft tissue ranges reported for Caucasian population. (Average H-Angle 7-15°, 5±2mm for subnasale to H-line and -1 to 2mm for lower lip to H-Line)

The soft tissue in relation to chin was recorded as chin thickness, which was found as a mean value of 12.32 mm in Class I, 10.65mm in Class II Division 1 and 11.58mm in Class II Division 2. This value was slightly higher than those reported in other studies. The least value of soft tissue chin thickness was in Angle’s Class II Division 1 malocclusion suggestive of response to the skeletal malrelation.

Thus, the present norms should be followed when diagnosing or planning treatment for any case belonging to the population studied. The study implies that ethnic and geographic population values emphasise the need for individual studies for different populations.

As the study was limited to a smaller sample, further studies are required on larger population sample to validate the norms obtained. In view of lack of adequate number of Class III patient records, further studies must include Class III population group for any variation in the malocclusion group.

CONCLUSION

The soft tissue norms vary for Amritsar population when compared with standards laid down for Caucasian population.

Further studies with greater sample size are required to validate the same.

REFERENCES:

ABSTRACT:
The placement of dental implants is a challenge for clinicians because of existing anatomy and high esthetic and functional demands. This article presents a case for implant placement for complete oral rehabilitation with implants.

Guided surgery is accepted as the most accurate way to place an implant and predictably relate the implant to its definitive prosthesis, although few clinicians use it. Virtual implant placement was planned using CBCT scan, casts with trial denture bases, Implant planning software and prosthetic designing software were used to fabricate a stereolithographic surgical guide.

The article describes the successful application of digital technology in the production of the surgical template for accurate placement of Osseo integrated implants.

Keywords: Computer-aided design, computer-assisted manufacture, surgical template, guided implant surgery.

CASE REPORT:
A 65 year old male reported in clinic for restoration of his failing dentition. Full mouth rehabilitation was planned due to vertical dimension loss and mobility and deterioration of his existing teeth and prostheses.

Vertical dimension was corrected and his anterior dentition was rehabilitated with re-established vertical dimension. Right maxillary premolars and molars were already extracted with the failed prostheses. Left maxillary posterior restorations were removed and teeth extracted.

Maxillary posterior implant restorations were planned. Diagnostic casts were prepared and diagnostic wax up at the established vertical height was done and trial in completed for adequate occlusal relation and functional verification.

The CBCT (cone beam coaxial tomography) was done to adequately get a 3D volumetric data of the alveolar bone in the maxillary implant site. The CBCT was analysed with Nobel Clinician software.

The maxillary cast and trial denture base was surface scanned with Nobel Procera 2G scanner and the surface scan exported to the Nobel clinician software for fusing the model scan and the CBCT generated data for prosthetic planning and accurate three-dimensional implant placement.
The implant location and type were finalised after fusing the CBCT and Procera scanner generated surface scan. The Nobel Active Implants were selected and surgical guide template was generated within the software planning in Nobel protocol.

The software generated surgical guide STL (Stereo Lithography file format) file was exported and stereolitohographic 3D printed surgical guide was fabricated for Nobel Active Implant.

The surgical guide was checked for fit and seating. The guided surgical kit for Nobel active implants was used in the surgical protocol and implant insertion achieved using the prescribed drill sets for the selected implants.

The implant insertion was achieved in a flapless environment and immediate transmucosal healing abutments were placed. The immediate post operative intraoral periapical
X-ray views were taken to verify the implant placement. The patient was recalled for check up and next phase of prosthetic rehabilitation.

**Discussion**

Digital technology has proved an invaluable tool in the way we diagnose the condition and plan the treatment. However, even the best of plans seems worthless if not properly executed. Anatomical limitation and better prosthetics demands the clinician to gain more precision in surgical positioning of dental implants. During oral implant placement, the drill (position, depth and angulation) must be guided by the clinician according to the final form of the prosthetics. Ideal placement facilitates the establishment of favourable forces on the implants and the prosthetic component. In this regard, surgical guides have shown better predictability of placement improving better prosthetic results. Several guides have been reported in the literature such as self/light cure acrylic resin, metal reinforced acrylic templates, vacuum formed polymers, milling, CAD-CAM prosthesis, stereo lithographic models. Out of these; Milling, CAD-CAM prosthesis or stereo lithographic models have provided good results.

**CONCLUSION:**

Prosthetically driven implant restorations insures good esthetics, function and hygiene maintenance enabling long time success. Accuracy in treatment planning and execution of planned treatment is vital for this success. Continous advancements that have occurred in planning treatment (virtual software) for implant prosthesis have generated an equal rise in transferring the planned therapy to surgical realization. In this regard, surgical templates have enabled clinician to deliver predictable surgical & prosthetic results. Surgical guides have not only decreased the chances of operator driven damage of critical anatomic structures; they also increase the aesthetic and functional advantages of restoration-driven implant therapy. If clinician is considered a pilot, then surgical guide is his navigator.

**REFERENCES**


ABSTRACT:
The predictability of aesthetic success depends on the tissue loss present at the initiation of treatment. Replacement of single as well as multiple missing teeth in the aesthetic zone is challenging particularly when the three dimensional architecture of the existing bone and soft tissue is deficient. The bony housing in this instance would require augmentation to provide a configuration that permits placement of implants in optimal positions which in turn would result in pleasing aesthetics. The purpose of this case report is to evaluate the stability and aesthetics of a single tooth implant placed in the anterior maxillary region with a bony defect through grafting of autogenous bone and use of a growth factor.

KEYWORDS: Single tooth implant, autogenous bone graft, platelet rich fibrin, growth factors

INTRODUCTION:
Achieving aesthetics with implant restorations is significantly more challenging. Diagnosis and appropriate treatment planning are critical in obtaining a successful outcome. It is not the specific implant design, surface characteristics or type of abutment that will guarantee an aesthetic result. It is rather the time spent on data collection in reaching a correct diagnosis that pays dividends in terms of function and aesthetics.²,³

Root form cylindrical implants placed following surgical techniques described by Branemark et al. have proven to be a predictable method for anchoring replacement teeth to the jaw bone.²,³ The successful integration of an implant is not sufficient to declare success; implants placed in poor restorative positions result in unaesthetic restorations that provide little satisfaction for the clinician or the patient. The predictability of the aesthetic outcome of an implant restoration is dependent on many variables including:

1) Patient selection and smile line
2) Tooth position
3) Root position of the adjacent teeth
4) Biotype of the periodontium and tooth shape
5) The bony anatomy of the implant site

6) The position of the implant.

CASE REPORT:
A 35 year old male businessman presented to the outpatient department of the department of Periodontology and Oral Implantology of Sri Guru Ram Das Dental College, Amritsar with a missing left maxillary central incisor due to trauma.

General physical examination: Extra oral examination of the patient revealed no gross physical deformities, no extra oral swelling, sinus formation or any asymmetrical features of the face.

Intra oral examination: Intra oral examination of the patient revealed missing maxillary left central incisor. Clinical examination of the alveolar ridge revealed that it was of inadequate width as well as height. No other deformities of the oral cavity were seen.

Radiographic examination: Radiographic examination of the patient was done through orthopantomograph (OPG) and it was ascertained that the alveolar ridge height in the region of left maxillary central incisor was inadequate and ridge augmentation would be performed.

Lab investigations: Lab investigations of the patient revealed normal leukocyte count with normal clotting and bleeding
time and haemoglobin also within normal range.

**Discussion:** Both clinical and radiographic examination of the patient's maxillary left central incisor region revealed inadequate dimensions for placement of implant. So in this case it was decided to go for grafting of the bone at the site of the missing tooth so as to provide adequate primary stability to the implant.

It was decided upon autogenous bone grafting in this case. Autogenous bone grafting was first was pioneered by Hegedus in 1923. The main sites for procuring an autogenous graft are ramus of mandible, symphysis region, edentulous sites, healing extraction wounds, and also regions where osteoplasty and osteotomy has been performed.

Although various studies have shown that intra oral grafts from the mandibular ramus region are more successful as and have less complications as compared to other areas, but grafts from the symphysis region are easy to procure.

During procedure, a crestal incision was given at the site of the maxillary left central incisor and consequently a mucoperiosteal flap was raised. This revealed that a bony defect was present over the buccal plate which required a graft.

For this purpose, a block was harvested from the symphysis area of the mandible and grafted over the defect along with platelet rich fibrin derived from the patient's own blood to serve as a growth factor.

The area was then sutured up and patient recalled after 1 month. After 2 months the grafted site was evaluated and evidence of bone formation was found.

It was then decided to place an implant in the region with the newly formed bone. The implant when evaluated after a period of 5 months was found to have adequate primary stability when percussion test was done. In light of stable placement of implant in the left maxillary central incisor region it was decided to place a crown and complete the restoration.

When evaluated according to Kois's criteria for aesthetic restoration, it satisfied all the requisite conditions.

**CONCLUSION:**

When a patient has a missing anterior tooth and desires replacement some choices for the patient include a conventional fixed partial denture, a resin bonded fixed partial denture or an implant borne restoration. Implants used to replace missing teeth in the aesthetic zone have many advantages from preservation of unrestored adjacent teeth, halting the resorption of edentulous spaces and providing support. At present it has the disadvantages of long treatment time, requiring a provisional restoration during implant integration, requiring surgical placement of the implant, requiring surgical uncovering of the implant, requiring a provisional restoration after the implant is uncovered and having a higher cost. But inspite of these disadvantages when one or more of the adjacent teeth are unrestored or in need of only a minor restoration, the single tooth implant should be considered the restoration of choice.

**REFERENCES:**

TREATMENT OF A PERIODONTAL ABSCESS BY MODIFIED KIRKLAND FLAP COMBINED WITH OSSEOUS REGENERATIVE THERAPY UTILISING AN ALLOPLASTIC GRAFT: A CASE REPORT

ABSTRACT:
A case of recurrent abscess was seen in a 28 year old male driver with poor oral hygiene and copious amounts of supragingival and subgingival plaque and calculus. Clinically there was evidence of moderate amount of bone loss which was ascertained by radiographic examination by utilising Gutta Percha point no. 30 as radio opaque marker. The patient was then educated about the shortcomings of his oral hygiene routine and advised oral prophylaxis along with surgical treatment. A modified Kirkland flap procedure was performed whereupon it was seen that a vertical defect was present mesial to the lower right lateral incisor. Subsequently bone grafting was done with an alloplastic graft material with further restorative treatment planned at follow up.

KEYWORDS: Periodontal abscess, angular bone loss, alloplastic graft material, pus

INTRODUCTION:
Periodontitis has been defined as an infectious microbial disease resulting in inflammation, bleeding (which may be elicited either by probing or may occur spontaneously), pocket formation, clinical attachment loss, bone loss, and tooth mobility.

Chronic generalised periodontitis is an inflammatory condition of the gingiva affecting more than 30% of the teeth in the oral cavity concomitant with clinical attachment loss and bone loss.

Among several acute conditions that occur in periodontal tissues, the abscess calls for special attention. Among all abscesses of the periodontium, the periodontal abscess is the most important one. It is a destructive process occurring in the periodontium, resulting in localised collections of pus.

Poor Oral hygiene has been proven to be a major aetiological factor in causation of periodontitis as it provides a favourable environment for biofilm formation.

CASE REPORT:
A 28 year old male driver reported to the outpatient Department of Periodontology and Oral Implantology, Sri Guru Ramdas Institute of Dental Sciences and Research, Amritsar, with chief complaint of pain and swelling in right
lower region of the jaw and bleeding from gums since 6 months. On detailed history patient told that this swelling was recurrent and earlier was associated with pain which later on decreased and then subsided.

**General examination:** General physical examination of the patient revealed that the patient was systemically healthy, with no extremes of age, stress or fatigue, with no ongoing medication or had taken any medication taken for any disease since the past 6 months.

**Intra oral examination:** Intra oral examination revealed that patient had extremely poor oral hygiene with gross stains and calculus along with sinus formation with respect to lower right lateral incisor. Probing depth between the mandibular central and lateral incisors was found to be 6mm, compared with a generalised probing depth of around 4.5mm-5.5mm. The tooth was non carious, slightly extruded out of position, whereas the adjoining central incisor was distally deviated and also out of position. The lateral incisor showed no evidence of fracture and was not tender on percussion but showed Grade 1 mobility when assessed according to Glickman’s Tooth mobility Index.

**Lab investigations:** Lab tests were performed and used to confirm the presence of a suspected infection. Tests showed elevated levels of leukocytes and also an increase in blood neutrophils suggestive of an inflammatory response of the body to microbial toxins.

**Radiographic examination:** Intra oral periapical radiographs clarified the presence of vertical defect mesial to the lower right lateral incisor and distal to the mandibular right central incisor. A Gutta Percha point no. 30 was inserted into the sinus so as to determine the exact pathway and source of the purulent discharge.

The source of the abscess was determined to be intrapulpal. So the patient was promptly referred to the department of

**Differential Diagnosis**: The differential diagnosis of the periodontal abscess is a clinically important step that allows the dentist to clearly understand the condition, assess reasonable prognosis, eliminate any life threatening condition and help in treatment planning until the condition subsides. The periodontal abscess was ruled out from the following similar conditions and lesions:

1. **Gingival Abscess**
   
   Features that differentiate the gingival abscess from the periodontal abscess are:
   
   I. History of recent trauma
   II. Localisation to the gingival
   III. No periodontal pocketing

2. **Periapical Abscess**

   Periapical abscess can be differentiated by the following features
   
   I. Located over the root apex
   II. Non-vital tooth, heavily restored or large filling
   III. Large caries with pulpal involvement
   IV. History of sensitivity to hot and cold food
   V. No signs / symptoms of periodontal diseases
   VI. Periapical radiolucency on intraoral radiographs

3. **Perio-Endo Lesion**

   The Perio-endo lesion shows:
   
   I. Severe periodontal disease which involves furcation
   II. Severe bone loss close to the apex, causing pulpal infection
   III. Non-vital tooth which is sound or minimally restored

4. **Endo-Perio Lesion**

   Endo-Perio lesion can be differentiated by:
   
   I. Pulp interaction spreading via the lateral canals into the periodontal pockets
   II. Tooth usually non-vital, with periapical radiolucency
   III. Localised deep pocketing

5. **Cracked tooth syndrome**

   Cracked tooth syndrome can be differentiated by:
   
   I. History of pain on percussion
   II. Crack line noted on the crown
   III. Vital tooth
   IV. Pain upon release after biting on cotton roll or rubber disc

V. No relief of pain after endodontic treatment

6. **Root Fracture**

   Root fracture can be differentiated by the presence of:
   
   I. Heavily restored crown
   II. Non vital tooth with mobility
   III. Post crown with threaded post
   IV. Possible fracture line and halo radiolucency around the root

V. Localised deep pocketing

**DISCUSSION**:

The treatment of periodontal abscess follows the management of simple dental infections albeit with some modifications:

1. Local measures:
   
   I. Drainage
   II. Maintain drainage
   III. Eliminate cause

2. Systemic measures in conjunction with the local measures:

   The management of a patient with periodontal abscess can be divided into three stages:
   
   I. Immediate management
   II. Initial management
   III. Definitive therapy

**Immediate Management**

Immediate management is advocated in:

1. Space infections of orofacial regions
2. Diffuse spreading infections

In non-life threatening conditions, systemic measures such as oral analgesics and antimicrobial chemotherapy will be sufficient to eliminate the systemic symptoms.

Antibiotics are prescribed empirically before the microbiological analysis and before the antibiotic sensitivity tests of the pus and tissue specimens.

**The common antibiotics which are used are**:

1. Phenoxymethylepenicillin 250 -500 mg qid 5/7 days
2. Amoxycillin 250 - 500 mg tds 5-7 days
3. Metronidazole 200 - 400 mg tds 5-7 days

**Initial Therapy**

The initial therapy is usually prescribed for the management of acute abscesses without systemic toxicity or for the residual lesion after the treatment of the systemic toxicity and the chronic periodontal abscess.
The treatment options for periodontal abscess under initial therapy:

1. Drainage through periodontal pocket
Drainage through the pocket is the treatment of choice if the abscess is not complicated by other factors. In such patients, the use of systemic antibiotics with short term, high dose regimens is recommended. Antibiotic therapy alone, without subsequent drainage and subgingival scaling is contraindicated.

2. Drainage through an external incision
If the lesion is sufficiently large, pin-pointed and fluctuating, an external incision can be made to drain the abscess. It is recommended to use systemic antibiotics as the only initial treatment in order to avoid the damage to the healthy periodontium. In such conditions, once the acute condition has receded, mechanical debridement including root planning is performed.

3. Periodontal surgery
   I. Surgical therapy has also been advocated mainly in abscesses which are associated with deep vertical defects, where the resolution of the abscess may only be achieved by a surgical operation.
   II. Surgical flaps are also proposed in cases in which the calculus is left subgingivally after treatment.
   III. The main objective of therapy is to eliminate the remaining calculus and to obtain drainage at the same time.

DEFINITIVE TREATMENT
The treatment following reassessment after the initial therapy is to restore the function and aesthetics and to enable the patient to maintain the health of the periodontium. Definitive periodontal treatment is done according to the treatment needs of the patient.

After thorough clinical, radiographic examination with subsequent lab tests, which showed the presence of a deep pocket along with angular defect mesial to lower right lateral incisor and leukocytosis, coupled with pain and swelling in the region since long duration and the presence of an otherwise sound tooth with no restoration a diagnosis of chronic periodontal abscess was made.

Since it was associated with a deep vertical defect, it was decided to treat the patient after raising a mucoperiosteal flap. Patient was informed about the diagnosis and then explained about the treatment modality, then recalled for open flap debridement in the form of Modified Kirkland flap combined with regenerative therapy applying a non bone graft material in the form of an Alloplastic graft consisting of Tricalcium Phosphate particles or TCP (RTR ™-France).

Patient was recalled after 7 days for suture removal and asked to come for follow up after 6 months.

There are several aetiologies for abscess formation. Poor oral hygiene linked chronic periodontitis is one of the most common. Due to chronic accumulation of plaque and subsequent mineralization there exists a congenial environment for micro organisms to flourish leading to periodontal breakdown and also abscess formation.

CONCLUSION:
The patient was not following proper oral hygiene procedures leading to plaque and calculus accumulation causing periodontitis and subsequent abscess formation.

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ABSTRACT:
Pyogenic granuloma is one of the inflammatory hyperplasias seen in oral cavity. It is exaggerated as a response to any minor trauma, low-grade local irritation, poor oral hygiene and is commonly seen during pregnancy. Pyogenic granuloma of oral cavity is known to involve the gingiva commonly. Extragingivally, it can occur on the lips, tongue, buccal mucosa and palate. It is frequently associated with difficulty in mastication and esthetic problems. Present case report describes the treatment of a 28-year old patient with Pyogenic granuloma. Treatment included Phase I therapy followed by electrosurgery and supportive periodontal therapy. Following electrosurgery, healing was uneventful with no recurrence post-operatively. Histopathological examination revealed pyogenic granuloma.

Key words: soft tissue enlargement, phase I therapy, excision, electrocautery, pyogenic granuloma.

INTRODUCTION
Soft tissue enlargements of oral cavity often present a diagnostic challenge, as diverse groups of pathologic processes produce such lesions. Among these lesions is a group of reactive hyperplasias, which develop in response to a chronic, recurring tissue injury that stimulates an exuberant or excessive tissue repair response. Pyogenic granuloma being one of the most common entities causing soft tissue enlargements. Pyogenic granuloma or granuloma pyogenicum is a relatively common benign non-neoplastic mucocutaneous lesion. It is also known as Eruptive hemangioma, Granulation tissue-type hemangioma, Granuloma gravidarum, Lobular capillary hemangioma, Pregnancy tumor and Tumor of pregnancy. It was first reported in 1844 in English literature by Hullihen. Pyogenic granuloma in human was first described in 1897 and was termed as botryomycosis hominis by Poncet and Dor. Hartzell in 1904 was credited for giving the current term of "pyogenic granuloma" or "granuloma pyogenicum", but the term "pyogenic granuloma" is a misnomer because it is not a true granuloma. It is not associated with pus and histologically also it resembles angiomatosus lesion rather than granulomatous lesion. Pyogenic granuloma may appear anywhere on the skin or...
mucous membrane, but is especially common on gingiva (approximately 75%). Chronic low grade trauma, physical trauma, hormonal factors, poor oral hygiene, bacteria, viruses and certain drugs have been implicated as causative factors in the development of pyogenic granulomas. Clinically it is a smooth or lobulated painless mass, size varying from few millimeters to several centimeters in diameter which tends to bleed easily because of its extreme vascularity. It is usually pedunculated, although some lesions are sessile. Its colour ranges from red to pink to purple, depending upon the age of lesion. Young pyogenic granulomas are highly vascular in appearance and older lesions tend to become more collagenized and pink. Treatment of this soft tissue lesion includes removal of causative irritating factor that may be present, followed by complete excision of the growth and microscopic study of the tissue.

We are hereby presenting a case of pyogenic granuloma on lingual aspect of mandibular anterior teeth and highlighting its clinical characteristics, histopathology, differential diagnosis with special emphasis on its diagnosis and treatment.

**CASE REPORT**

A 28 year old male patient reported to the department of Periodontology and Oral Implantology, Sri Guru Ram Das Institute Of Dental Sciences And Research, Sri Amritsar with a chief complaint of swelling in lower anterior teeth since 1 year. Since it was asymptomatic, patient neglected it. History revealed that initially the gingival growth was minimal in size but it gradually increased to reach up to the present size interfering with mastication. Patient’s past dental, medical and drug history were non-contributory.

**Extra oral examination** was non-significant.

**Intraoral examination revealed** a large pedunculated gingival overgrowth approximately 2.5x1.3cm in size, extending on lingual surface of 31,32,41,42,43,44. It was whitish pink in colour and was firm in consistency. Growth was non tender but caused discomfort to the patient while mastication. The surface was lobulated with no ulcerations. Although patient exhibited poor oral hygiene, mobility of teeth was not an associated feature.

**Radiographic feature:** There were no visible abnormalities and alveolar bone in the region of the growth appeared normal.

**Treatment:** The patient did not have any systemic history so the case was prepared for surgery on the basis of the clinical and radiographic evidence. Excision and biopsy of lesion was planned. Treatment plan was explained to the patient and written consent was obtained. Scaling and root planing of adjacent teeth was completed to remove all the local irritants, which could have been the primary etiologic factors in the present case and the lesion was excised under aseptic conditions. Excision was performed under local anesthesia (2% lignocaine with 1:2,00,000 adrenaline) using an electrocautery, followed by curettage and thorough scaling of involved teeth. Periodontal dressing was placed and the patient was recalled after 1 week for removal of pack. Patient was prescribed antibiotics and analgesics. Oral hygiene instructions were given and chlorhexidine gluconate 0.12%
mouthwash was prescribed.  

**Histopathological examination:** Excised tissue was sent for histological evaluation. It revealed parakeratinized stratified squamous epithelium. Section exhibited highly cellular connective tissue stroma composed of numerous proliferating endothelial cells, budding capillaries, blood vessels and fibroblasts. The stroma was densely infiltrated by chronic inflammatory cells. A final diagnosis of pyogenic granuloma was rendered.  

**DISCUSSION**  

Pyogenic granuloma is a common tumor-like lesion of the oral cavity. It is considered to be non-neoplastic and shows a highly vascular proliferation, sometimes organized in lobular aggregates. Oral pyogenic granuloma occurs over a wide range of 4.5 to 93 years with highest incidence in second and fifth decades, females being slightly more affected than males. Due to its behavioral alterations such as rapid growth, multiple occurrence and frequent recurrence of pyogenic granuloma, some investigators regard it as a benign neoplasm but it is mostly considered to be a reactive tumor-like lesion as a response to various stimuli such as traumatic injury, hormonal factors or certain kinds of drugs.  

Management of pyogenic granuloma depends on the severity of symptoms. Many treatment techniques have been described for Pyogenic granuloma. But, before treating any case, the etiology must be clearly identified and eradicated. Before attempting surgical excision of the lesion, a thorough oral prophylaxis should be performed because local factors such as plaque and calculus are the most important etiologic factors for Pyogenic granuloma. If the lesion is small and painless, oral prophylaxis, removal of causative irritants (foreign materials, source of trauma) and follow-up are advised, whereas lesions of large size are treated by a thorough oral prophylaxis followed by surgical excision.  

Different treatment modalities such as scalps, Nd: YAG laser, carbon dioxide laser, flash lamp pulse dye laser, cryosurgery, electrodessication, sodium tetradecyl sulfate sclerotherapy and use of intralesional steroids can be used. In the present study electrosurgery is being used.  

**Advantages of use of electrosurgery:**  
1. A clear view of the surgical site is provided.  
2. Tissue separation is clean with little or no bleeding.  
3. The technique is pressureless and precise.  
4. Planing of soft tissue is possible.  
5. Access to difficult-to-reach areas is increased.  
6. Chair time and operator fatigue are reduced.  
7. Electrode cuts on its side as well as on its tip.  
8. Hemostasis is immediate and consistent.  
9. Healing discomfort and scar formation are minimal.  
10. Wound is nearly painless and the tip is self-disinfecting.

After excision, recurrence occurs in up to 16% of the lesions. Recurrence is believed to result from incomplete excision, failure to remove etiological factors or re-injury to the area. It should be emphasized that gingival cases show more recurrence rate than lesions from other oral mucosal sites.

**Differential diagnosis of Pyogenic Granuloma:**  
1. Peripheral giant cell granuloma  
2. Pregnancy tumour  
3. Peripheral ossifying granuloma  
4. Metastasis of malignant tumors  
5. Hemangioma  
6. Inflammatory gingival hyperplasia  
7. Angiosarcoma  
8. Kaposi’s sarcoma  

**Peripheral giant cell granuloma** is an exophytic lesion that is seen exclusively on gingiva, is more likely to cause bone resorption, with appearance of multinucleated giant cells. Diagnosis of pregnancy tumour is valid clinically in describing eradicated. Before attempting surgical excision of the lesion, oral prophylaxis, removal of gingiva; however, it has a minimal vascular component unlike a pyogenic granuloma. **Metastatic tumors of the oral cavity** are rare and attached gingiva is commonly affected, clinically they resemble reactive or hyperplastic lesions such as pyogenic granuloma, but microscopically they usually resemble the tumor of origin, which usually is distant from the metastatic lesion seen in the oral cavity. Due to proliferating blood vessels differential diagnosis of pyogenic granuloma from a hemangioma is made histologically in which Hemangioma shows endothelial cell proliferation without acute inflammatory cell infiltrate, which is a common finding in pyogenic granuloma. **Conventional hyperplastic gingival inflammation** resembles pyogenic granuloma in histopathologic sections and it is impossible for the pathologist to reach a diagnosis and in such cases the surgeons description of the lesion is relied on.  

**Angiosarcoma** shows lobular growth pattern, well defined vessels, and cytologically bland endothelial cells. **Kaposi’s sarcoma** of AIDS shows proliferation of dysplastic spindle cells, vascular clefts, extravasated erythrocytes and...
intracellular hyaline globules, none of which are features of Pyogenic granuloma.\textsuperscript{2}

This present case reveals that poor oral hygiene could have been the primary etiological factor of pyogenic granuloma, so oral prophylaxis followed by excision of the growth was the line of treatment. The procedure was simple, essential for final diagnosis and provided a rapid result. There was no scar formation and patient was satisfied with the treatment outcome.

CONCLUSION

Although pyogenic granuloma is a non-neoplastic growth in the oral cavity, proper diagnosis, prevention, management and treatment of the lesion are very important. Inspite of various treatments, recurrence is quite frequent so in many cases re-excision may be necessary.

REFERENCES

SUBMANDIBULAR SALIVARY GLAND SIALOLITHIASIS MANAGEMENT: A CASE REPORT

ABSTRACT: Sialolithiasis is a common disease of salivary glands. The submandibular gland is affected by a number of disease processes that may be difficult to distinguish clinically. Its superficial location makes it ideal for ultrasound evaluation and a useful adjunct to clinical examination. There is a slight male predominance. More than 80% of salivary calculi occur in the submandibular gland or its duct. This occurrence along with more deep and proximally placed common calculi in submandibular gland may occasionally cause a dilemma in selection of the appropriate surgical approach in the present era of sialoendoscopic surgery. Excision of the submandibular gland with the stone in such a situation should still be preferred as the gold standard of treatment. The accepted method for submandibular gland excision traditionally includes ligation of the facial artery. Preservation of the Facial Artery may be significant in reconstructive procedures of the head and neck and its ligation may altogether be obviated.

INTRODUCTION

Sialolithiasis is the most common disease of the salivary glands in middle-aged patients. It is estimated that sialolithiasis affects 12 of every 1000 patients in the adult population. More than 80% of the salivary gland calculi appear in the submandibular gland, but they can also be located in the glandular parenchyma and more frequently in the excretory duct. More than 80–95% of the salivary gland calculi appear in the submandibular gland, parotid gland 5–20%, and 1–2% in sublingual and minor salivary glands. The submandibular gland is most frequently involved because of its anatomic location, long and tortuous duct with a narrow orifice compared to the main portion of duct.

Traditional and recent etiopathogenetic factors include a reduced salivary flow rate, a change in pH, dehydration, duct anomalies, and the retrograde migration of foods, bacteria, or foreign bodies from the oral cavity favoring stone formation.

CASE REPORT

A 48-year-old male reported to the Department of Oral and Maxillofacial Surgery at Sri Guru Ram Das Institute Of Dental Sciences and Research with a history of intermittent, dull, aching pain and swelling in his right submandibular area since the past 1 month. The patient also gave a history of similar episode around 10 years back which resolved with
medication. On extraoral examination, there was a localized swelling in the right submandibular region measuring approximately 3.5 cm × 2 cm. The swelling was tender with no color change in the overlying mucosa. On bimanual milking of the gland, frank pus was expressed from ductal opening. General clinical history revealed that the patient was in good health; no other signs, symptoms, or abnormalities were found.

Orthopantomogram and right lateral oblique view of mandible were advised. The radiographs revealed two well-defined radio-opacities in the involved region, suggestive of sialoliths. Ultrasonography of right submandibular gland revealed an enlarged submandibular gland measuring 39 × 23 mm with presence of two hyperechoic foci and echopoor collection measuring 2.8 × 1 cm in size deep to right submandibular gland. A definitive diagnosis of submandibular gland sialolithiasis with acute sialadenitis was made. Patient was prescribed antibiotics. Injection Cefotaxime Sodium (Taxim) 1 g I/V twice a day, Injection Amikacin Sulphate (Mikacin) 500 mg I/V twice a day, Tablet Metronidazole (Metrogyl) 400 mg three times a day, Tablet Limcee 500 mg once a day, along with good fluid intake for acute sialadenitis. After the acute phase subsided, the patient was posted for surgical intervention.

The right submandibular gland removal was done under general anaesthesia. A 7 cm long incision was placed 3 cm below the inferior border of mandible along the natural skin crease in order to avoid damage to the mandibular branch of the facial nerve. The skin flap was raised. The subcutaneous fat was stripped with firm pressure with a swab from the underlying muscle for approximately 1 cm on each side of the incision. The underlying platysma was then incised to the full extent of the skin incision. The underlying investing layer of the deep cervical fascia was next divided, with scissors, after the fascia was tented outwards with toothed forceps. Subplatysmal flap was elevated superiorly and inferiorly and the marginal mandibular nerve was identified and gently retracted with the upper part of the flap. The delicate capsule overlying the gland was then lifted with toothed dissection forceps and opened with scissors. The loose connective tissue was separated with scissors to expose the surface of the gland. The left submental vein was identified at the superior border of submandibular gland and submental artery was deep to the gland. The vascular branches to the gland were meticulously dissected and clamped. The anterior belly of the digastric muscle and the mylohyoid muscle were detached. The facial vein and facial artery were preserved. The dissection continued to mobilize the posterior pole of the superficial lobe of the gland which is then gently retracted posteriorly. The posterior border of the mylohyoid lies within the groove of superficial and deep lobes. It was gently freed with scissors and then retracted forward with a Langenbeck retractor. The submandibular salivary gland was then now be pulled downwards revealing the V-shaped lingual nerve which was retracted carefully. The submandibular duct was clamped, divided and ligated as anterior as possible with just enough remaining to drain the...
sublingual gland. The gland was liberated from the submandibular ganglion thus freeing the lingual nerve & was then removed.

**DISCUSSION**

The salivary calculi develop as a result of deposition of mineral salts around a nidus of bacteria, mucus, or desquamated cells. The sialoliths are mainly made up of calcium and phosphate with smaller quantities of ammonia, potassium and magnesium. The parotid stones generally comprise of 49 % inorganic material and 51 % organic material whereas, the submandibular stones consist of 82 % inorganic and 18 % organic material.

The aetiologic factors implied in the sialolith formation can be classified in two large groups: a) saliva retention due to morphoanatomic factors (salivary duct stenosis, salivary duct diverticuli, etc.) and b) saliva composition factors (high supersaturation, crystallisation inhibitors deficit, etc.).

The predisposing factors in calculus formation are salivary stagnation, increased alkalinity of saliva, infection or inflammation of the salivary duct or gland, and physical trauma to the salivary duct or gland. It results in swelling, pain and recurrent infections of the associated gland by causing the obstruction of salivary flow. Stones are believed to be more common in submandibular duct system and the reasons cited for that are: (1) the submandibular excretory duct is wider in diameter and longer (2) the salivary flow in the submandibular gland is against gravity (3) the submandibular salivary secretion is more alkaline compared with pH of parotid saliva (4) the submandibular saliva contains a higher quantity of mucin proteins.

Investigations like sialography, occlusal radiographs, orthopantomogram, ultrasonogram, CT scan and MRI Neck have been advocated. In our case, an ultrasound, orthopantomogram and a lateral oblique view of calculi in the gland was done to accurately confirm the length and total dimension of the calculus.

According to Tepan complete obstruction of the duct causes constant pain and swelling with associated pus draining from the duct. On palpation a tender, firm to hard submandibular gland indicates a longstanding infection of the gland. Our patient also reported with pain in the right submandibular area which was aggravated by eating or in response to other salivary stimuli. Further, due to long standing obstruction, fibrosis of the gland was present. The swelling was hard and firm when palpated extraorally and on bimanual milking, frank pus was expressed indicating an acute infection.

Treatment options for sialolithiasis are

1) Intraoral sialolithotomy (traditional approach),
2) For large sialoliths that are located in the close proximal duct managed by extracorporeal shock wave lithotripsy (ESWL) (ultrasound to break the stone),
3) Endoscopy intracorporeal shock wave lithotripsy (EISWL) is also gaining importance because of less damage to the adjacent tissues during the procedure,
4) Sialendoscopy, which is a non-invasive technique, can be used to manage large sialoliths and duct obliteration,
5) The extra oral approach might required some times mainly when dealing with a large stone
6) A large sialolith in the gland requires excision of the gland.

Patients presenting with sialolithiasis may benefit from trial of a conservative approach. Various published reports of minimally invasive techniques makes the time tested excision of salivary gland in glandular calculi unpopular. However, authors believe that surgical excision of the gland with the calculi is still the gold standard of treatment for intraglandular calculi with associated non-functional gland. In our case, we decided to do a total excision of the gland with removal of calculi as the calculi was intraglandular. Although the arterial supply of the face is abundant, gland was excised following the preservation of facial vessels. The preservation of the Facial vessels does not significantly prolong the procedure or leads to complications, the time honored principle of ‘do no harm’ should be adhered to.

**BIBLIOGRAPHY**


ABSTRACT:
Fibrous or flabby ridge is a mobile or extremely resilient alveolar ridge which becomes displaceable due to fibrous tissue deposition. It is more prevalent in anterior maxillary region. Conventional impression making leads to compression of the flabby ridge which tends to recoil and result in inadequate support, stability and retention of complete denture. This article presents a case report of modified impression technique for managing flabby tissue in anterior maxillary region which helped in recording flabby tissue with minimal displacement and hence enhanced the stability, support and retention of the denture.

Key words: Flabby ridge, Kelly syndrome, Window technique

Introduction
Edentulous ridges that are mobile or resilient with little evidence of underlying supportive bone, may give the appearance of being "flabby". Fibrous or flabby ridge is a superficial area of mobile soft tissue affecting the maxillary and mandibular ridges. Such a situation arises in some complete denture wearer where alveolar bone has been replaced by fibrous tissue. It is particularly evident in maxillary anterior region especially when only the natural mandibular anterior teeth remain, a so called combination or Kelly syndrome. The reported prevalence has varied, but has been demonstrated in up to 24% of edentulous maxillae, and in 5% of edentulous mandibles. In the edentulous patient, it is evident in the anterior region more commonly in both arches. It is often related to the degree of bone resorption and in severe cases this can be to the level of the anterior nasal spine.

Masticatory forces can displace this mobile denture-bearing tissue, leading to altered denture positioning and loss of peripheral seal. If the flabby tissue is compressed during conventional impression making, it will tend to recoil and dislodge the resulting overlying denture. Clearly, an impression technique is required which will compress the non-flabby tissues to obtain optimal support, and, at the
same time, will not displace the flabby tissues. Thus this case report presents a modified impression technique for flabby tissues in the anterior maxillary region.

Case Report

A 65 year old male patient reported to the department of Prosthodontics and Crown and Bridge of Sri Guru Ram Das Institute of Dental Sciences and Research with a chief complaint of replacement of missing teeth in upper and lower arches. The patient was a denture wearer for the last 6 years and described the existing dentures as “loose.” On examination the patient was completely edentulous in upper and lower arches. The anterior canine to canine region in maxilla was flabby. (Fig 1)

All the treatment options including implant supported prosthesis and surgical removal of the flabby tissue was suggested to the patient but patient was not willing for the same. So it was decided that upper and lower complete dentures will be fabricated with a different impression technique.

Technique

1) A primary impression of the upper and lower arches was taken with irreversible hydrocolloid and the primary casts were generated and the displaceable tissues were identified on the cast.

2) On the maxillary cast, dental wax was applied as an “I” shaped spacer along the mid palatine raphe using modelling wax with additional wax relief of two uniform thicknesses given in the flabby area from canine to canine region. (Fig 2)

3) A maxillary custom tray was fabricated using autopolymerising acrylic resin covering the tissues except the area that was flabby. Over the “open” area of the tray another “supporting tray” of acrylic was made thus covering the flabby ridge.

4) Handle of the tray should be placed on the centre so that relief holes can be drilled in the region of flabby tissue. (Fig 3)

5) The maxillary borders were recorded by border moulding using green stick compound. The relief wax was removed and multiple holes were drilled in the “supporting tray”. Placement of multiple relief holes was done to ensure prevention of pressure build-up in the flabby area thereby leading to inadvertent tissue compression. (Fig 4)

6) A final impression was made with light body silicone impression material. (Fig 5)

Discussion

The flabby ridge occur as a result of a maxillary complete denture opposing mandibular anterior natural teeth leads to anterior hyperocclusion resulting in excessive forces in the anterior region. Excessive anterior forces can also result when porcelain anterior teeth are used in same denture with acrylic posterior teeth. The low wear resistance of acrylic resin teeth result in hyperocclusion of anterior porcelain teeth. It may also arise due to unplanned or uncontrolled
dental extractions.

The treatment options available in such cases are surgical removal of flabby tissue, bone grafting or placement of dental implants. Surgical debulking of flabby tissue has some of the difficulties as many complete denture patients are elderly or have complex medical histories for which any form of surgery is contraindicated. It may also result in shallow ridges which hampers the retention of the resultant complete denture. Surgical removal of tissue is contraindicated where little or no bone is available.

Similarly implant placement is also not without risks. It is clear that if there has been excessive bone resorption and replacement by flabby tissues, then there will be little bone remaining into which dental implants can be placed. While it would be technically possible to augment the remaining ridge with bone grafts, the prognosis of such treatment would be questionable. Furthermore, there are a group of patients who for a variety of clinical or medical reasons are unsuited for dental implant treatment. There are also some patients who do not wish to have surgically invasive procedures such as placement of dental implants.

In Conventional Prosthodontics, various techniques have been recommended and there is controversy as to whether a mucodisplaceable technique which compresses the mobile tissue aiming to achieve maximum support from it or whether a mucostatic technique with the aim of achieving maximum retention should be employed. This case report describes a simple technique to record flabby tissues in their undischplaced state using readily available clinical materials like low viscosity silicone impression material.

A multitude of impression techniques have been described for overcoming the problem of the flabby ridge. Liddlelow described a technique whereby two separate impression materials are used in a custom tray (using 'plaster of Paris' over the flabby tissues, and zinc oxide and eugenol over the 'normal' tissues). Osborne described a technique whereby two separate impression trays and materials are used to separately record the 'flabby' and 'normal' tissues, and then related intra-orally. Watson described the 'window' impression technique where a custom tray is made with a window or opening over the (usually anterior) flabby tissues. A mucocompressive impression is first made of the normal tissues using the custom tray and zinc oxide and eugenol. Once set, it is removed, trimmed, and re-seated in the mouth. A low viscosity mix of 'plaster of Paris' is then painted onto the flabby tissues through the window. Once set, the entire impression is removed. Each of these techniques might be considered cumbersome, and the difficulties associated with their manipulation could lead to inaccuracies. Watt and McGregor — recently revisited by Lynch and Allen — described a technique where impression compound is applied to a modified custom tray. The thermoplastic properties of this material are then manipulated to simultaneously compress the 'normal tissues', while avoiding displacement of the 'flabby tissues' using the same material and impression tray. The problem with all these techniques is that they rely on materials such as 'plaster of Paris', impression compound, and zinc-oxide and eugenol. Crawford and Walmsley mentioned controlled lateral pressure technique for fibrous posterior ridge with light body silicone impression material.

Many general dental practitioners now rely on 'newer', more 'easy-to-use' materials, such as low viscosity silicone elastomer used particularly for fixed prosthodontics. The materials used in this technique are commonly used in general dental practice. This technique does not require additional clinical visit. It doesn't require extra time for the specialised impression technique as compared to the conventional impression procedures. Thus, it can be easily performed by general dental practitioner.

References
ABSTRACT:
Success of non-surgical root canal treatment is predicted by meticulous cleaning and shaping of the root canal system, three-dimensional obturation and a well-fitting, leakage-free coronal restoration. Various techniques have been developed to achieve the proper obturation of root canal system including the lateral compaction, vertical compaction and carrier based obturation. Over the years, pitfalls with one technique have often led to the development of newer methods of obturation. This article presents the case report of endodontic obturation by means of thermoplasticized gutta percha by using ThermaFil system along with Thermaprep oven in two different cases to achieve 3- dimensional hermetic seal. Thermafil provides a void free obturation with higher degree of homogeneity and less working time.

Keywords- Obturation, ThermaFil system, thermoplastification, curved canals.

INTRODUCTION
Root canal treatment consists of cleaning, disinfection and obturation of the root canal. The primary objective of obturation is to prevent communication of bacteria from the oral cavity through the root canal system into the periapical tissues. Additionally obturation prevents the ingress of apical tissue fluids and the growth of any residual bacteria left in the canal system. Complete filling of the root canal system using a semisolid core such as gutta-percha (GP) and sealer is critical in accomplishing these goals. An inadequate seal can result in contamination of the canal system and can lead to periapical disease. The gutta-percha has been the most commonly used filling material due to its biocompatibility, dimensional stability, plasticity and ease of removal whenever necessary.

Schilder first introduced the vertical condensation technique with heated gutta-percha and since that, thermoplastic methods have been proposed. Thermoplastic method use gutta percha in alpha phase and system used in these case reports is ThermaFil (Dentsply Maillefer, Ballaigues, Switzerland).

ThermaFil System
In 1978, Johnson introduced an obturation technique using a carriers coated with alpha phase gutta-percha (ThermaFil Endodontic Obturator, Dentsply Maillefer, Switzerland).
ThermaFil is a patent endodontic obturator consist of a flexible central carrier that is uniformly coated with a layer of "alpha phase" gutta-percha. When heated, the "alpha phase" gutta-percha becomes sticky and tacky, with excellent flow characteristics and thus obturates the main canal as well as available lateral and accessory canals. The ThermaFil carrier is a flexible 25mm biocompatible radiopaque plastic material with a .04 taper. The greatest feature of ThermaFil is that it is so quick and easy to learn and no longer there is the need to use lateral spreaders and multiple accessory gutta-percha points.

ThermaFil obturators are designed to correspond to the ISO standard file sizes, various tapered nickel-titanium rotary files. Size verifiers are available to aid in selection of the appropriate carrier and which should fit passively at the corrected working length.

**ThermaPrep plus oven**

The ThermaPrep Plus Oven (Dentsply Maillefer, Switzerland) has been specially developed for heating ThermaFil endodontic obturators for use in root canal obturation.

Before obturation, turn the oven on by the power on and the green stand-by indicator will light up. Put both obturator holders in the upper position. After disinfecting the obturator and setting the silicone stop according to working length, place the ThermaFil endodontic obturator in the left

**Case report - 1**

![Fig 1: Preoperative IOPA](image1)

![Fig 2: Working length determination](image2)

![Fig 3: Verifiers placed in canals after BMP](image3)

![Fig 4: Verifiers on IOPA](image4)

![Fig 5: Corresponding obturator heated in the oven](image5)

![Fig 6: Obturators in canals](image6)

![Fig 7: Complete obturation](image7)

**Case report - 2**

![Fig 8: Preoperative IOPA](image8)

![Fig 9: Working length determination](image9)

![Fig 10: MTA apical plug and thermoplasticized obturation done](image10)

![Fig 11: Follow up at 3 month](image11)
obturator holder and silicone stop must be under the holder. Push the holder down (arrow down) until it sounds a click. Push the button which corresponds to the size of the ThermaFil endodontic obturator to be heated. Then push the “start left” button. The obturator is now being heated. The heating time depends on obturator size varies from 20 to 45 seconds and is regulated automatically.

After the first signal beep, the obturator is ready for use. Push the obturator holder (arrow up) and take the obturator carefully out of the holder by pulling it towards and not to scrape the obturator on any part of the holder. The oven will “beep” every 15 seconds to remind, that the obturator is still in the oven but after 90 seconds, the heating element will switch off automatically. If more obturators are required, alternatively use the left and right holders. Wait until after the signal “beeps” for the first holder, then immediately start to heat the other one. It is unable to heat both sides at the same time.

Case reports in the article presents the obturation of root canal with ThermaFil system.

**CASE REPORTS**

**Case-1:** A 31 year old patient visited the Outpatient Department of Conservative Dentistry and Endodontics in Genesis Institute of Dental Sciences and Research, Ferozepur, Punjab with chief complaint of pain in upper right back teeth region since 10 days. After taking history and performing various diagnostic tests, it was decided to go for root canal treatment of 16 (fig 1).

After explaining all procedure to patient, access cavity was made and working length was determined under rubber dam isolation. Biomechanical preparation of root canals were completed by using universal ProTaper system in crown down manner, following the instructions recommended by manufacturer. Instrumentation was under copious irrigation with 3% sodium hypochlorite (Prevest DenPro Ltd) followed by 17% EDTA (Prime dental product Ltd) . MB canal was prepared upto F2, DB upto F3 and palatal upto F3, but after apical gauging it was extended to apical size 35no. Canal sizes were verified by verifiers of corresponding sizes and the matching obturators were selected (fig 3,4). After confirming the verifiers on radiograph, canals were dried with sterile paper points and a thin layer of zinc oxide eugenol based sealer was applied to canal walls. One by one obturators were placed into Thermaprep oven, when heated obturators were securely placed into canals and left undisturbed for 2 minutes to set warm gutta percha (fig 5,6). Remaining carriers were removed by shearing off from the canal orifices with round bur. Post obturation radiograph shows well defined sealed canals. Composite restoration was used to restore the pulp chamber and advise for coronal restoration (fig 7).

**Case-2:** A 23 old male patient visited the Out Patient Department of Genesis Institute of Dental Sciences and Research, Ferozepur, Punjab with chief complaint of fractured and discolored upper right front tooth. Patient gave history of accident at the age of 11 year. Clinical examination revealed Ellis class III fracture and discolored 11. After performing various diagnostic tests, root canal treatment was indicated for 11. In this case of internal resorption, H files were used for biomechanical preparation of root canals (fig 9).

Due to wide apex, MTA apical plug was made by placing MTA with help of amalgam carrier and condensed with hand plunger upto 5mm and over it a moist cotton pellet was kept and temporary restoration (Orafill –G, Prevest Dent pro) was placed. After 48 hours, patient was recalled and setting of MTA was checked to form a hard mass of cement (fig 11). After a apical plug was made, same procedure was followed to obturate the canal with ThermaFil system. After 3 month follow up, tooth was asymptomatic and well secured in a dentition (fig 12).

**Discussion**

The main aim of endodontic treatment is to fill the space of root canals with the best possible adaptation to the walls, through the use of a homogeneous mass of gutta-percha and a thin layer of endodontic cement. Piati et al. stated that the seal must be sufficient to prevent reinfection by fluids and bacterial byproducts. The obturation techniques assist in this process, but the strong influence of the anatomical variability of root canals may lead to failure.

Gutta-percha is the trans isomer of polyisoprene (rubber) and exists in two crystalline forms (α and β). In the unheated β phase the material is a solid mass that is compactable. When heated the material changes to the α phase and becomes pliable and tacky and can be made to flow when pressure is applied. A disadvantage to the α phase is that the material shrinks on setting, same, when α-phase gutta-percha is heated and cooled it undergoes less shrinkage, making it more dimensionally stable for thermoplasticized techniques. The use of α-phase gutta-percha for obturation has increased as thermoplastic techniques have become more common.²

Ribeiro et al. stated that the thermoplastification aims to promote greater amount of gutta-percha, better adaption to irregularities and consequently, the smaller amount of cement as compared to those that use cold gutta-percha lateral condensation and vertical condensation and the single cone.³ Internal root resorption presents as an irregular
resorptive defect in root canals. In the presented case report 2, maxillary central incisors with internal resorptive cavities located in the middle third of the root was obturated with ThermaFil system, as it is difficult to achieve 3D obturation with other obturation techniques.

Various studies show obturation of curved root canals with ThermaFil, results in a more dense and well adapted root canal filling throughout the entire canal system, than lateral condensation with standard gutta-percha. The predisposition for extrusion of filling materials with the ThermaFil obturation technique is observed when the apical foramen was not patent. Prevention of this occurrence is to be done by the use of an apical dentine matrix plug, that has been demonstrated by Scott & Vire (1992). Emmanuel Samson et al, evaluated that the apical seal by ThermaFil obturating technique shows minimum mean apical dye penetration as compared to Obtura II and lateral condensation.

Once the ThermaFil obturation is completed, Pro-Post drills (DENTSPLY Tulsa Dental Specialties) are recommended if post space is required for restoration of the tooth. The unique eccentric cutting tip keeps the instrument centered in the canal while friction softens and removes the gutta-percha and plastic carrier. When retreatment is necessary the thermafil plastic carrier has a groove along its length to provide an access point for placement of a file. Chloroform and hand files can be used to remove the gutta-percha surrounding the carrier. All aspects are covered in Thermafil system for making it universally accepted even if post core and retreatment is to be done. It all contributes to its versatile nature and mechanically well accepted in obturating the complex root canals anatomies.

Conclusion

The ThermaFil system of thermoplastification obturation is effective in different clinical situations regardless of the curvature, number of root canals and resorptive defects, thus providing its versatility. The technique is fast contributing for a shorter working time, if previous training is delivered.

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RENEWAL DISEASE AND ITS ORAL MANIFESTATIONS: REVIEW AND CASE REPORT

ABSTRACT:
Chronic renal disease is a condition defined as the progressive and irreversible loss of renal function, leading to marked reduction in the glomerular filtration rate. This condition manifests oral consequences very frequently. About 90% of the patients with renal failure have oral symptoms like dry mouth, mucosal pallor, stomatitis, uremic odor, change in taste, and glaze salivary flow. Moreover, candidiasis and recurrent herpes are more common in chronic renal disease. The aim of the article is to familiarize the dental clinician with the oral signs of patients with renal disorders through these case reports. Dental treatment plan should be made taking into consideration that these patients have a greater tendency of bleeding, hypertension, anemia, drug intolerance and increased susceptibility to infections.

KEYWORDS: Renal disease, chronic renal failure, uremia, uremic stomatitis

INTRODUCTION:
All the diseases affecting the human body tend to show their manifestations mostly in the oral cavity. Making a thorough assessment of oral status of a patient is a must in diagnosing sometimes an underlying systemic cause. Kidneys are the vital organs for maintaining a stable internal environment i.e. haemostasis. The renal system comprises an essential part of the normal physiology of human body and causes maximum cases of mortality and morbidity worldwide. There are two main diseases related to kidneys namely Chronic renal disease and End stage renal disease (ESRD), which are approximately 25-40%. Chronic renal disease is the twelfth leading reason of death. The various functions of kidneys include excretion of metabolic waste, blood pressure control, Vitamin D activation and electrolyte regulation.

Acute and Chronic renal failure result from an inability of the kidneys to adequately filter metabolic wastes from the blood. This results in reduced GFR and an accumulation of ammonia and uric acid causing systemic imbalance.

Chronic Renal Disease is defined as the structural and functional abnormality of kidneys including with/without GFR leading to kidney damage. It includes abnormalities in urine and blood composition. GFR less than 60 mL/min. per 1.73 m² for 3 months or more, with or without kidney damage is indicative of chronic renal disease. It leads to clinical syndrome called uremia. Signs of uremia are hematological changes, bone metabolism changes and alteration in immune status. This condition is measured by creatinine clearance which gives an acceptable approximation of the value of GFR.
The function of kidneys can be assessed indirectly to the plasma creatinine levels. Normal value of serum creatinine is 0.5-1.4 mg/dL. Diabetes mellitus, arterial hypertension and glomerulonephritis are the most important etiological factors for chronic renal disease. Treatment of chronic renal insufficiency include dietary changes, correction of systemic complications and dialysis or renal graft. About 90% of renal failure patients have oral symptoms, which may be consequences of dialysis and renal transplantation and etiological factors causing chronic renal failure.

This article highlights the scenario of improper regulation of the excretory system and its effects on the other aspects of health with a focus on ill effects on oral health. It also reviews the various precautionary measures to be taken in a dental set up.

ETIOLOGY AND PATHOGENESIS:

Patients may report with a variety of oral complaints prior to or with the appearance of oral symptoms. On several occasions, frank uremia, metabolic acidosis and hypertensive crisis is present. These symptoms indicate chronic renal failure followed by hemodialysis which further complicates the situation causing various oral manifestations.

Once diabetic nephropathy is established in a patient, continuous ambulatory peritoneal dialysis follows which can further cause repetitive bacterial peritonitis. This is also accompanied by complaints of hypoaucysis and neurosensory cochlear deafness in some patients.

After years of evolution, the patient can present with glaucoma in the eyes. The patient can also show complications due to diabetes mellitus and peripheral vascular problems and signs of secondary hyperparathyroidism.

CLINICAL PRESENTATION:

Patients with acute or chronic renal failure present with the clinical symptoms when it starts affecting the gastrointestinal system, it causes nausea, vomiting, ammonical taste and halitosis. Neuromuscular symptoms vary from headache, peripheral neuropathy to seizures in some cases. Blood picture shows lymphocytopenia, increased bleeding tendencies in several patients.

Endocrinial symptoms are similar to that of secondary hyperthyroidism also impairing growth. Renal failure can affect the cardiovascular system causing congestive heart failure, pericarditis. Bone changes are presented as bone resorption, osteitis fibrosa, delayed growth, rickets and delayed tooth eruption.

ORAL MANIFESTATIONS

The patient can present with enlarged salivary glands accompanied by a decrease in salivary flow causing an increased tendency to dental caries. Dry mouth or xerostomia is a common manifestation accompanied by a very frequent complaint of halitosis caused by a breakdown of urea into ammonia. This is the most predictable outcome because of an increase in urea levels in patients with chronic renal failure. The patient also complains of a metallic taste in mouth. Dry mouth also results in difficulty in speech, mastication and swallowing.

If the renal failure occurs in growing stages of life, altered or delayed eruption occurs alongside enamel hypoplasia with or without brown discoloration. Calcification of pulpal chamber in adult patients can also occur. There is increased calculus formation requiring meticulous oral prophylaxis from the dentist and the patient to prevent further bacterial complications.

The mucosa is pale with low grade gingival inflammation. It can be induced by cyclosporins or calcium channel blockers. It principally affects labial and interdental papilla. It can become extensive involving the gingival margins, lingual and palatal surfaces.

The patient also has a frequent occurrence of petechiae, ecchymosis and gingival bleeding caused due to increased bleeding tendencies because of impaired platelet functions.

Due to continuous administration of immunosuppressive drugs, lichenoid reaction (drug induced) and pyogenic granuloma are frequently observed in CRF patients. Moreover, due to drug related immunosuppression, oral hairy leukoplakia can be observed. These lesions lack Ebstein Barr Virus (EBV) but appear similar clinically and histopathologically.

Oral candidiasis may affect 20-30 % transplant patients. Candidal infections may present as angular cheilitis, pseudomembranous and erythematous ulcerations or chronic atrophic infections. Viral infections such as Herpes Simplex Virus (HSV) used to be common in transplant recipients. The use of anti-herpetic agents such as 5% Acyclovir has significantly reduced the frequency of these infections.

The risk of oral squamous cell carcinoma in the patients receiving hemodialysis is generally similar to that of otherwise healthy individuals in the general population. Although there have been reports suggesting that therapy following renal transplantation predisposes to epithelial dysplasia and carcinoma of lip. Any increased risk of oral malignancy in renal failure probably reflects the effects of iatrogenic immunosuppression which increases liability to
virally associated tumors such as Kaposi sarcoma or non Hodgkin lymphoma.5

Finally, uremic stomatitis is an oral complication of unknown aetiology and it is relatively uncommon, usually seen in patients with an end stage or untreated renal disease. The onset may be abrupt with white plaque, distributed predominantly on buccal mucosa, tongue and floor of mouth. The clinical appearance has been known to mimic oral hairy leukoplakia.1

**RADIOGRAPHIC FEATURES**

Demineralisation of bone may be seen along with loss of bony trabeculations.

These may present either as generalized demineralization or as frank intrabony lesions (in more advanced stages), sometimes containing focal tumors that are histologically similar to giant cell tumors of the bone giving a ground glass appearance in some areas.50

Socket sclerosis is seen in most areas which causes tooth mobility in most of the cases. Bone osteodystrophy follows with decrease or loss of cortical bone observed at the mandibular angle and around the maxillary sinuses, mental foramen and mandibular canal.50

**CASE REPORT 1:**

A 45 yr old male reported to the Department of Oral Medicine and Radiology for bleeding in the oral cavity. He had a medical history of chronic renal failure since 3 years and was on periodic hemodialysis, which he underwent irregularly. The patient presented with extreme pallor, cold clammy skin, excessive weight loss and tremors. Regarding the dental history, the patient presented with a strong malodor and ulcers in the oral cavity covered with a white pseudomembrane suggestive of uremic stomatitis and there were white scrapable patches indicating candidal infection. (Fig 1,2 and 3). The patient had an increased serum creatinine levels of 12.6 mg/dL and blood urea of 381 mg/dL.

**CASE REPORT 2:**

Another patient, a male aged 62 years of age reported to the department of Oral Medicine and Radiology with the
complaint of multiple mobile teeth. He was a known case of chronic renal failure since 1 year, undergoing haemodialysis. The oral examination showed irregular ulceration on the tongue with lack of an erythematous halo and was covered with necrotic slough. (Fig 4) The patient had abnormal serum chemistry with high level of serum potassium.

**DENTAL CONSIDERATIONS IN PATIENT WITH RENAL DISEASE**

As a dentist, precautionary measures need to be considered before, during and after treatment. It is always preferable to avoid any dental treatment if the disease is unstable because untreated dental infections in immunosuppressed individuals can potentially contribute to mortality and transplant rejections. Regular non-surgical oral prophylaxis is indicated in these patients for accurate oral hygiene. Infection is poorly controlled in immunosuppressed patients, which may spread locally or systemically as bacteremia. Antimicrobial considerations include Erythromycin and Cloxacillin in standard doses. Penicillin, metronidazole, cephalosporin should be given in low doses, as they are inadequately metabolized. Since very high serum level can be toxic to central nervous system, Aspirin and other NSAIDs should be avoided as they increase gastrointestinal irritation and bleeding associated with renal failure.

To minimize the risk of adrenal crisis in individuals who have taken large doses of corticosteroids (10mg prednisolone daily) and undergoing major surgical procedures (such as extractions of more than one tooth), appropriate corticosteroid cover should be administered before treatment.

In patients with increased bleeding tendencies, the treatment should be carried out only when the effect of heparin is minimum, which is one day after dialysis. Careful haemostasis should be ensured in various surgical procedures. If bleeding is prolonged, desmopressin can provide haemostasis for up to 4 hours. If this fails, cryoprecipitate may be effective.

Routine annual dental radiographs should be done to establish and follow manifestations of osteodystrophy. Therapy for xerostomia should be continued and routine recall maintenance must be ensured.

**CONCLUSION:**

The prevalence of chronic renal failure is increasing day by day. Oral and systemic complications can occur as a result of chronic renal failure and its treatment. Upto 90% of patients with chronic renal disease show oral signs and symptoms, such as bleeding tendencies, greater susceptibility to infections and gingival overgrowth produced by cyclosporine. As for dental considerations and management strategies for these patients, we should take into account that the drug dose adjustment must be done using creatinine clearance: before invasive dental procedures, a blood test must be requested. The well supervised treatment protocols, in the dental management of individuals with chronic renal failure can be effective and safe.

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ABSTRACT:
Barrier precautions are a fundamental component of any blood borne pathogen strategy and a critical aspect of all isolation systems. Many infections are transmitted from patient-to-patient via the hands of personnel and gloves and gowns are widely recommended to provide an extra measure of protection against cross-infection. Barrier precautions may also fail if infected patients are not identified promptly. Universal precautions were designed to protect personnel, not to provide barriers to cross-infection and are prone to misinterpretation and misapplication.

INTRODUCTION
The practice of barrier precautions to prevent cross-infection, particularly the use of gloves, has all the characteristics of a typical ritual. It would be difficult for a person living in an industrialized society during the twentieth century not to have been exposed to concepts of public and personal hygiene.

In the last decade, health professions have reassessed infection control and the ethics of the provision of healthcare as a result of professional and public concern regarding bloodborne pathogens such as human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV).

Dental professionals are exposed to a wide variety of microorganisms in the blood and saliva of patients. These microorganisms may cause infectious diseases such as the common cold, pneumonia, tuberculosis, herpes, hepatitis B, and acquired immune deficiency syndrome (AIDS).

Hepatitis A, B and C viruses and the delta agent are responsible for most infectious hepatic diseases. Although hepatitis types A and C are spread primarily by contact with the faeces of infected individuals, Hepatitis B can be spread by contact with any human secretion. The Hepatitis B virus therefore, has the most serious risk of transmission for the...
dentist, staff, and patients. It is usually transmitted by the introduction of infected blood into the bloodstream of a susceptible person, but infected individuals may also secrete large amounts of the virus in their saliva, which can enter an individual through any moist mucosal surface or epithelial wound. Minute quantities of the virus have been found capable of transmitting disease (only $10^2$ to $10^3$ virions/ml of blood). Unlike most viruses, it is exceptionally resistant to desiccation, and quaternary ammonium compounds.

**KNOWLEDGE OF DENTISTS AND PATIENTS**

The acquisition of Hepatitis B virus infection by health service staffs or from patients is an occupational hazard, which can be estimated by comparing infection rates in health service staff with the general population. During normal dental practice, dentists are at risk of infection from microorganisms carried by patients. Injuries in dental offices happen because of a confined space, the frequent patient movement and the variety of sharp dental instruments used in normal dental practice.

Universal precautions of infection control apply to blood, other body fluids containing visible blood, semen, and vaginal secretions. Universal precautions also apply to tissues and to the following fluids: cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids. However, Universal precautions do not apply to faeces, nasal precautions, sputum, sweat, tears, urine, and vomitus unless they contain visible blood.

Patient’s attendance in dental clinics exposes them to two risks: first, the probability of cross-infection from one patient to another from an infected dental instrument and second, the potential hazard of an infected dentist, whereby the pathogen can be transmitted from the operator to the patient.

**IMPORTANCE OF PREVENTION IN DENTISTRY**

The recommendation to use universal, precaution systems form a necessity for treating all patients, as though they are infected with HIV, HCV, or HBV. Thus additional precautions for infected patients are unnecessary. Dental surgeons, who wear glasses and work with ultrasonic and rotary instruments, are aware of the amount of droplet spread of saliva, blood and water because of deposits on their glasses. Blood-borne infections such as HBV have a occupational risk of a percutaneous exposure to HBV as estimated to be 2% for HBeAg-negative and about 30% for HBeAg-positive blood.

Dentists are among the most at high risk of exposure of Hepatitis B virus. Reusing local anesthetics syringes following recapping, and cleaning instruments were the two most important causes of needlestick injuries in dental students and dental hygienists. Currently, vaccination is the most important method of preventing HBV infection. The number of vaccinated dentists is increasing constantly. Unvaccinated dentists are five times more likely to be infected than vaccinated dentists. Transmission of blood-borne pathogens following an exposure depends on the concentration of virus in the blood or body fluid, the volume of infective material inoculated, the loss of infectivity during transfer of inoculate and the port of entry.

Since dentists who perform oral surgical procedures are exposed to blood and saliva, the dental surgery team should wear barriers to protect from contaminating any open wounds on hands and any exposed mucosal surfaces. This includes wearing of gloves, face mask, and eyeglasses, during surgery. The dental staff should continue to wear these protective devices when cleaning instruments and when handling impressions, casts, or specimens from patients. The current climate in today’s society regarding infectious diseases, in particular herpes, hepatitis, and HIV infections, dictates that the dental profession must close the door to any possible transmission of infection in the dental surgery and incorporate within their practices accepted infection control techniques.

An injury caused by needle or blade can be prevented by holding the sheath with an instrument during resheathing of needles after use, taking care never to apply or remove a blade from a scalpel handle or a needle from a syringe without an instrument, and disposing of used blades and needles into rigid, well marked receptacle box, container specially designed for contaminated sharp objects. Post exposure prophylaxis refers to comprehensive management given to minimize the risk of infection following potential exposure to blood-borne pathogens (HIV, HBV, HCV).

**PROTOCOL FOR NEEDLE STICK INJURY**

A) **FIRST AID**

Immediately following any exposure, whether or not the source is known to pose a risk of infection.

1) The wound should be washed immediately and thoroughly with soap and water.

2) Antiseptics are not necessary as there is no evidence of their efficacy.

3) Wounds should not be sucked.

4) For mucosal contact such as spillage into the conjunctiva, the exposed part should also be washed immediately and liberally with clean running water.

**MANAGEMENT OF ACCIDENTAL EXPOSURE TO HEPATITIS B VIRUS (HBV)**

1) The management of an incident of accidental exposure to Hepatitis B virus involves proper risk assessment, counseling...
tailored to the needs of individual, and the prescription of postexposure prophylaxis as appropriate.

2) For the best protection, all health care staff with potential risk of exposure to blood and body fluids are advised to receive hepatitis B vaccination as soon as possible for their own safety. Subjects with anti-HBs titre ≥ 10 mIU/mL 1-4 months after vaccine completion are considered as responders. Non-responders are those with no detectable anti-HBs and hypo-responders refer to those whose anti-HBs titre are between 0-10 mIU/mL. Both non and hypo-responders should complete a second 3-dose vaccine series and retested at the completion of the second vaccine series. Non-responders to the initial 3-dose vaccine series have a 41% chance of responding to a second 3-dose series.

Two types of products are available for prophylaxis against HBV infection. Hep B vaccine which provides long term protection against HBV infection. HBIG (Hepatitis B immunoglobulin) provides temporary protection (i.e for 3-6 months). Both passive and active PEP with HBIG and hepatitis A vaccination and active PEP with hepatitis B vaccine alone has been demonstrated to be highly effective in preventing transmission after exposure to HBV.

If percutaneous exposure (e.g bite or needlestick injury) occurs, Hepatitis B vaccine and Hepatitis B immunoglobulin should always be encouraged to have baseline blood taken for HIV antibody after receiving pre-test counseling and giving consent.

3) The HIV status of the source person is not always obtainable. Therefore, the likelihood of HIV infection has to be estimated based on clinical clues in the setting:

a) HIV prevalence of the community group which the source belongs to
b) HIV-related risk behaviours e.g unprotected sex, multiple sex partners, needle-sharing for drug injection.

c) HIV related illnesses, e.g Pneumocystis jiroveci pneumonia, oral thrush etc.

4) To date, Zidovudine is the only drug for which there is evidence of a reduction in risk of HIV transmission following HBV infection. Hep B vaccine which provides long-term protection against HBV and it continues to be a reasonable choice as component of PEP.

CONCLUSION

It's a multifactorial approach as improvement of infection control practice requires continual assessment of the group's stage, intervention and prophylaxis assessment of appropriate intervention supporting individual and group creativity. Because of the complexity of the change process, it is not surprising that single behavioural theory but are out of organizational or individual context- often fail.

More education is required to promote a more realistic perception of the risk of cross-infection with HIV and HBV and the use of Universal Precautions. This may allay fears related to personal risk and facilitate access to care for patients with bloodborne pathogens.

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8. WGO practice guideline, "Needle stick injury and accident exposure to blood"; 2005
EMERGENCY CARE IN PATIENTS WITH HEAD AND NECK INJURIES

ABSTRACT:
Trauma accounts for a significant proportion of annual mortality world-wide. Being the most exposed part of the body, face is more vulnerable to such injuries. Multimodal optimization of surgical care significantly improves patient's physical and psychological function with reduced patient morbidity and mortality after surgical procedure. The physical examination begins with reevaluation of the patient's vital signs. If the patient's vital signs are worsening or if there is a deterioration of any system evaluated during the primary survey, the secondary survey is halted and resuscitation is continued. The Advanced Trauma Life Support Programs (ATLS) were built around three core concepts which represented a dramatic change in traditional "medical" thinking. The first concept defines the ATLS approach. Treat the greatest threat to life first. The loss of an airway kills faster than the loss of intravascular volume which kills faster than an acute intracranial bleed. This principle is simplified as the "ABCDE" approach to the trauma evaluation. The second principle is that an indicated treatment should not wait for a definitive diagnosis. And third, an extensive history is not a critical component of the initial evaluation of the injured patient. Life threatening injuries must be managed appropriately, prioritized evaluation and intervention are essential.

INTRODUCTION
With the advent of modernization and backed by a thriving economy, India over the past few decades has seen considerable increase in motorization development and production. However, not being backed by proper road administration, proper understanding of machinery and lack of traffic rule enforcement has led to proportionately increasing number of road traffic accidents with injuries to craniofacial skeleton being the most challenging, alarming and disfiguring. Adding to the factors are interpersonal violence, occupational and sports injuries which also contribute to the already increasing number of craniofacial trauma. Maxillofacial trauma is commonly associated with multiple system injuries and occurs in 33% of severely injured trauma victims brought into emergency rooms.
Studies have found that in maxillofacial region, along with the nasal bone, mandible is one of the most vulnerable facial bone to trauma due to its projection and prominent position with reported incidences of 24.3 to 75%.

The overall management consists of a rapid primary survey, resuscitation of vital functions, a detailed secondary survey, and lastly the initiation of definitive care. The primary survey immediate management of critical injuries are imperative first steps in the successful resuscitation of a trauma victim.

EARLY ASSESSMENT AND MANAGEMENT OF THE TRAUMA PATIENT

The overall management consists of a rapid primary survey, resuscitation of vital functions, a detailed secondary survey, and lastly the initiation of definitive care. The primary survey
identifies injuries in a systematic fashion. The mnemonic ABCDE defines the specific prioritized evaluations and interventions should be followed in all injured patients:

- **A** – Airway maintenance with cervical spine protection
- **B** – Breathing and ventilation
- **C** – Circulation with hemorrhage control
- **D** – Disability: neurologic status
- **E** – Exposure/Environmental control with temperature control

Although the steps in the assessment and early management of trauma patients are outlined in a linear fashion, during the primary survey, life threatening conditions are identified and management is begun simultaneously. The patient’s airway is evaluated and protected before moving forward to assess breathing, circulation, and disability. The secondary survey involving tests and observations does not begin until the

### TABLE 1: INDICATIONS FOR TRACHEOSTOMY PLACEMENT

- Ventilator dependence/respiratory failure
- Prolonged intubation (>1 week)
- Inability to protect airway
- Inability to generate sufficient respiration
- Upper airway obstruction
- Definitive therapy of obstructive sleep apnea and obesity
- Hypoventilation syndrome
- Where there is severe maxillo-facial trauma
- Where a patient can no longer manage their own secretions.
- Where mucous membranes may become inflamed and swell so much that they may occlude airways. Inflamed membranes also secrete large amounts of mucus.
- Where an aspirated object may cause laryngeal muscles to spasm (making it difficult to pass an endotracheal tube)
- When long term intubations are required
- Where a decreased level of consciousness causes upper airway obstruction due to relaxation of structures

### TABLE 2: Percutaneous tracheostomy: indications and contraindications

#### Indications
- Inability to maintain/protect airway
- Upper airway obstruction/cancer (laryngectomy)
- Prolong ventilator requirements

#### Absolute contraindications
- Unstable cervical spine injuries
- Coagulopathy
- Emergency airway
- Pediatric age (<15 years old)

#### Relative contraindications
- Obesity
- Short neck
- Enlarged thyroid isthmus/goiters
- High-riding innominate artery
- Previous tracheostomy
- High positive end-expiratory pressure requirement
primary survey (ABCs) is completed, resuscitation is initiated, and the patients ABCs are re-evaluated.

Resuscitation

A. Airway Evaluation in the Trauma Patient

All patients of trauma should be suspected to have an altered or compromised airway till ruled out. They should continue to receive supplemental oxygen and have cervical immobilisation done using manual-inline stabilisation during examination and airway management. The most utilized predictive scheme for airway assessment is the Mallampati classification 1983, which assigns three gradations of increasing difficulty in visualizing the posterior pharyngeal structures in order to predict difficult laryngeal exposure (Fig 1).

Once it has been identified that the patient has an inadequate airway, one can adopt:

1. Simple airway strategy
2. Definitive airway strategy (endotracheal intubation or surgical airway), or
3. Semi-definitive airway strategy for making the

---

**TABLE 3: RISKS OF TRACHEOSTOMY PLACEMENT**

<table>
<thead>
<tr>
<th>Standard Surgical Risks</th>
<th>Tracheostomy-Specific Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>Hemopneumothorax</td>
</tr>
<tr>
<td>Infection</td>
<td>Damage to trachea or esophagus (including tracheoesophageal fistula)</td>
</tr>
<tr>
<td>Bleeding</td>
<td>Tracheal stenosis</td>
</tr>
<tr>
<td>Need for additional procedures</td>
<td>Inability to decannulate</td>
</tr>
<tr>
<td>Damage to surrounding structures</td>
<td>Mucous plug</td>
</tr>
<tr>
<td>Scar</td>
<td>Tracheoinnominate fistula/erosion</td>
</tr>
</tbody>
</table>

**TABLE 4: Composition of common crystalloids**

<table>
<thead>
<tr>
<th>Crystalloid</th>
<th>Osmolality (mOsm kg⁻¹)</th>
<th>pH</th>
<th>Na⁺ mmol l⁻¹</th>
<th>K⁺ mmol l⁻¹</th>
<th>HCO₃⁻ mmol l⁻¹</th>
<th>Cl⁻ mmol l⁻¹</th>
<th>Ca²⁺ mmol l⁻¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9% Saline</td>
<td>300</td>
<td>5.0</td>
<td>150</td>
<td>0</td>
<td>0</td>
<td>150</td>
<td>0</td>
</tr>
<tr>
<td>Hartmann’s</td>
<td>280</td>
<td>6.5</td>
<td>131</td>
<td>5.0</td>
<td>29ᵃ</td>
<td>111</td>
<td>2</td>
</tr>
<tr>
<td>Plasmalyte 5%</td>
<td>299</td>
<td>5.5</td>
<td>140</td>
<td>5</td>
<td>50ᵇ</td>
<td>98</td>
<td>0</td>
</tr>
<tr>
<td>Dextrose 4%</td>
<td>278</td>
<td>4.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dextrose in 0.18% Saline</td>
<td>286</td>
<td>4.5</td>
<td>31</td>
<td>0</td>
<td>0</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>7.5% Saline</td>
<td>2400</td>
<td>1250</td>
<td>1250</td>
<td>1250</td>
<td>1250</td>
<td>1250</td>
<td>1250</td>
</tr>
</tbody>
</table>

ᵃ HCO₃⁻ is provided as lactate
ᵇ 27 mmol l⁻¹ as acetate and 23 mmol l⁻¹ as gluconate
TABLE 5: Glasgow Coma Scale (GCS) by Teasdale G. and Jennett B.\textsuperscript{16}

<table>
<thead>
<tr>
<th>Eye opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous – 4</td>
</tr>
<tr>
<td>To speech – 3</td>
</tr>
<tr>
<td>To pain – 2</td>
</tr>
<tr>
<td>None – 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motor response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obeys commands – 6</td>
</tr>
<tr>
<td>Localizes to pain – 5</td>
</tr>
<tr>
<td>Normal flexion (withdrawal) – 4</td>
</tr>
<tr>
<td>Abnormal flexion (decorticate) – 3</td>
</tr>
<tr>
<td>Abnormal extension (decerebrate) – 2</td>
</tr>
<tr>
<td>Flaccid – 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Verbal response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oriented – 5</td>
</tr>
<tr>
<td>Confused conversation – 4</td>
</tr>
<tr>
<td>Inappropriate words – 3</td>
</tr>
<tr>
<td>Incomprehensible sounds – 2</td>
</tr>
<tr>
<td>None – 1</td>
</tr>
</tbody>
</table>

TABLE 6: Traditional classification of hypothermia and revised definitions for the trauma patient\textsuperscript{17}

<table>
<thead>
<tr>
<th>Degree of hypothermia</th>
<th>Traditional classification (°C)</th>
<th>Trauma classification (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>32—35</td>
<td>34—36</td>
</tr>
<tr>
<td>Moderate</td>
<td>28—32</td>
<td>32—36</td>
</tr>
<tr>
<td>Severe</td>
<td>20—28</td>
<td>&lt;32</td>
</tr>
<tr>
<td>Profound</td>
<td>14—20</td>
<td></td>
</tr>
<tr>
<td>Deep</td>
<td>&lt;14</td>
<td></td>
</tr>
</tbody>
</table>

airway patent as per existing situation

SIMPLE AIRWAY STRATEGY

This includes Head tilt and Chin lift (avoid in patients with cervical trauma)/jaw thrust or the use of basic adjuncts such as oropharyngeal airway in unresponsive patients without gag reflex, and/or nasopharyngeal airway in patients with more active reflexes but without evidence of fracture of base of skull.\textsuperscript{3}

DEFINITIVE AIRWAY STRATEGY

This includes either endotracheal intubation(ETI) or a surgical airway. Options for achieving ETI may include any one of the following airway aids depending on the situation, device availability and presence of operator with necessary expertise:

1. Direct laryngoscopy and tracheal intubation.
2. Video laryngoscopy and intubation.
3. Fibreoptic tracheal intubation.
4. Lightwand-guided tracheal intubation.
5. Intubating LMA/C-Trac-aided tracheal intubation
6. Blind nasal intubation

Surgical airway should be resorted when there is severe glottis oedema and/or oropharyngeal haemorrhage, fracture of the larynx and when endotracheal tube fails to be
passed through the vocal cords. 1% of trauma patients requiring intubation require a surgical airway. Surgical airway techniques include:

**Cricothyrotomy**

Surgical cricothyrotomy has potential applications in patients who require an elective or emergency surgical airway. In cases where intermaxillary fixation is needed or when nasal or submental intubation is not desired, it allows intraoperative and postoperative intermaxillary fixation without compromising the airway.

Cricothyrotomy can be performed using the following three techniques(Fig.2-3):

A. A needle using a 12-14 gauge cannula. The cannula, after withdrawing the needle, is connected to 40-50 psi source delivering oxygen at 15L/minute. Intermittent insufflation, 1 second on and 4 second off, can provide satisfactory jet insufflation.

B. A needle airway procedure as above, but where the ventilation is provided by low pressure ventilation.

C. “Surgical Airway” where a cuffed tube is inserted into the trachea through the cricothyroid membrane and ventilation is performed through a self-inflating bag or other ventilating technique. *(Fig.4)*

**Tracheostomy**

Tracheostomy is a commonly performed elective procedure that is indicated in patients experiencing prolonged tracheal intubation for mechanical ventilatory support or as an emergent procedure in the event of sudden loss of an airway that cannot be secured by conventional methods. *(Table 1-3)*

**SEMI-DEFINITIVE AIRWAY STRATEGY**

Currently, the LMA*, the ProSeal laryngeal mask airway (PLMA) *(Fig.5)*, the laryngeal tube (LT), the laryngeal tube with integrated suctioning tube (LTS) and the oesophageal tracheal combitube (OTC) are the best evaluated and most widespread devices. Both the LMA and the PLMA have been shown to be perfectly suitable for routine anaesthesia and emergency airway management.

**B. Breathing**

After a definitive airway is confirmed, the patient’s breathing is evaluated. The chest wall should be exposed to allow for a thorough inspection. Inspection will confirm appropriate chest movement with respiration. Palpation and percussion will confirm diaphragmatic excursion and may detect signs of blood or air in the pleural space.

Diminished or absent breath sounds may indicate a pneumothorax or hemothorax. A tension pneumothorax develops if, after chest wall or lung injury, a one-way valve mechanism exists that allows air to enter the pleural space without exit. There is an eventual shift in the mediastinum to the contralateral side and compression of the major vessels entering the chest. With compression, there is a decrease in venous return to the heart and resulting decline in cardiac output. This lesion is suspected in the patient with signs of chest trauma, absence of breath sounds on one side, hyperresonance of the chest wall, hypotension, and shift of the trachea to the contralateral side. The treatment is immediate decompression of the pleural space with a large-bore needle inserted through the second intercostals space along the mid-clavicular line, followed by the formal insertion of a thoracostomy tube. Intubation and positive pressure ventilation can cause a relatively small pneumothorax to expand rapidly. Breathing should be repeatedly evaluated with auscultation of the chest and a chest radiograph should be obtained as soon as possible.

**C. Circulation**

Hemorrhage and hemorrhagic shock that account for 30 to 40% of trauma deaths, are more amenable to interventions to reduce mortality and morbidity. Furthermore, about 25% of CNS injuries are complicated by shock. Among those with multiple injuries, brain injury remains the primary cause of death, but hypotension increases mortality in this group two-to three-fold.

**Early Mortality**

Hemorrhage leads to death during the prehospital period in 33 to 56% of cases, and exsanguination is the most common cause of death among those found dead upon the arrival of emergency medical services (EMS) personnel. Hemorrhage accounts for the largest proportion of mortality occurring within the first hour of trauma center care, over 80% of operating room deaths after major trauma, and almost 50% of deaths in the first 24 hours of trauma care. After first few hours of trauma care, CNS injury replaces hemorrhage as the leading cause of trauma mortality. Very few hemorrhagic deaths occur after the first day. There are multiple potential sources of bleeding in the trauma patient. External blood loss is managed during the primary survey with pressure on the wound.

**Late Mortality and Morbidity**

The presence of hemorrhagic shock is a predictor of poor outcome in the trauma patient. As the amount of blood loss increases, so do resuscitation requirements and physiologic derangements including hypotension and acidosis. Hemorrhage is defined as an acute loss of circulating blood volume. The average adult blood volume is approximately 7% of body weight (70 ml/kg). Children have estimated blood...
volumes of 8–9% of body weight and infants estimated blood volumes are 9–10% of body weight. Blood loss of 10–15% of a healthy person’s blood volume can generally be tolerated without clinical sequelae. Shock is defined as an abnormality in the circulatory system that results in inadequate tissue perfusion and oxygenation. Early signs of a collapsing circulatory system are tachycardia and peripheral vasoconstriction. As the system continues to fail, perfusion to central organs and muscle decreases in order to preserve cerebral perfusion.²

**TYPES OF FLUID**

Intravenous fluids may broadly be classified into colloid and crystalloid solutions. They have very different physical, chemical and physiological characteristics.

**Crystalloid solutions**

Solutions of inorganic ions and small organic molecules dissolved in water are referred to as crystalloids (Table 4). The main solute is either glucose or sodium chloride (saline) and the solutions may be isotonic, hypotonic or hypertonic with respect to plasma. Isotonic saline has a concentration of 0.9% w/v (containing 0.9g NaCl in each liter of water). Potassium, calcium, and lactate may be added to more closely replicate the ionic makeup of plasma. Crystalloids with an ionic composition close to that of plasma may be referred to as “balanced” or “physiological”.³

**Colloid solutions**

A colloid is a homogeneous non-crystalline substance consisting of large molecules or ultramicroscopic particles of one substance dispersed through a second substance - the particles do not settle and cannot be separated out by ordinary filtering or centrifuging like those of a suspension such as blood. Colloid solutions used in clinical practice for fluid therapy are divided into the semisynthetic colloids (gelatins, dextran and hydroxyethyl starches) and the naturally occurring human plasma derivatives (human albumin solutions, plasma protein fraction, fresh frozen plasma, and immunoglobulin solution). Most colloid solutions are presented with the colloid molecules dissolved in isotonic saline but isotonic glucose, hypertonic saline and isotonic balanced or “physiological” electrolyte solutions are also used.³

Further fluid resuscitation and the need to transfuse blood are based upon estimates of the volume of blood loss and the patient’s response to the initial fluid bolus. If the patient had minimal blood loss (10–15% of estimated blood volume) and a rapid response to the initial fluid with a return to normal vital parameters they are not likely to require blood transfusion. If the patients had moderate blood loss (20–40% of estimated blood volume) and only a transient response to the initial fluid bolus then ongoing fluid resuscitation is anticipated. It is likely that the patient will require blood transfusion but type-specific blood may be available. In the patient with severe hemorrhage (over 40% of estimated blood volume) immediate transfusion is required. In this situation type O blood will be used until type-specific blood is available.²

**D. Disability (neurologic evaluation)**

A decline in the patient’s level of consciousness may be due to a decrease in cerebral perfusion or cerebral oxygenation, or may be due to an intracranial injury. The first response to an altered mental status is to re-evaluate airway, breathing, and circulation. A rapid neurologic assessment should include an evaluation of sensory and motor function.²

The Glasgow Coma Scale is a rapid objective clinical measure of neurologic function. The scale was initially published in 1974, by two neurosurgeons (Graham Teasdale and Bryan Jennett) at the University of Glasgow.²³ (Table.5)

The scale assesses eye opening, motor response, and verbal response. Each category is scored based upon best response and the scores are tallied to determine a Coma Score. The highest score obtainable is 15 (indicating an unaltered, awake patient) and the lowest is 3 (indicating deep coma).²

**E. Exposure/environmental control**

The primary survey concludes with complete exposure of the patient. During the resuscitation, and particularly once the patient is undressed, it is critical to protect the patient from developing hypothermia. Hypothermia develops in up to 70% of trauma patients at some point during resuscitation. Exposure, paralysis, and fluid administration all contribute to lowering the patient’s core temperature. Hypothermia can produce a relative coagulopathy. It alters platelet function, the coagulation cascade, and the fibrinolytic system. A drop in the core temperature of just a few degrees is enough to produce a marked decrease in clotting ability. (Table.6)

Hypothermia also produces a dramatic increase in oxygen consumption. Decrease in the core temperature of 0.3°C produces a 7% increase in oxygen consumption and a decrease of 1.2°C, produces a 92% increase in oxygen consumption. Hypothermia can produce negative inotropic changes in the heart and respiratory depression, and exacerbate hyperglycemia by decreasing insulin production and creating end-organ insulin resistance. Hypothermia, along with acidosis and coagulopathy, has been identified as a component of the “lethal triad” in injured patients, and has been shown to contribute to increased mortality in these patients.³

Rewarming of the trauma patient can be undertaken using...
either passive or active methods. Passive rewarming consists of optimizing environmental conditions while allowing the patient’s own heat generating capabilities to correct the decrease in core temperature. Active rewarming includes external methods of rewarming as well as methods directed at rewarming the core. External rewarming techniques include the use of heating blankets, convective air blankets, reflective blankets, and radiant heat shields.

**SUMMARY**

The treatment of trauma requires the rapid assessment of injuries and institution of life-preserving therapy. Because Timing is crucial, a systematic approach that can be rapidly and accurately applied is essential. This approach is termed the “initial assessment” and includes the following elements: Preparation, Triage, Primary survey (ABCDEs), Resuscitation, Adjuncts to primary survey and resuscitation. Specifically, appropriate monitoring and repeated clinical assessment are required, along with support for all major organ systems, including cardiorespiratory function, renal function and fluid and electrolyte balance. Multimodal optimization of surgical care significantly improves patient’s physical and psychological function with reduced patient morbidity and mortality.

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PROSTHODONTIC MANAGEMENT OF GAGGING: A REVIEW

ABSTRACT:
The gag reflex is a complex physiologic phenomenon. The problem compromises the quality of dental treatment and is a barrier to optimal patient care. The function of the reflex is protective in nature. When the reflex is abnormally active, the dentist may be presented with a bewildering and frustrating problem in various dental procedures, resulting in a strong potential for compromised treatment. The purpose of this paper is to describe methods of managing the gagging patient that has a sound rationale based on modified treatment approaches.

Key words: Gagging, trigger zones, vomiting, reflex, management.

INTRODUCTION

Gagging is an involuntary contraction of muscles of soft palate or pharynx that results in retching. It is a normal protective reflex designed to protect the airway and remove irritating material from the posterior oropharynx and upper GIT tract. Gagging reaction ranges from mild choking to violent, uncontrolled retching which may/may not precede vomiting. It is a reflex mechanism in which afferent signals are carried by trigeminal, glossopharyngeal and vagus nerves from receptors around the mouth, tongue, soft palate to the brain in medulla oblongata. Efferent signals are carried out by trigeminal, facial, vagus, hypoglossal and sympathetic nerves which results in gagging.
ETIOLOGICAL FACTORS

<table>
<thead>
<tr>
<th>ANATOMIC FACTORS:</th>
<th>MEDICAL FACTORS</th>
<th>PSYCHOLOGICAL FACTORS</th>
<th>DENTAL FACTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Atonic and relaxed soft palate</td>
<td>A. Nasal obstruction</td>
<td>A. Stress</td>
<td>A. Thin consistency impression material</td>
</tr>
<tr>
<td>B. Long soft palate</td>
<td>B. Postnasal drip</td>
<td>B. Phobia</td>
<td>B. Oversized impression tray</td>
</tr>
<tr>
<td>C. Sudden drop at the junction of soft and hard palate</td>
<td>C. Catarrh</td>
<td>C. Alcoholism</td>
<td>C. Inadequate posterior palatal seal</td>
</tr>
<tr>
<td>D. Undue sensitivity of the soft palate, uvula, fauces, posterior pharyngeal wall and tongue</td>
<td>D. Nasal polyp</td>
<td>D. Fear</td>
<td>D. Restricted tongue space in dentures</td>
</tr>
<tr>
<td></td>
<td>E. mucosal congestion of upper respiratory tract</td>
<td>E. Visual and olfactory stimuli</td>
<td>E.. Poor retention.</td>
</tr>
<tr>
<td></td>
<td>F. Chronic gastrointestinal diseases notably chronic gastritis, peptic ulcers and carcinoma of stomach</td>
<td></td>
<td>F. Surface finish of acrylic resin.</td>
</tr>
<tr>
<td></td>
<td>G. Hiatus hernia and uncontrolled diabetes</td>
<td></td>
<td>G. Inadequate free way space.</td>
</tr>
</tbody>
</table>

Some people have a **reduced or absent reflex**, whilst others have a **pronounced one**. Pronounced gag reflexes can compromise all aspects of dentistry, from the diagnostic procedures and radiography to any form of active treatment. In some patients with marked gagging reflexes, it can lead to avoidance of treatment.

Active gag reflex upsets the patient, compromises quality of treatment and frustrates the dentist. Effective management of gagging depends on treatment of the cause and not merely the symptoms. By thorough examination, taking adequate medical history, conversation with the patient, the dentist needs to determine cause for gagging which can be because of iatrogenic factors, organic disturbances, anatomic or psychological factors.

**REVIEW OF LITERATURE**

Schote et al (1959) gave the relationship of gag reflex to the vomiting reflex and describe that vomiting centre lies in the dorsal portion of the lateral reticular formation of medulla oblongata.

Singer et al (1973) tried to place glass marbles in mouth prior to the treatment of denture patients.

Murphy et al (1975) surveyed gagging and analyzed medical history. He attributed the problem to complete or partial maxillary dentures. he treated gagging patients by construction of clear acrylic training plate combined with relaxation therapy.

Flamer and Connely (1984) suggested technique for construction of plateless dentures which are not covering palatal vault but it is satisfactory only if maxillary ridge is well formed.

**CAUSES OF GAGGING**

5 *Intraoral areas are known to be "Trigger Zones": palatoglossal and palatopharyngeal folds, base of tongue, palate, uvula and posterior pharyngeal wall.* Sensitivity to these areas is known to cause gag reflex. Various factors are as follows:

**CLASSIFICATION OF GAGGING**

**ACC. TO KROLL (1963):** Psychogenic or somatic in origin

**ACC. TO FAIGENBLUM (1968):** On the basis of severity of the problem: mild or severe retching

**ACC. TO DAVIS:** Physiological or psychological

**MANAGEMENT OF GAGGING REFLEX**

The aim of treatment is to allow the patient to receive dental care such as restorative treatment or wearing of dental prosthesis with minimum of anxiety and stress. The various management strategies are as follows:

1. Psychological intervention
2. Prosthodontic management
3. Pharmacological measures
4. Surgical intervention
5. Acupressure and Acupuncture
6. **PSYCHOLOGICAL INTERVENTION**
Psychotherapy includes: relaxation, distraction and desensitization procedures

a) **RELAXATION**: Gag reflex may be a manifestation of an anxiety state. Relaxation techniques are helpful in reducing the gag reflex like ask the patient to tense and relax certain muscle groups, starting with legs and working upwards, while continually providing reassurance in calm atmosphere.

b) **DISTRACTION**: These techniques are to divert the patient’s attention and to allow short dental procedures to be performed by engaging the patient in conversation, by asking the patient breathe audibly through the nose and at the same time rhythmically tap the right foot on the floor, by instructing to patient to raise one leg and hold it in air.

2. **PROSTHODONTIC MANAGEMENT**

1. **During the initial steps of impression making following points should be considered:**
   a) **Selection of tray**: Tray size should be appropriate. Oversized tray can lead to gagging.
   b) **Material selection**: Impression material of thin consistency should be avoided. Use of fast setting material is advocated. Tray should not be overloaded with impression material.
   c) **Posterior palatal seal** should be appropriately recorded and should not be underdamed or overdamed.
   d) **Modified maxillary custom tray** can also be used to prevent gagging. It is easy to use these trays using disposable saliva ejectors at distal aspect so that excess impression material flow through these areas without triggering the soft palate.

2. **Recording jaw relations**: Vertical dimension of occlusion should be appropriately recorded because when vertical dimension decreases space for tongue also decreases due to which tongue will fall back and it can lead to gagging.

3. **In known gagger Marble technique** is suggested. The patient is asked to keep 5 marbles in their mouth, as often as possible, in a week prior to the commencement of prosthodontic treatment.

4. **TRAINING BASES**: In desensitization technique, a patient is progressively supplied with series of small to full sized denture bases. A thin acrylic denture base without teeth is fabricated and the patient is asked to wear it at home, gradually increasing the length of the time the training base is worn.

5. **ROOFLESS DENTURE**: maxillary denture can be reduced to a U-shaped border situated approximately 10mm from the dental arch. Denture wearers with the above type of dentures reported that reduction of the palatal coverage influences their sense of taste positively, and reduces or eliminates gagging tendency.

6. **MATTE FINISH DENTURE**: Jordan in 1954 suggested
that a smooth highly polished surface coated with saliva may produce a slimy sensation which is sufficient to cause gagging in some patients; a matte finish has been advocated as more acceptable in this situation.

7. **CONTROLLED BREATHING METHOD** - This method advocated by the National Child Birth Trust for use by women in labour in similar to that advocated by Morphy. All patients were instructed in controlled rhythmic breathing and told to practice it for one or two weeks before prosthetic treatment commenced. The breathing was slow, deep and even, and the rhythm maintained by concentrating the mind upon a particular verse or tune with an even tempo.

3. **PHARMACOLOGICAL METHODS**

When clinical and prosthodontic procedures fail, pharmacological assistant is taken to control the gagging. Drugs used are classified as peripherally acting which include topical and local anesthetics and centrally acting drugs are antihistamines, sedatives, tranquilizers and CNS depressants.

4. **SURGICAL CORRECTION**

Leslie reported that persistent gagging result from atonic and relaxed soft palate which is found in nervous patient. So he advocated an operation to tighten and shorten the soft palate. 10

5. **ROLE OF ACUPUNCTURE**:

Acupuncture is a system of medicine in which a fine needle is inserted through the skin to a depth of a few millimeters, left in place for a time, sometimes manipulated and then withdrawn. There is a specific, recognized anti-gagging point on the ear. The needles are not disturbed during access to the mouth for dental treatment. (Fig. 1)

6. **ACUPRESSURE TECHNIQUE**:

Acupressure caves are sensitive points in the human body that feel soreness distention, when deep pressure is applied for five to twenty minutes. These points are left and right concave area at medial aspect of the forearm and concave area between first and second metacarpal bones. Acupressure points for gagging are Yingtang, Neiguan, Hegu. (Fig 2, 3 and 4)

**CONCLUSION**

Overt gagging can be distressing for both the patient and clinician. There appears to be no universal remedy for the successful management of the gagging patient. A wide variety of management strategies have been described and these should be tailored to suit the needs of individual patients. This can only be ascertained by taking a detailed history. In many situations a combination of treatment techniques is required.

**REFERENCES**

ABSTRACT:
Root canal treatments (RCTs) aim to eradicate pulpal diseases and save the infected teeth by eliminating microorganisms from the root canal system. Starting but not finishing an RCT can perpetuate a dead space for bacterial growth, which can spread to other sites in the body and develop systemic symptoms. Cardiovascular diseases (CVD) have a complex etiology determined by risk factors, which are in turn associated to a strong genetic component and to environmental factors. In the biological background for the development of CVD, low-grade chronic inflammation plays a role as a pathogenetic determinant of atherosclerosis.

Bacterial etiology has been confirmed for common oral diseases such as caries and periodontal and endodontic infections. Bacteria causing these diseases are organized in biofilm structures, which are complex microbial communities, composed of a great variety of bacteria with different ecological requirements and pathogenic potential. The biofilm community not only gives bacteria effective protection against the host's defense system but also makes them more resistant to a variety of disinfecting agents used as oral hygiene products or in the treatment of infections. Successful treatment of these diseases depends on biofilm removal as well as effective killing of biofilm bacteria.

Keywords: Root canal treatment, biofilm, endodontic infections, cardiovascular diseases

INTRODUCTION
Cardiovascular disease (CVD) is one of the leading causes of mortality worldwide, approximately 30% of all deaths and have a complex etiology determined by risk factors, which are in turn associated to a strong genetic component and to environmental factors. Atherosclerosis is the main cause of coronary heart and cerebrovascular disease which, in turn, are the most common causes of death in the industrialized world. In recent years, low-grade chronic inflammation and bacterial or viral organisms involved in chronic inflammation have been proposed as strong factors associated with atherosclerosis and CVD events. Inflammatory and immune responses are initiated in the pulp tissue or periapical area when antigens are introduced into the root canal. Exudate is often found in it. Periodontal and pulpal diseases are 2 major low-grade chronic inflammatory infectious diseases of the oral cavity. Periodontal disease is a chronic gram-negative anaerobic infection of the tooth-supporting structures with an estimated prevalence of as high as 75% in adults in the US. Apical periodontitis is caused by bacteria residing inside the root canals of the diseased teeth, and organized in a biofilm, as a consequence of pulpal infection, which is usually the
ultimate result of a deep carious lesion. Clinically, it is diagnosed from patient symptoms, clinical signs, and radiographic images; chronic apical periodontitis, and is confirmed through observation of periradicular radiolucencies on affected teeth.

Additionally, acute endodontic inflammation also plays a role in CHD risk. Links between endodontic inflammation and cardiovascular outcomes are biologically plausible, considering the predominance of Gram-negative anaerobes associated with endodontic infections (Baumgartner, 1991), evidence of cytokine production in inflamed pulp and periradical granulomatous tissues (Miller et al, 1996), and observations of elevated systemic levels of inflammatory mediators (Marton et al, 1988).

Bacterial infection of the dental pulp ultimately results in the formation of dental periradical lesions consisting of granulomas and cysts, which represent two different stages of development of the same inflammatory lesion.

Cytokines are produced in inflamed pulp and periradical granulomatous tissues, and systemic levels of inflammatory mediators have been observed in patients undergoing RCT. A plausible mechanism is that infectious processes associated with the root canal system may not only cause local manifestations of oral cavities but also extend to nearby and distant body compartments along anatomic pathways or systemic circulation.

Ischemic heart disease, Dysrhythmias, and Infective Endocarditis are some of the cardiovascular conditions most commonly seen among the population.

A comprehensive treatment plan should be constructed keeping in view all the pros and cons related to patient’s medical condition.

**DIFFERENT MICROBES FOUND IN ENDODONTIC INFECTION**

The rationale for endodontic treatment is to eradicate the infection, to prevent microorganisms from re-infecting the root or periradicular tissues. Thus, a thorough understanding of the endodontic microbiota is the basis for the success of endodontic treatment.

**Intraradicular infections**

The endodontic pathogens that cause primary intraradicular infections are:

1. Black pigmented Gram negative anaerobic rods (Bacteroides melaninogenicus).
   - Saccharolytic – Prevotella intermedia
   - Asaccharolytic – Porphyromonas gingivalis
2. Tannerella forsythia
3. Fusobacterium nucleatum
4. Spirochetes are highly motile, gram negative bacteria. All

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**Table No: 1** Prevelance of bacteraemia arising after various types of dental procedures and oral cavity.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Prevelance of Bacteraemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraction</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>51%</td>
</tr>
<tr>
<td>Multiple</td>
<td>68-100%</td>
</tr>
<tr>
<td>Periodontal surgery</td>
<td></td>
</tr>
<tr>
<td>Flap procedure</td>
<td>36-88%</td>
</tr>
<tr>
<td>Gingivectomy</td>
<td>83%</td>
</tr>
<tr>
<td>Endodontics</td>
<td></td>
</tr>
<tr>
<td>Intracanal instrumentation</td>
<td>0-31%</td>
</tr>
<tr>
<td>Extracanal instrumentation</td>
<td>0-54%</td>
</tr>
<tr>
<td>Endodontic surgery</td>
<td></td>
</tr>
<tr>
<td>Flap reflection</td>
<td>83%</td>
</tr>
<tr>
<td>Periapical curettage</td>
<td>33%</td>
</tr>
</tbody>
</table>

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Indian Journal of Comprehensive Dental Care
oral spirochetes fall into the genus Treponema.\textsuperscript{13}
- Treponema denticola
- Treponema socranskii

6) Gram positive anaerobic rods:
- Actinomyces spp.
- Eubacterium spp.

7) Gram positive cocci that are present in endodontic infection:
- Streptococcus mitis
- Enterococcus faecalis.

**Bacteria persisting intracanal disinfection procedures and after root canal treatment**

The most common Gram negative anaerobic rods are:
- Fusobacterium nucleatum
- Prevotella spp.

The most common Gram positive bacteria are:
- Lactobacilli
- Staphylococci
- E. faecalis
- Eubacterium

**Extraradicular infections**

Intraradicular microorganisms usually constrain themselves in the root canal and can overcome the defense barrier and establish an extraradicular infection. This may lead to development of acute apical abscess in periapical tissue. The dominant microorganisms present are anaerobic bacteria\textsuperscript{14}:
- Actinomyces spp.
- Porphyromonas gingivalis
- Prevotella spp.

**PATHWAYS OF INFECTION**

Kakehashi et al stated that there are so many ways by which
the microorganisms reach the pulp.\textsuperscript{11} The various routes are:

1. **Dental tubules:** After a carious lesion or during dental procedures, microorganisms may use the pathway in a centripetal direction to reach the pulp. Bacteria gain access to the pulp when the dentin distance between the border of carious lesion and the pulp is 0.2 mm.\textsuperscript{16}

2. **Periodontal membrane:** Microorganisms from gingival sulcus may reach the pulp chamber through the periodontal membrane, using a lateral channel or the apical foramen as a pathway. This pathway becomes available to microorganisms during a dental prophylaxis, due to dental luxation, as a result of the migration of epithelial insertion to the establishment of periodontal pockets.\textsuperscript{11}

3. **Faulty restoration:** Studies have proven that salivary contamination from the occlusal aspect can reach the periapical area in less than 6 weeks in canals obturated with gutta-percha and sealer.\textsuperscript{16} Three possible metastatic pathways can be responsible for the consequences of oral infections on systemic diseases such as CVD.\textsuperscript{2}

1. **Metastatic spread of infection from the oral cavity**
2. **Metastatic injury by circulating oral microbial toxins**
3. **Metastatic inflammation arising from an immune response to oral microorganisms.**

Cardiovascular diseases are one of the main causes of mortality in the developed world. The two cardiovascular conditions that cause most deaths are ischemic heart disease and cerebrovascular disease.\textsuperscript{17}

Dental professionals may be the first line of defense in the detection and referral of a patient suspected of having cardiovascular disease, an uncontrolled disease status, or oral adverse drug reactions, and they have a key role to play in oral and systemic disease prevention and treatment.\textsuperscript{10}

**The Focal Infection Theory**
A focal infection is a localized or generalized infection caused by the dissemination of microorganisms or toxic products from a focus of infection.\textsuperscript{18}

Rosenow\textsuperscript{17} (1917) reinforced the concept of a focus of infection from which microorganisms could enter the bloodstream causing systemic illness. He insisted that enclosed lesions that could only drain into the circulation, such as a necrotic pulp, were the most dangerous foci of infection.

**Fish Theory**
In 1939, Fish theorized that the zones of infection are not an infection by themselves but the reaction of the body to infection. He concluded that this response occurred regardless of the virulence of the organisms.\textsuperscript{19} Zones of Fish theory are:

1. **Zone of Infection:** This is the nidus of infection at the foramen where the bacteria are confined; characterized by PMN's and microorganisms along with the necrotic cells.\textsuperscript{20}
2. **Zone of contamination:** This zone is characterized by death of normal tissue cells, due to high concentration of toxins and lymphocytes.\textsuperscript{20}
3. **Zone of irritation:** This zone consists of some normal tissue cells that have survived due to lower concentration of toxins. Osteocytes and histiocytes resorb bone and isolate the infection at its center. No bacteria are present in this zone.\textsuperscript{20}
4. **Zone of stimulation:** This zone has a severe dilution of bacterial toxins; this stimulates fibroblasts and osteoblasts to produce an irregular bone matrix.\textsuperscript{20}

**Bacteraemia in nonsurgical root canal treatment:**
Bender et al. (1963) showed that endodontic procedures with instrumentation beyond the apex produce bacteraemia in 31% of cases, but, when instrumentation was confined within the tooth, blood cultures were negative.\textsuperscript{14}

**ENDODONTIC BIOFILMS**
Biofilm is defined as aggregate of microorganisms in which cells that are frequently embedded within a self produced
matrix of extracellular polymeric substance (EPS) adhere to each other or to a surface.  

**BIOFILMS IN ENDODONTIC INFECTION:**

Endodontic bacterial biofilms can be categorized as:

- intracanal biofilms,
- extraradicular biofilms,
- periapical biofilms and
- biomaterial-centered infections.

**Intracanal microbial biofilms**

They are microbial biofilms formed on the root canal dentin of an endodontically infected tooth. Major bulk of the organisms existed as loose collections of filaments, spirochetes.

**Extraradicular microbial biofilms**

They are also termed as root surface biofilms which are formed on the root surface adjacent to the root apex of endodontically infected teeth. Extraradicular biofilms are reported with asymptomatic periapical periodontitis and in chronic apical abscesses.

**Periapical microbial biofilms**

They are isolated biofilms found in the periapical region of endodontically infected teeth. These microorganisms have the ability to overcome host defense mechanisms.

**Biomaterial-centered infection**

Biomaterial centered infection is caused when bacteria adhere to an artificial biomaterial surface and form biofilm structures. In endodontics, biomaterial-centered biofilms form on root canal obturating materials.

**BACTEREMIA**

Bacteria were first demonstrated scientifically in the diseased dental pulp by Miller (1894). William Hunter (1900) theorized that microorganisms present in the oral cavity could disseminate throughout the body, resulting in systemic disease.

Dissemination of oral microorganisms into the bloodstream is common, in less than 1 min after an oral procedure, organisms from the infected site may have reached the heart, lungs, and peripheral blood capillary system.

There are more than $10^9$ microbes on all surfaces of the body. In the oral cavity there are several barriers to bacterial penetration from dental plaque into the tissue: a physical barrier composed of the surface epithelium; defensins, which are host-derived peptide antibiotics.

In many instances the occurrence of endocarditis does not relate to the so-called dental-induced bacteraemia. It may well transpire that random bacteraemia may be more causative in IE than dental surgeons carrying out treatment.

Antibiotic prophylaxis (AP) may be defined as the use of an antimicrobial agent before any infection has occurred for the purpose of preventing a subsequent infection (Gerding 1996, Titsas & Ferguson 2001).

Bacteraemia is usually eradicated by the reticulo-endothelial system within a few minutes and poses no threat to the healthy patient. However, some medically compromised patients may be at risk from this transient blood-borne infection, mostly infective endocarditis (IE) (Dajani et al. 1997).

Thus, implementation of antibiotic prophylaxis (AP) has been advocated widely in an attempt to provide some degree of protection for 'at-risk' patients.

**EFFET OF PULP ON PERIODONTAL TISSUES**

Tissues of dental pulp and periodontium are interlinked from the embryonic stage.

Pulp communicates with periodontal ligament via the apical foramen, auxiliary canals and dentinal tubules. The first indication of periodontal involvement as a sequela to pulp involved is the thickening of periodontal ligament space at the apical end. Root canal system is a complex anatomical space within the root of the tooth. Main canals terminate in the PDL at an exit point close to the end of the root. When the pulp begins to break down, the bacterial by-products of cellular necrosis egress from within the root canal system through the POE’s into the surrounding PDL and bone. These toxins in turn will destroy the healthy peri-radicular tissues and create bone loss.

**Relationship of cardiovascular disease and periodontitis**

Periodontitis has been proposed as having an etiological or modulating role in cardiovascular diseases. Aerobic and anaerobic bacteria are the microorganisms found in periodontal disease. The chronic activity of bacteria, their toxins, followed by a host immune response, lead to a progressive failure of periodontal attachment. The pro-inflammatory cytokines TNF-alpha, IL-1beta, and gamma interferon as well as prostaglandins reach high tissue concentrations in periodontitis. The periodontium can therefore serve as a renewing reservoir, which can enter the circulation and induce systemic effects. Periodontal disease is believed to provide inflammatory cytokines, which promote atherosclerosis and thrombotic events.

**Relationship of cardiovascular diseases with apical periodontitis**

Apical periodontitis is a sequel to endodontic infection and develops as the host response to microbial infection.
comes from the root canal system of the affected tooth. Endodontic infection that leads to apical periodontitis is caused by a mixture of oral bacterial species also found in dental plaque, dominated by obligate anaerobes.

The proximity to the bloodstream of micro flora present in the root canal and periapical tissues can cause a transient bacteremia during clinical dental procedures. Normally, microorganisms penetrated into the blood stream are eliminated by the host within minutes. However, it is known that in patients with valvular heart disease, a transient bacteremia may lead to infective endocarditis and myocardial infarction.

Endo-perio lesions

The pulp-periodontal interrelationship is a single or biologic unit in which there are so many paths of communication. They can get affected individually or combined. Endodontic-periodontal problems are responsible for more than 50% of tooth mortality today.

There are various pathways for the exchange of infectious elements and irritants from the pulp to periodontium or vice versa, leading to the development of endodontic periodontal lesions.

1. Pathways of developmental origin: *Apical foramen, accessory /lateral canals *Congenital absence of cementum
2. Pathways of pathological origin: *Empty spaces created by Sharpey’s fibers *Root fracture following trauma *Idiopathic root resorption - internal and external

It is easier to determine the origin of the lesion when a pulp vitality test is positive because this will rule out an endodontic etiology. However, pulp tests may not be always reliable. If pulpal necrosis is associated with inflammatory involvement of the periodontal tissue, it presents a greater diagnostic problem. In this situation, the location of these pulpal lesions is most often at the apex of the tooth, but they may also occur at any site where lateral canals exit into the periodontium.

ANTIBIOTIC PROPHYLAXIS

Prophylaxis is recommended in all the dental procedures involving the manipulation of gingival tissue, periapical region or the perforation of the oral mucosa such as extractions, endodontic treatment.

Prophylaxis in turn is not recommended in the routine injection of anesthetic solutions in non-infected tissues, dental X-rays or bleeding secondary to lip or oral mucosa traumatism.

Guidelines

Various guidelines have been proposed for AP, although it has not been possible to perform controlled clinical trials in human beings to establish their effectiveness, because of ethical issues of withholding AP from patients. Current guidelines from the British Cardiac Society (BCS) (Ramsdale et al. 2004), the AHA (Dajani et al. 1997) and the BSAC (Gould et al, 2006) differ with regard to which antibiotic regimens should be prescribed and for which dental procedures.

BSAC guidelines for antibiotic prophylaxis:

1. Conditions predisposing to risk of infective endocarditis
   - History of infective endocarditis
   - Ventricular septal defect
   - Patent ductus arteriosus
2. Patients not at risk from infective endocarditis
   - After coronary by-pass surgery
   - Six months after surgery for-
     Ø Ligated ductus arteriosus
     Ø Surgically closed atrial or ventricular septal defects
3. Special risk patients
   Ø Those who require a general anaesthetic and have a prosthetic heart valve or are allergic to penicillin or who had penicillin more than once in the previous month.

American Heart Association Guidelines for antibiotic prophylaxis:

1. High risk category
   - Prosthetic heart valves
   - Previous bacterial endocarditis
2. Moderate risk category
   - Most other congenital cardiac malformations
   - Hypertrophic cardiomyopathy
3. Negligible risk category
   - Isolated secundum atrial septal defect
   - Previous coronary artery by-pass graft surgery

Dental procedures for which antibiotic prophylaxis is recommended to prevent infective endocarditis (AHA recommendations):

Dental extractions
Periodontal procedures
Dental implant placement Endodontic instrumentation or surgery beyond the apex

Possible risks associated with antibiotic prophylaxis:
When antibiotics are given prophylactically to prevent
Infective Endocarditis (IE), the clinician needs to consider the risk and cost benefit of such treatment. The most significant adverse event associated with the penicillins is hypersensitivity reactions. These can range from a troublesome rash to a life threatening anaphylactic reactions. 

The chance of a penicillin reaction following administration of the drug is in the range of 0.7–5 %. However, high doses of oral amoxycillin can cause an allergic rate similar to intramuscular penicillin. Patients receiving penicillin (amoxycillin) prophylaxis to prevent IE are 5 times more likely to die from an anaphylactic reaction to the drug than to die from contracting endocarditis.

The World Health Organisation has recognised antimicrobial resistance as a global problem. Approximately one third of all antibiotics are prescribed for prophylactic purposes and a high proportion of these are for prevention of IE. The continued and repeated use of prophylactic antibiotics has caused selection of antimicrobial resistance in oral streptococci. Overprescribing of antimicrobials has made some antibiotic regimens less effective.

### DENTAL CONSIDERATIONS IN PATIENTS WITH HEART DISEASES

Patients suffering from cardiac diseases like ischemic heart disease, valvular disease are prone to angina or myocardial infarction.

#### ISCHEMIC HEART DISEASE:

Ischemic heart disease is the main cause of death in the developed world. This is characterized by a reduction in coronary blood flow followed by thrombus formation that occludes the arterial lumen. Angina is often precipitated by physical activity or stress and may radiate to the arm or jaw or may present as facial or dental pain. Fear and anxiety associated with a dental procedure may be a precipitating factor for angina in some patients. Chest pain (angina) occurs when coronary occlusion is partial and no necrosis is produced, while acute myocardial infarction is observed when coronary occlusion is total and necrosis is produced as a result.

Management: Treatment for patients with ischemic heart disease should include morning appointments, short appointments, oral premedication with an anxiolytic drug or nitrous oxide or oxygen sedation, limited use of vasoconstrictors.

#### ARRHYTHMIAS

Arrhythmias are variations in normal heart rate due to cardiac rhythm, frequency or contraction disorders. Atrial fibrillation is the most common type of cardiac arrhythmia.

Management: Consultation with the supervising physician is advised in order to know the current condition of the patient and the type of arrhythmia involved, as well as the medication prescribed. Anxiolytics can be used to lessen stress and anxiety. It is very important to limit the use of a vasoconstrictr in local anesthesia. Sublingual nitrites are to be administered in the event of chest pain. The patient should be placed in the Trendelenburg position. The dental team should be prepared for basic cardiopulmonary resuscitation.

#### HEART FAILURE

Heart failure (HF) is defined as the incapacity of the heart to function properly, pumping insufficient blood towards the tissues and leading to fluid accumulation within the lungs, liver and peripheral tissues.

Management: Dental treatment is to be limited to patients who are in stable condition. Anxiety and stress are to be avoided during the visits. The patient should be placed in the semi-supine position in a chair. In patients administered digitalis, the vasoconstrictor dose is to be limited to two anesthetic carpules. Aspirin can lead to sodium and fluid retention, and therefore should not be prescribed in patients with heart failure.

#### INFECTIVE ENDOCARDITIS

Infectious endocarditis (IE) is an infrequent condition resulting from the association of morphological alterations of the heart and bacteremia of different origins. Infective endocarditis is a serious problem, with an estimated incidence of 1.5-3.3 per 1000 intravenous drug abusers and 5-10% mortality rate.

Management: According to the European Society of Cardiology and American Heart Association, antibiotic therapy of IE relies on monotherapy or combination of bactericidal drugs active on the microorganism involved, administered intravenously, at high dosage and for up to 6 weeks.

### CONCLUSION

Unfinished RCTs are associated with a higher risk of CVD hospitalization. An RCT can be left unfinished for several reasons, including symptomatic teeth infected with gram-negative anaerobic bacteria. The root canal flora of teeth with clinically intact crowns and necrotic pulps is dominated by obligate anaerobes. These microbes can indirectly elevate inflammatory mediator levels and cytokines.

An unfinished RCT, involving a temporary restoration, can increase the risk of contamination of the oral cavity, leading to bacterial infection of the root canal system and apical periodontitis when the inflammation progresses to the
Willershau sen et al (2009) reported that patients who have experienced myocardial infarction had a higher number of radiographic apical lesions compared with healthy patients.

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DENTAL DILEMMA-13

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Dr.Adesh S Manchanda, Reader, Department of Oral Pathology & Microbiology, SGRD Institute of Dental Sciences and Research, Sri Amritsar.

QUESTION:
A 48 year old male complained of pain and bleeding from gums. Intra- oral examination showed diffuse erythematous area involving free gingival margin of maxillary and mandibular teeth. The erythematous area involved both anterior and posterior teeth bilaterally, which was suggestive of desquamative gingivitis. (Fig.1) Histopathological examination revealed subepithelial split in the epithelium and connective tissue was infiltrated with chronic inflammatory cells.(H&E; X10).(Fig.2)

Identify the condition?

Answer to DENTAL DILEMMA 12 :- Ameloblastoma.