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CONTENTS

CLINICAL TIP

EDITORIAL

PERI-IMPLANTITIS : AVOIDING THE MAN MADE DENTAL CATASTROPHE

Over the last few years, dentistry has revolutionized. A major role in this has been played by Dental Implants. The research and experimentation in this field has written a new success story. The predictability of this modality of oral rehabilitation has been achieved due to multifactorial reasons including better understanding of principles of asepsis, sophisticated instrumentation, improvements in macro and micro geometry of implants, better understanding of bone, healing process and optimum loading protocols.

It is a known fact that successful implant therapy has an increased demand. The sudden advertisement of dental implants, increasing awareness among patients, more inflow of implant systems making the implants affordable has witnessed a lot of implants being placed over the past few decades with exponential rise in the last decade in particular. It is undebatable that dental implants have been a bliss but with this comes a lot of responsibility. The literature is suggesting that 90% of the dental implants develop perimucositis within five years of placement and 40% of these convert to periimplantitis. Reports have been published that annually 1,40,000 implants are lost due to periimplantitis i.e., every 4 minutes 1 implant is lost across the globe.

The rehabilitating oral healthcare professionals should very carefully screen the patients for dental implants. Local factors like plaque control, periodontal health, available bone, gingival biotype and occlusion should be critically evaluated along with systemic screening for diabetes, cholesterol levels, osteoporosis and irradiated jaws. At the same time habits like smoking should be recorded. This should be followed by a prosthetic wax up as implant dentistry should be practiced as a reverse engineering process. The prosthetic end result should be critically evaluated first and a three dimentional planning should be carried out before implant placement. The clinician should also have a sound knowledge of various thread configurations of implants, implant abutment connections, platform switching, morse taper and laser lok etc to choose from over 300 implants available across the world.

We have to realize that periimplantitis is on the rise and we can not ignore this man made dental catastrophe. The treatment regimen for periimplantitis include mechanical debridement, localized or systemic antimicrobial therapy, detoxification of implant surface, flap management and laser therapy etc. However, till date there is no gold standard treatment of periimplantitis and literature lacks long term studies regarding the same. Further the literature still awaits answers to the practice of tilted implants being utilized in All-on-Four treatment modality. Thus, preventive and supportive therapy still remains the best answer to this disease and this can only be achieved with meticulous planning, good oral hygiene and a judicious selection of implant patients.

Dr Hari Parkash
Editor-in-Chief

Anaesthetic Efficacy of the Anterior Middle Superior Nerve Block for Extraction of Maxillary Anterior Teeth

Bansal S[1], Kukreja P[2], Kumar S[3], Sharma M[4], Rakshak AK[4], Jha KB[5]

Abstract:

Aim: The aim of the present clinical trial was to evaluate the efficacy of a relatively newer anterior middle superior alveolar (AMSA) local anaesthetic technique for the extraction of anterior maxillary teeth. **Method :** Forty subjects with an age range of 18 to 45 years were selected for the present study. AMSA technique was used for obtaining local anaesthesia of maxillary anterior teeth. 2% ligocaine containing 1:200,000 epinephrine was used for anaesthesia. For each patient, the operator obtained the time of onset of anaesthesia, visual analogue scales for pain after the injection and immediately after extraction. VAS scores of acceptance of the procedure were also recorded postoperatively. Patients Data was analyzed using descriptive statistical methods (frequency, means and standard deviations) using SPSS ver. 16.0 (SPSS Inc.). **Results:** The average time of onset in seconds was M=291.46, SD=50.26 and SEM=8.04 in seconds. The pain of injection in VAS score was M=4.02, SD=1.06 and SEM=0.17. The pain of extraction in VAS score was M=0.56, SD=0.64, SEM=0.10. The patients' acceptance of the procedure in VAS score was M=2.74, SD=0.91 and SEM=0.14). All the patients accepted the procedure well and did not have any post extraction complications. All were evaluated seven days after the procedure and showed satisfactory healing of the extraction sockets. **Conclusions:** The AMSA technique is a useful alternative technique for maxillary anterior teeth extractions. It is a preferable technique for periodontal surgeries and restorative procedures, because it does not anaesthetize the buccal and facial tissues.

Keywords: Maxilla, Local Anesthesia, Teeth, Extraction.

Introduction

Over a long time period, anaesthesia of the maxillary teeth by has been obtained by administering an infiltration injection on the buccal or labial aspect of the tooth to be treated.[1] The infraorbital, or intraosseous and intraligamentary injection have also been traditionally used for anaesthesia of the maxillary teeth and soft tissues.[2,3] Maxillary dentoalveolar procedures almost always require more than one injections. They may also affect the smile line by inadvertently anesthetizing the facial structures.[3] This may be a source of embarrassment to the patients and can adversely affect their social life.

The anterior middle superior alveolar (AMSA) injection is a relatively recent technique, which has been used for the

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anaesthesia of the anterior maxillary teeth.[4] This technique was introduced by Friedman and Hochman.[4] They stated that for an expected duration of 45 to 60 minutes, the AMSA achieves pulpal anaesthesia of the maxillary central and lateral incisors, canines, and first and second premolars, after an injection of 0.6 to 1.4 mL of anaesthetic solution. They also stated that no numbness of the lips and face, or interference with the muscles of facial expression is noted, and palatal soft tissue anaesthesia is obtained.[4]

This nerve supposedly anaesthetises the anterior and middle superior alveolar nerves because of diffusion of the anaesthetic solution via numerous nutrient channels on the palatal process of the maxillary bone.[4,5] The AMSA derives the name because of this reason. Ten maxillary teeth extending from the second premolar on one side to the second premolar on the opposite side are anesthetised by a bilateral AMSA. The site for the AMSA injection is located palatally at a point that bisects the premolars and is approximately halfway between the midpalatine raphe and the crest of the free gingival margin.[6] Since its discovery, this local anaesthetic technique has been successfully used in various maxillary dentoalveolar procedures.

The purpose of this prospective study was to determine the anaesthetic efficacy of the AMSA injection delivered by the conventional syringe for extraction of maxillary anterior teeth, using 2% Lignocaine hydrochloride and 1:200000 adrenalin as a local anaesthetic agent.

Materials and Method

A total of 40 adult patients who required extractions of any single maxillary anterior tooth for various reasons were included in the study. The inclusion criteria was healthy adult patients, free from systemic disease, patients who gave consent for participation in the study, and requiring extraction of only one maxillary anterior tooth. The exclusion criteria were use of medications that alter pain perception, presence of systemic pathologies or allergies that contraindicate local anaesthetics with vasoconstrictors, patients allergic to local anaesthetics and pregnancy. This study was approved by the ethics committee of our institution. A written signed informed consent was obtained from all the patients.

To establish the injection site on the palate, the parameters described in the original technique by Friedman and Hochman were followed.[4] The AMSA injection site was centred halfway between the mid palatine raphe and the gingival margin of the first and second premolars (Fig.1). A topical aerosol local anaesthetic (15% lignocaine w/w) was used at the site before injection for duration of 60 seconds. About 1.4 ml of 2% lignocaine with 1:200000 adrenalin was used as the local anaesthetic agent. Subjects were placed in a semi-supine position with the head tilted up and back. It was delivered using a 2ml conventional Luer lock syringe with needle specifications 0.45 X 38 mm, 26 X 1 ½. 1.4 ml of the solution was deposited in the palate over a period of 3 minutes as described by Velaso et. al. (2012).[3]

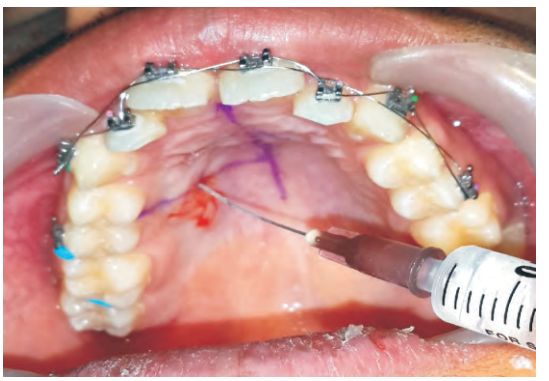

Fig. 1: The site of injection for AMSA block

The adequacy of anaesthesia was checked by objective signs, determined by no pain at the buccal and palatal gingiva on probing 6 minutes after the injection completion. Thereafter the extraction procedure was carried out. Time of onset (seconds), pain on injection (visual analogue scale=VAS), pain of extraction (VAS), and acceptance of the procedure (VAS) was recorded. The patient was given standard postoperative instructions and analgesic tablet 400mg ibuprofen T.I.D for two days. The patient was instructed to contact the operator in case of any problem. The data so obtained was subject to simple statistical analysis using the SPSS software version 16.0. Since it was not a comparative study, no particular statistical tests were employed.

Results

The sample comprised of 25 (62.5%) females and 15 (37.5%) males. Their age groups ranged from 18 years to 45 years. The average age in years was mean (M)=25.79, Standard deviation (SD)=6.53 and standard error of mean (SEM)=1.04 (Fig. 2, Table-1). All were healthy and free from systemic disease. The out of the total teeth extracted, 28 (70%) were maxillary first premolars, 16 (40%) of right side and 12 (30%) of left side. 8 (20%) were maxillary second premolars, 4 (10%) left and 4 (10%) right, 2 (5%) were central incisors (both right), 1 (2.5%) was right side canine and one (2.5%) was left side lateral incisor (Fig. 3).

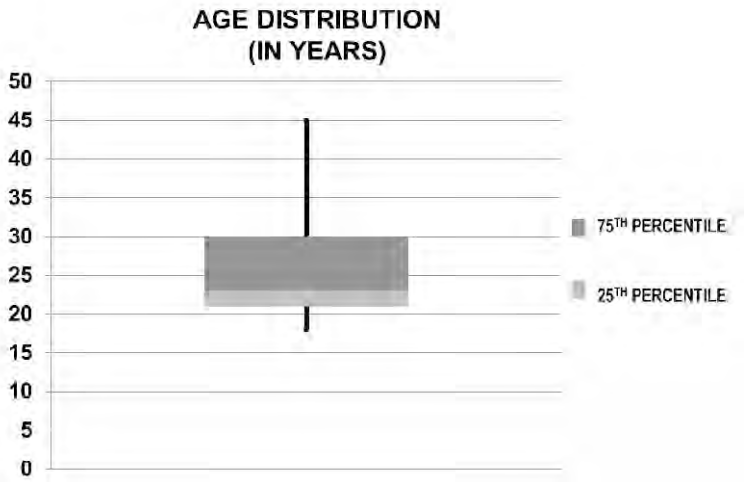

Fig. 2: Age distribution of patients (in years)

Table – 1: Table showing patient age and the parameters measured

Parameter	Mean	Standard deviation	Standard error of mean
Age (Years)	25.79487	6.538065	1.046928
Onset of anaesthesia (Seconds)	291.4615	50.26972	8.049597
Pain of injection (VAS)	4.025641	1.06344	0.170287
Pain of extraction (VAS)	0.564103	0.640513	0.102564
Patient acceptance (VAS)	2.74359	0.909539	0.145643

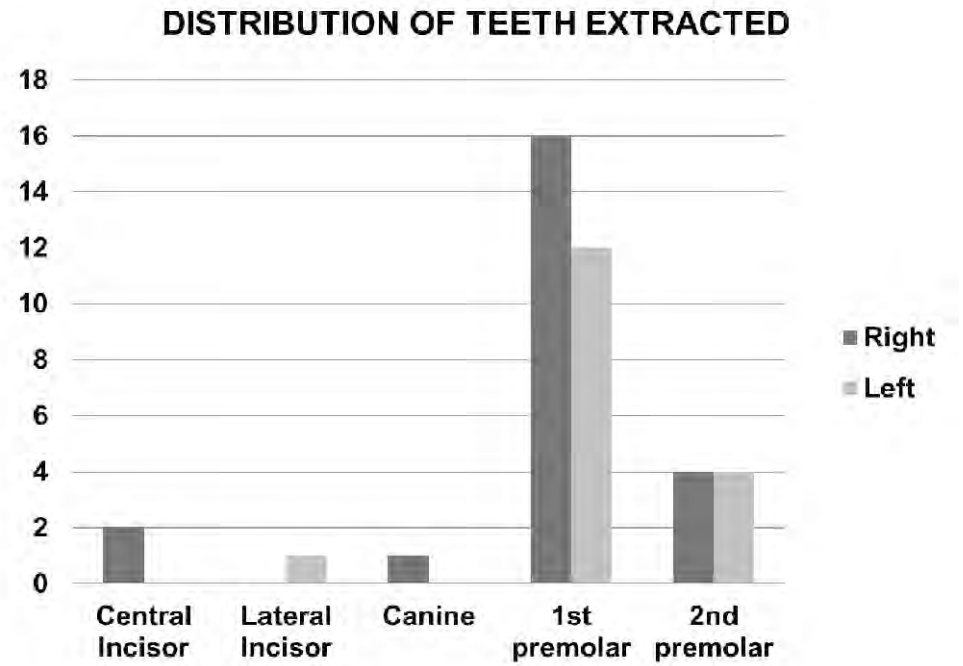

Fig. 3: Distribution of teeth extracted

The average time of onset in seconds was M=291.46, SD=50.26 and SEM=8.04 in seconds (Fig.4, Table-1). The pain of injection in VAS score was M=4.02, SD=1.06 and SEM=0.17 (Fig. 5, table-1). The pain of extraction in VAS score was M=0.56, SD=0.64, SEM=0.10 (Fig. 5, table-1). The patients' acceptance of the procedure in VAS score was M=2.74, SD=0.91 and SEM=0.14 (Fig.4, Table-1). All the patients accepted the procedure well and did not have any post extraction complications. All were evaluated seven days after the procedure and showed satisfactory healing of the extraction sockets.

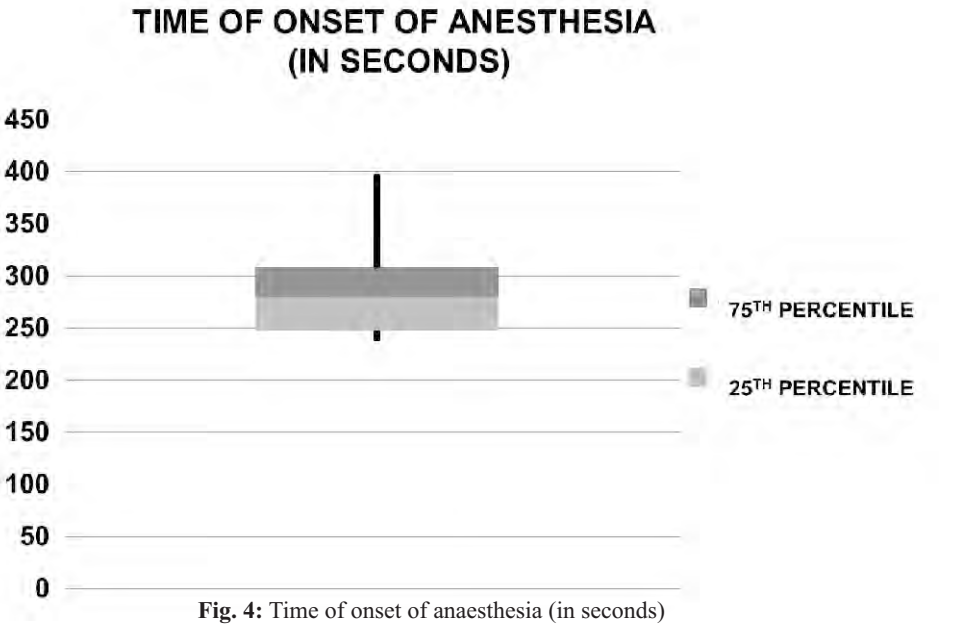

Fig. 4: Time of onset of anaesthesia (in seconds)

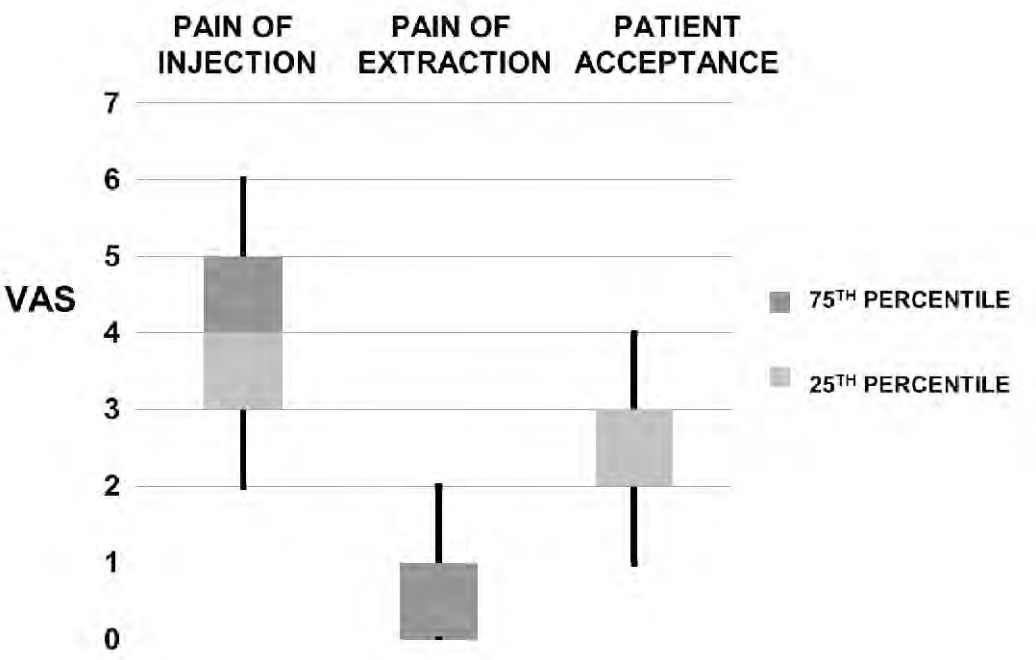

Fig. 5: Graphical representation of parameters measured

Discussion

Multiple injections are required to obtain anaesthesia of the hard and soft tissues for Maxillary dentoalveolar surgery. Whereas greater palatine and nasopalatine blocks are used for palatal anaesthesia, posterior and superior alveolar nerves (PSA), middle superior alveolar (MSA), and anterior superior alveolar (ASA) block injections are used to anesthetize buccal tissues. The pain of these transmucosal punctures is unpleasant for the patient.[7] Although these injections effectively anesthetize maxillary tissues, it may also affect facial structures, such as the upper lip, lateral aspect of the nose and lower eyelid.[8]

The use of a single maxillary injection would unilaterally anesthetize all the maxillary anterior teeth from incisors to second premolar for approximately 60 minutes. This is achieved with no collateral facial or buccal anaesthesia. The conventional supraperiosteal infiltrative anaesthesia is applied in multiple injections for each maxillary tooth. The main theoretical advantage of this AMSA nerve block is that it reduces the number of injections and the quantity of anaesthetic solution administered. It does not cause numbness of the lip and face, so is well suited for use in cosmetic dentistry.[3] The middle superior alveolar (MSA) and anterior superior alveolar (ASA) nerves branch from the infraorbital nerve, before they exit from the infraorbital foramen. The MSA nerve is thought to innervate the maxillary premolars and plays some role in pulpal innervation of the mesiobuccal root of the first molar. The ASA nerve provides pulpal innervation to the central and lateral incisors and canines. The plexus where the 2 nerves join is the target site for the AMSA injection.[6]

The anaesthetic agent should be injected into the site at a moderate rate of 0.5 mL per minute.[9] This slow rate is warranted to avoid

patient discomfort due to the tightly bound nature of palatal tissues. Regardless of technique, Anaesthesia in the present study had a gradual onset. The authors observed palatal blanching extending anteriorly to the incisive papilla and posteriorly to include the soft palate in all the patients of the study.[10] The palatal blanching did not cross the midpalatine raphe. Therefore, it seems likely that some portion of the anaesthetic solution remains in the palatal soft tissue and the remainder passes through the palatine process to anesthetize the maxillary teeth.[6]

The sense of tightness and numbness of palatal tissues and periodontium from central incisors through second molar confirms the onset of anaesthesia. In our study, the mean time of onset of anaesthesia was 4 minutes and 51 seconds. This is in accordance with other studies by Friedman and Hochman (1998)[9] and Patel (2012),[10] which reported times ranging from 2 minutes to 8 minutes. However, this is in contrast with other studies by Lee et. al. (2004)[6] and Velasco (2012)[3], which reported onset time ranging from 6 minutes to 26 minutes. This wide variation and gradual onset of pulpal anaesthesia is most likely due to the time it takes for the anaesthetic solution to pass through the palatine process.[6]

In the present study, the authors were able carry out simple intra-alveolar extraction procedures using this anaesthesia technique. The patients' injection pain perception of the injection was 4.02 in VAS score. This is in accordance with studies by Hochman et. al. (1997),[11] Fukayama et.al. (2003)[12] and Nusstein et. al. (2004)[1]. However, one of the main disadvantages of the AMSA nerve block is that palatal injections are generally considered the most painful injections.[13] In our study, severe pain during the technique was not reported, possibly due to the prior application of topical anaesthetic and the slow and controlled injection of the anaesthetic solution. Pain of extraction in VAS score was 0.56. Recent studies have successfully used this anaesthesia technique for periodontal surgical procedures as well.[10.14]

Patients tolerated the procedure of injection and extraction well in the present study. The mean patient acceptance score in VAS was 2.74. This is in accordance with numerous other studies of Saloum et al (2000),[15] Goodell et al (2000),[16] Gibson et al (2000),[17] Allen et al (2002), [18] and many more. In fact, it has been shown to be tolerated well by preschool of age 2 to 5 years, especially when delivered by a computer controlled delivery system.[18]

One of the greatest advantages of the AMSA injection is that it is able to cover large maxillary surgical fields by a single injection. It provides multiple benefits as it eliminates repetitive trans mucosal punctures, reduces the cumulative number of necessary injections, reduces the total amount of delivered vasoconstrictor and may prove useful for cardiovascular-compromised patients requiring maxillary anaesthesia. The AMSA's maintenance of upper lip function allows for continuous evaluation of gingival contours unimpeded by the "lip drooping" that typically occurs with traditional anaesthetic techniques. The disadvantage is that AMSA also has a long administration time of approximately 4 to 5 minutes. Some patients may find it disconcerting to have an injection last 4 minutes, and attempts to speed up the AMSA injection may lead to increased patient discomfort at the injection site.

One drawback of the present study was that the shape of the palate was not recorded. But the

authors believe that there was a homogeneous distribution between the deep and shallow palate in this study. Because this anaesthetic technique was applied to a fairly young population, the results may not be applied to children or the elderly.

Conclusion

AMSA is a new technique that has been introduced for anesthetizing maxillary anterior teeth. The AMSA technique has been shown to be a useful alternative to the conventional technique for extraction of maxillary anterior teeth in the present study. AMSA may be clinically useful in restorative dentistry as it does not anesthetize the facial muscles and does not affect the smile line. It may also be of particular importance in periodontal surgery due to the excellent haemostatic control in palatal soft tissues. Further studies in this direction with a larger sample size involving various procedures on maxillary anterior teeth are warranted.

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Smile Photographs as a Tool for Forensic Identification

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Abstract :

The execution of forensic odontology technique for human identification depends on the existence of dental files produced ante – mortem. However, when these are not present, other sources of dental data should be searched, such as photographs of the smile. This study executes human identification through the analysis of photographs of the smile based on dental parameters. The justification for this alternative investigation is based on the search of data on shape, dimensions and alignment of the teeth of a person, which can compromise a unique and specific site. Considering that in the analysis of bodies so – called "unrecognizable" the forensic odontology techniques superimposes the other methodologies – because of their lower operational cost, faster analysis and data interpretation, higher reliability of the results obtained and the presence of qualified professionals – it becomes essential that new parameters be either developed or obtained, aiming to evidence and identify as unique the dental features of each individual.

Keywords: Smile Photographs, Human Identification.

Introduction

In the traditional forensic odontology practices dental files and records[1,2] provide a safe data source for ante and post – mortem comparisons. But these records sometime may be inappropriate for several reasons like extensive destruction of facial complex, lack of records obtained for clinical purpose or records with irrelevant forensic information.

Considering that in the analysis of unrecognizable bodies the forensic odontology techniques superposes the other methodologies because of their lower operational cost, higher reliability of the results obtained and the presence of qualified professionals. So there comes the need to establish new parameters aiming to evidence and identify unique dental features of each individual.

So nowadays, forensic experts acting in practice of human identification search for information in alternative sources, such as photographs of face,[3] shootings[4] or photographs of smile, which exhibit specific characteristics of each subject. The justification for this alternative investigation is based on search of data on shape, dimensions and alignment of teeth of a person, which can be a unique and specific set.

Hence the present study was aimed to demonstrate the importance and applicability of photographs of the smile as information source for human identification, through the comparative analysis to correlate photographs

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of smile to intraoral photographs and to identify parameters which would be more recurrent for establishing positive forensic identification by using photographs.

Methodology

A study was conducted in the department of oral medicine and radiology at ITS-CDSR Muradnagar, Ghaziabad. A total of 40 patients were taken from those visiting the department of oral medicine and radiology in the months of May- June 2014. Out of 40 patients 20 patients had undergone orthodontic treatment and rest 20 are patients without orthodontic treatment. Patients were informed prior to the beginning of the study and a written consent form was obtained. Ethical clearance was taken from institutional ethical committee. Proper dental and medical history was recorded; thorough clinical examination was done for each patient.

Study was divided into two stages:

Stage 1 – in which collection of data and images (intra oral and smile photographs were done); Stage 2 – analysis of the images obtained.

Stage 1:

Individuals without orthodontic appliance on the labial surfaces of the anterior teeth and the possibility of visualization of the anterior teeth inside the area of the exposition of the smile were included in the study. Smiles that did not show the incisal edge of the maxillary anterior teeth and the presence of diastemas between the maxillary central incisors, traumatized, discolored anterior teeth were excluded from the study.

For every individual, types of photographs produced included: a smile and an intraoral, which resulted in 20 pairs of photographic images for each group.

To obtain photograph of smile, all face of individual was framed in frontal norm: individuals were asked to exhibit a forced or social smile, so that incisal edges of all the anterior teeth could be seen. These photographs were performed with tripod and conventional digital camera (Sony Cybershot, DSC W210, 12.1 megapixels), with 3.0 megapixel of resolution. Individual was placed in seated position on a chair at 1.5 m far from lens, with Frankfurt plane parallel to floor. Photograph was cut using Adobe Photoshop software version 7.0, resulting in image of area between infraorbital margin and chin.

To obtain intraoral photograph, participant was photographed at lying position on a dental chair with dental reflector turned off. Lips were manually separated, so that incisal edges of maxillary and mandibular teeth could be seen. Photographic record was carried out with semiprofessional camera (Nikon Coolpix 7800, 8 megapixels), with 3.0 megapixels of resolution.

To stimulate probable forensic odontology identification, smile photographs were considered as standard images, that is produced during life (ante mortem), and intraoral photographs were considered as question images, that is they would have been produced after death (postmortem).

Stage 2:

Second stage of research comprised a voluntary participation of 3 Oral Medicine and Radiology postgraduate students.This group of 3 students stimulated action of a forensic odontology expert in two situations:

Identification of one missing person when there are 10 non identified bodies, through using smile photograph [Fig 1 & 2]

Identification of one non identified body when there are 10 non identified bodies.

At this stage, participants were informed that either smile or intraoral image that should be analyzed had its correspondent pair necessarily present within photographic set, stimulating the situation which occurs in closed events, that is when the list of missing people is known.

To make test viable, four different types of tests were created by dividing the images as:

A. 1 smile and 10 intraoral images in the group without orthodontic treatment
B. 1 intraoral and 10 smile images in the group without orthodontic treatment
C. 1 intraoral & 10 smile images in the group submitted to orthodontic treatment
D. 1 smile & 10 intraoral images in the group submitted to orthodontic treatment

Image displayed in each set were numbered from 1 to 10; then a number was drawn which enabled the search for its correspondent image, which was recorded on an answer sheet. Each 1 of the 3 participants of this stage performed 4 tests, comprising a total time period of 20 minutes (5 minutes for each test).

Following to the comparative analysis, participant should mark on answer sheet: number of photograph of set correspondent to image analyzed and type of particularity which based the final conclusion, whose criteria should be visualized in both photographs.

Statistics

For statistical analysis, Fisher's exact test was applied, comparing the performance of the the postgraduates in positively correlating intraoral with extra oral photographs.

Results

Tests B and D showed 91.6% of right answers among the postgraduate students.

Most relevant parameters pointed out by the postgraduate students to reach the positive identification through the smile photographs were - incisal alignment, crowding, lack of teeth (agenesis, etc.), colour, midline deviation, diastemas, wearing of surfaces, composite veneers, crown fractures, giroversions, tooth inclination,crown morphology of tooth # 11/21, 12/22, 13/23, morphology of the incisal edges, morphology of the mandibular anterior teeth, ratio between the crown dimensions of the maxillary central and lateral incisors, composite restorations.

In test A; morphology of crowns of maxillary central incisors (83.3%) and morphology of incisal edges of anterior teeth (75%) were used by postgraduate students.

In test B; postgraduate students used morphology of maxillary lateral incisors (66.6%) and morphology of incisal edges of anterior teeth (66.6%).

In test C; postgraduates used incisal edges morphology (83.36%) and color of anterior teeth (83.36%).

In test D; postgraduates used crown morphology of teeth 11 and 21 (75%) andmorphology of incisal edges of anterior teeth (66.6%).

Discussion

Forensic dentistry identification through photographs of smile aims to comparative analysis between ante mortem and postmortem features of individuals who for any reason do not have their identity established through fingerprint analysis. It is worth highlighting that if on one hand, identification through smile photographs is difficult because of orthodontic treatment; on other hand, this type of treatment makes easy classical forensic odontology identification

because of presence of orthodontic files of individual, comprising radiographs, photographs and dental casts.

It was possible to observe that the right answer rate for 4 tests was high (95.8%); only 2 identification errors occurred. This showed that all postgraduate students were technically prepared to execute human identification through smile photographs of people who had been or had been not submitted to orthodontic treatment.

In test B, only 1 postgraduate participant did not answer right (97.9%), demonstrating that lack of orthodontic treatment enabled identification of dental features that were not therapeutically corrected (misalignments, crowding, etc.).[7] In tests C and D, 1 error occurred (6.3%) within 06 identifications, evidencing that analysis of photographs of individuals already submitted to orthodontic treatment had a higher difficulty rate than that of individuals without orthodontic treatment.

It emphasized the importance of morphological variations in the incisal edges of the anterior teeth, mainly in the maxillary central and lateral incisor crowns, which tend to be a single and specific set of dental features within the smile of each individual.[6,7] Accordingly, to classify the maxillary central incisors regarding to their shape (square, triangle and ovoid)[6] is an important stage to start to include or exclude the individuals for the analysis of the smile photographs.

The incisal alignment or line is frequently analyzed during either the orthodontic clinical practice or the planning of aesthetical tooth interventions.[8,9] Notwithstanding, this parameter may constitute an important element in evidencing a set of specific dental features, through using specific software for image editing, as Adobe Photoshop®.

Identification of individual dental features in images produced ante- and post-mortem cannot be simply faced, because all data set should be properly described, evidenced, and discussed on forensic report so that this document could constitute the fundamental tool for establishing a positive correlation between a missing person and a non-identified body. In this sense, forensic odontology expert is the professional who has the best post-graduation level to interpret the dental vestiges and exhibit them efficiently to the Justice.

Conclusion

Considering the great amount of dental features that can be potentially found in anterior teeth (anatomic, functional, pathological, traumatic or therapeutical), the smile photographs can be considered as an adequate information source to establish a positive forensic odontology identification. The postgraduate student demonstrated technical capacity to analyze the smile photographs aiming to human identification in a direct analysis of comparison.

Fig. 1A

Fig. 1B : Test A: Smile photograph (A) and set of intraoral photographs (B), without orthodontic treatment

Fig. 2A

Fig. 2B : Test D: Smile photograph (A) and set of intraoral photographs (B), with orthodontic treatment

Table I – Right answer rate of postgraduates for each one of the tests applied (n = 3)

Test	Postgraduates (%)
A	100
B	91.6
C	100
D	91.6

Table II – Number of times that each inclusion criterion was pointed out by the participants for each test type (n = 3)

	A	B	C	D	Total
Incisal alignment	4	5	4	7	20
Crowding	1	6	1	-	8
Lack of teeth (agenesis, etc.)	-	-	1	-	1
Colour	3	5	10	3	21
Midline deviation	-	-	-	-	-
Diastemas	-	-	-	-	-
Wearing of surfaces	6	4	5	1	16
Composite veneers	-	-	1	-	1
Crown fractures	1	3	5	-	9
Giroversions	2	4	1	-	7
Tooth inclination	2	2	2	2	8
Crown morphology of tooth # 11/21, 12/22, 13/23	10	5	4	9	28
Morphology of the incisal edges	4	8	7	6	25
Morphology of the mandibular anterior teeth	7	5	-	2	14
Ratio between the crown dimensions of the maxillary central and lateral incisors	9	8	10	8	35
Composite restorations	1	-	-	-	1

Test A – without orthodontic treatment/smile image x intraoral photograph set; test B – without orthodontic treatment / intraoral image x smile photograph set; test C – with orthodontic treatment/ intraoral image x smile photograph set; test D – with orthodontic treatment / smile image x intraoral photograph set

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Impact Strength of Poly Methyl Methacrylate Denture Base Resin of Different Thicknesses Reinforced with Glass Fibre- An Invitro Study

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Abstract :

The "impact strength" of acrylic denture base resin of two different thicknesses was evaluated by reinforcing it with glass fibres in different and same concentration using Charpy type plastic impact testing machine. A total of 80 specimens of DBR were used in the present study. All the specimens (unreinforced and reinforced) were put under the category A and B depending on their dimensions.To prepare the acrylic resin specimens wax blocks were made using the brass dies and were invested and acrylized. In the group A reinforced acrylic resin (with 3% glass fibres) specimen had the highest impact strength (5.49±0.93) followed by reinforced acrylic resin (with 2% glass fibres) specimen (5.20±0.88).In the group B reinforced acrylic resin (with 3% glass fibres) specimen had the highest impact strength (1.24±0.17) followed by reinforced acrylic resin (with 2% glass fibres) specimen (0.82±0.10).On applying ANOVA test to compare the groups of category A the result was showing very highly significant difference as the p-value was 0.000 (p> 0.001 -very highly significant) . Similar results were obtained for groups of category B.

Keywords : Glass fiber, Poly Methyl-methacrylate, Impact strength, Denture Base Resins.

Introduction

Denture base materials are extensively researched materials in the field of dentistry. Early 20th century sawintroduction of various newer materials like stainless steel, cobalt chromium alloys, acrylic resins(heat cure and self-cure) as DB materials.However, acrylic resin seems to be a material, which got more attention because it fulfils many of the desired properties like ease of processing, favourable working characteristics, accurate fit, stability in oral environment, superior aesthetics, use with inexpensive equipments and adequate mechanical properties.

The first plastic type acrylic resin i.e. poly (methyl methacrylate) was available under the name of "veronite". Rohm and Hass in 1936 introduced poly (methyl methacrylate) in the form of transparent sheet[1]. In 1937, Du Dout De Nemours introduced it in powder form[1]. Poly (methyl methacrylate) revolutionized the art of denture fabrication to the extent that by 1946, 95% of the dentures were made by it. However, research was still going on to improve certain properties of poly (methyl methacrylate). Late 20th century saw introduction of high impact acrylic resin (1967) and visible light cure acrylic resin (1986). Poly (methyl methacrylate) has been the denture base material of choice for more

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than 70 years from now and still it shows no signs of beingreplaced.

Breakage/ fracture may occur due to either impact failure or flexural fatigue. Accidental dropping of the denture during cleaning, coughing and sneezing may contribute to impact failure. Flexural fatigue, in complete maxillary denture, where continual flexing of the denture base during function leads to crack development and to the embarrassment and inconvenience of patient being suddenly deprived of their dentures.

The impact strength of poly(methyl methacrylate) can be increased either chemically or mechanically. Chemically it is increased by modification of poly(methyl methacrylate) through the addition of rubberin the form of butadiene styrene and mechanically by reinforcement with other materials such as carbon fibres, glass fibres and ultra-high modulus polyethylene, metal inserts (in the form of wires, meshes, plates), sapphire whiskers, silica fibres, aramid fibres, nylon fibres, poly(methyl methacrylate) fibres and beads of polyethylene and poly(methyl methacrylate)[1,2] .

Effective fibre reinforcement is dependent on many variables, including the type of the fibres, the percentage of fibres in the matrix, distribution of the fibres, fibre length, orientation, form, and the interfacial bond. Carbon-fibres have been added to acrylic resin in various forms, such as chopped or mat.Despite producing successful reinforcement, the black colour of the fibre, difficult handling characteristics and toxicity have restricted their use. The incorporation of Aramid fibres produced similar problems with respect to colour. The yellow appearance is difficult to mask within the denture, necessitating a thick layer of acrylic resin that adds significantly to the bulk of the denture. Polyethylene fibres are biocompatible, of low density and high modulus, aesthetically satisfactory and have been successfully incorporated into acrylic denture base with reported improvement in the mechanical properties of the resin. However, technical difficulties associated with the need of additional processing procedures have limited their use. Metal inserts in the form of wires, meshes and plates are still incorporated into dentures in an attempt to reinforce areas that are potentially vulnerable to fracture. Often, a metal insert acts only as an area of stress concentration and the tendency is to weaken rather than strengthen the denture base.

Reinforcement with glass fibres has given promising results in obtaining higher transverse strength, flexural modulus, fatigue strength and impact strength. Impact strength of the acrylic resin in different thickness and with different concentration of glass fibres was studied[1,2,3]. The present study aims to evaluate and compare the impact strength of acrylic resin of two different thicknesses and to evaluate and compare the impact strength of acrylic resin by reinforcing it with glass fibres in different and same concentration.

Materials and Method

A total number of 80 specimens of chosen acrylic resin denture base material were used in the present study. Charpy type plastic impact testing machine was used for testing the impact strength of the specimens. The data was analysed statistically. To prepare the acrylic resin specimens wax blocks were made using the brass dies and were invested and acrylized.

For preparation and standardizations of samples wax blocks were prepared pouring the molten wax into the brass dies of 56mm x

11mm x 11mm and 56mm x 11mm x 6mm internal dimensions (Fig.1). Upper member, the lid and lower member, the base of the die were in single pieces while the middle part of the die was in two pieces length wise for easy removal of the wax block. Upper member was having a 'V' shaped projection in the centre towards the die cavity. The base of the 'V'was 2.2mm and the height was 1/3 of the thickness of the specimen. Once the wax was hard, the blocks were recovered by de- assembling the die. Hundreds of such wax blocks were prepared. Care was taken to add more wax to compensate the shrinkage while the wax was hardened. Fifty blocks of dimensions 56mm x 11mm x 11mm and50 blocks of dimensions 56mm x 11mm x 6mm were thus prepared. Each block was having a notch of 1/3depth in the centre. The blocks were invested in dental flask using dental plaster (Fig.2). Dewaxing had been performed which left the mould cavity in the plaster. The plaster mould cavities were used to make the acrylic resin specimens. Almost equal numbers of un-reinforced, reinforced with 1% glass fibres, 2% glass fibres and 3% glass fibres acrylic resin specimens were made using the plaster mould cavities. For mixing, packing and curing the manufacturer's instructions were followed.

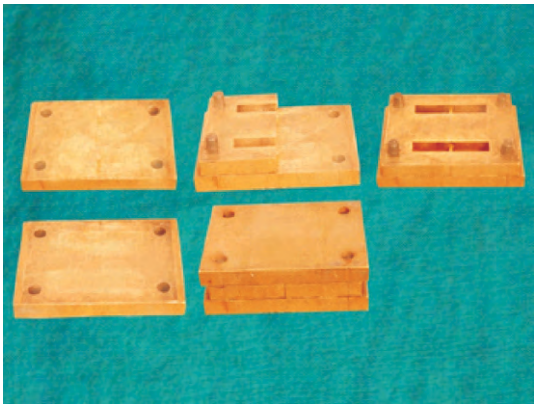

Fig. 1 : Brass dies for sample preparation

Fig. 2 : Investing of wax blocks

Unreinforced poly (methyl methacrylate) denture base resin (DPI-- Batch No. P-4112 L-4111) was used for making approximately 25% of the specimens (equal number of each size). Alginate separating medium was applied on the dental plaster mould cavity with the help of a brush and dried. Polymer and monomer were mixed in the ratio of 3:1 by volume (1.56:1 by weight). The mixture was kneaded and packed into the mould cavity in dough stage. Trial closure was carried out, the flask was opened, cellophane sheet was removed and excess material was trimmed using a BP knife. Final closure was done under pressure of 20 KN and kept for 30 min to allow proper penetration of monomer into the polymer. Curing cycle was followed according to manufacturer's recommendation. After the completion of the curing cycle, the flasks were allowed to bench cool to room temperature. Specimens were carefully removed from the mould cavity and the excess was trimmed and finished. These specimens were finally finished with silicone carbide paper, 120grits size. It was made sure that after finishing the dimensions of the specimen were 55x10x10mm and 55x10x5mm. The dimensions were checked using digital calliper (Mitutoyo, Japan) (Fig.3).

Reinforced acrylic resin denture base material

specimens were fabricated in the same manner as described earlier by incorporating the glass fibres in the dough stage of the material during packing. The glass fibres were dipped in the monomer and air dried. To add exact amount of glass fibres, the weight of unreinforced specimens were measured and accordingly the amount of glass fibres were weighed and added during packing of reinforced specimens. The weight of unreinforced specimen was 11.20gm. So, 0.112gm, 0.224gm and 0.448gm glass fibres were added to make the 1%, 2% and 3% reinforced specimens respectively. For weighing, the amount of glass fibres electronic weighing machine (Japan) was used (Fig.4). Two layers of measured amount of glass fibres were added at a different level of thickness in the plaster mould cavity while packing the acrylic resin denture base material. Care was taken to spread the glass fibres homogeneously throughout the length. Same procedure was followed for making specimens of other dimensions i.e. 55x10x5mm. The weight of specimen of this dimension was 5.56 gm and accordingly 0.056 gm, 0.112 gm and 0.168 gm of glass fibres were added. In this way, the reinforced specimens were having two layers of glass fibres in between acrylic resin denture base material. All the specimens (unreinforced and reinforced) were put under the category A and B depending on their dimension 55x10x10mm and 55x10x5mm respectively.

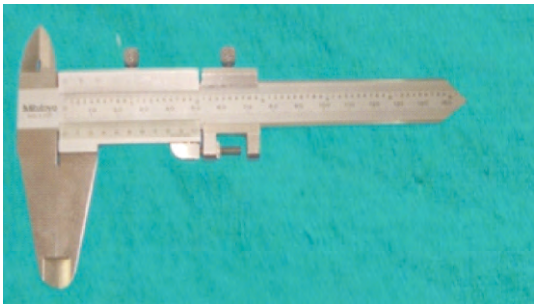

Fig. 3 : Digital caliper (Mitutoyo, Japan)

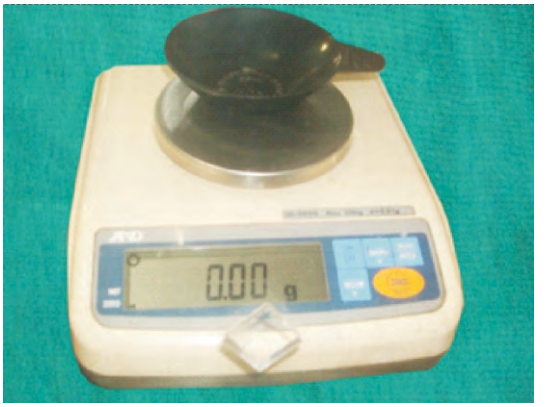

Fig. 4 : Weighing Machine

The specimens were grouped as follows:

1. Group 1A : Unreinforced acrylic resin specimens.
2. Group 2A: Reinforced acrylic resin (with 1% glass fibres) specimen. Category A
3. Group 3A: Reinforced acrylic resin (with 2% glass fibres) specimen.
4. Group 4A: Reinforced acrylic resin (with 3% glass fibres) specimen. 55x10x10mm
5. Group 1B: Unreinforced acrylic resin specimens. Category B
6. Group 2B: Reinforced acrylic resin (with 1% glass fibres) specimen.
7. Group 3B: Reinforced acrylic resin (with 2% glass fibres) specimen. 55x10x5mm
8. Group 4B: Reinforced acrylic resin (with 3% glass fibres) specimen.

All the specimens of different groups were stored separately in water at room temperature for two weeks before testing their impact strength. Impact strength test was carried out at Central Institute of Plastic Engineering and Technology (CIPET) (Deptt. of Chemicals and Petrochemicals, Ministry of Chemical and Fertilizer, Govt. of India) ISO 9001:2001 QMS, ISO/IEC 17020, Lucknow. Prior to testing, the specimens were wiped to remove

water. The impact strength of the specimens was tested on Charpy type plastic impact testing machine (Tinius Olsen, USA) (Fig 5). This machine is capable of determining the impact strength using either Charpy or Izod configuration, without changing the pendulum. The user attaches the appropriate striking tup on the pendulum and the specimen clamp or anvils in the base of the unit, to test plastics in accordance with ASTM D6110 (Charpy Impact). The aerodynamically designed compound pendulum provides maximum rigidity in the direction of the impact and virtually eliminates any windage losses. Pendulum capacity is easily changed by adding on any one of seven optional weight sets. The energy absorbed in breaking the specimen can be configured in selectable energy units of J, in.lbf, ft.lbf, kgf.m and kgf.cm and is determined by an optical encoder mounted on the shaft of the machine. Pendulum capacity was configured initially with four kg and five and a half kg weights. Some of the specimens did not fracture with this configuration. So pendulum capacity was finally configured with seven and a half kg weights. The specimen was placed in the clamps and was adjusted. The specimen broke into two pieces as the pendulum hit it (Fig 6). The digital monitor displayed the impact strength needed to break the samples.

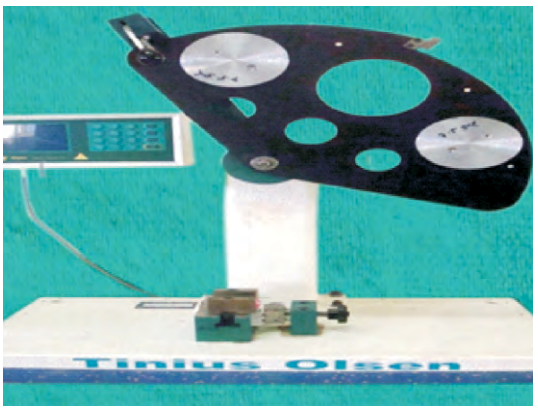

Fig. 5 : Charpy type plastic impact testing machine (Tinius Olsen, USA)

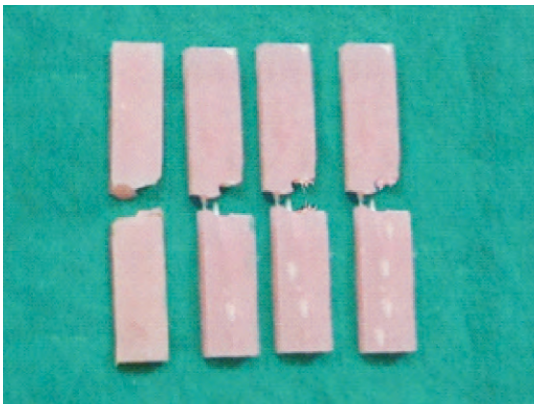

Fig. 6 : Fractured samples

Results

All the data were collected and statistically analysed. The results achieved were tabulated. Impact Strength of specimens in the both A and B groups were calculated (Table 1,2) and compared using SPSS (Statistical Package for the Social Sciences) statistical – version 16.0.

For finding out the significance between the Unreinforced acrylic resin specimens and glass fibre reinforced specimens ,the independent t-test was subjected in both groups at a significance level of 0.0001 (Table 3,4,5,6).In the group A Reinforced acrylic resin (with 3% glass fibres) specimen had the highest impact strength (5.49±0.93)followed by Reinforced acrylic resin (with 2% glass fibres) specimen (5.20±0.88).This shows that the impact strength is significantly altered with glass fibres reinforcement.In the group B Reinforced acrylic resin (with 3% glass fibres) specimen had the highest impact strength (1.24±0.17) followed by Reinforced acrylic resin (with 2% glass fibres) specimen (0.82±0.10).This shows that the impact strength is significantly altered with glass fibres reinforcement. The difference between the subgroups was statistically significant at the level 0.0001.On applying ANNOVA test to compare the groups of category A the result was showing very highly significant

difference as the p-value was 0.000 (p> 0.001 -very highly significant) (Table 7). Similar results were obtained for groups of category B (Table 8). It shows that the groups are dissimilar as far as their impact strength is concerned. It means that adding glass fibres affects impact strength.

Table 1: Impact Strength of specimens in category A (in Joules).1A- unreinforced acrylic resin specimens; 2A- reinforced acrylic resin (with 1% glass fibres) specimen; 3A- reinforced acrylic resin (with 2% glass fibres) specimen; 4A- reinforced acrylic resin (with 3% glass fibres) specimen.

S .No.	GROUP 1A	GROUP 2A	GROUP 3A	GROUP 4A
1	0.3384	3.9024	3.5871	6.2219
2	0.1357	3.825	5.5479	5.2070
3	0.1029	3.9024	5.0321	6.7908
4	0.1595	3.6282	6.7663	4.9890
5	0.1440	3.5201	5.1261	4.7148
6	0.1564	4.0123	6.1802	4.2912
7	0.1742	3.5081	5.2551	4.3908
8	0.1379	2.8231	4.3214	5.3076
9	0.1401	4.0321	5.2216	6.2103
10	0.1395	3.0124	5.0333	6.7393
Mean	0.16286	3.61661	5.2071	5.4863
Standard deviation	0.06444	0.41525	0.8802	0.9379

Table 2: Impact Strength of specimens in category B (in Joules).

S .No.	Group1B	Group2B	Group3B	Group4B
1	0.0817	0.627	0.817	0.9943
2	0.0567	0.577	0.737	1.3040
3	0.0635	0.567	0.706	1.2236
4	0.0597	0.517	0.8667	0.9378
5	0.0498	0.439	0.7105	1.2036
6	0.0577	0.517	0.935	1.5432
7	0.0517	0.603	0.9245	1.2987
8	0.0547	0.597	0.7160	1.3024
9	0.0647	0.542	0.9650	1.3243
10	0.0438	0.565	0.8650	1.2349
Mean	0.05840	0.55510	0.82427	1.2367
Standard deviation	0.010325	0.054256	0.10105	0.17112

Table 3: Shows the result of unpaired Student t- test for groups 1A & 1B.

Group	N	Mean	Std. Deviation	t-value	p-value
1A	10	0.162860	0.064439	5.062	0.000
1B	10	0.058400	0.010325		

Table 4: Shows the result of unpaired Student t- test for groups 2A & 2B.

Group	N	Mean	Std. Deviation	t-value	p-value
2A	10	3.616610	0.415255	23.118	0.000
2B	10	0.555100	0.054256		

Table 5: Shows the result of unpaired Student t-test for groups 3A &3B.

Group	N	Mean	Std. Deviation	t-value	p-value
3A	10	5.207110	0.880211	23.118	0.000
3B	10	0.824270	0.101047		

Table 6: Shows the result of unpaired Student t-test for groups 4A & 4B.

Group	N	Mean	Std. Deviation	t-value	p-value
4A	10	5.486270	0.937956	14.095	0.000
4B	10	1.236680	0.171164		

Table7: Shows the result of One Way Analysis of Variance ANOVA test (Group A).

Group	N	Mean	Std. Deviation	F value	p-value
1A	10	0.162860	0.06443	130.73	0.000
2A	10	3.616610	0.41525		
3A	10	5.207110	0.88021		
4A	10	5.486270	0.93795		

Table 8: Shows the result of One Way Analysis of Variance ANOVA test (Group B).

Group	N	Mean	Std. Deviation	F value	p-value
1B	10	0.06	0.01034	229.8	0.000
2B	10	0.56	0.05425		
3B	10	0.82	0.10104		
4B	10	1.24	0.17116		

Discussion

Acrylic resin has been used extensively for the fabrication of denture base because they provide large number of advantages than any other material. However, one of the major drawbacks with the use of acrylic resin as denture base material is its susceptibility to fracture[4]. It is generally recognized that impact strength and fatigue strength of poly (methyl methacrylate) acrylic resin denture base material is not satisfactory[2,38].

Smith[4] analyzed the practical situation with respect to the fracture of dentures and showed two types of failure. i) Outside the mouth, caused by impact forces, i.e. a high stress and ii) inside the mouth, usually in function, which is probably a fatigue phenomenon, i.e. a low and repetitive stress. It has been shown that the "midline fracture" is a fatigue failure. It is characterized by a particular morphologic state on the fracture surface, which at low power magnification appears as a series of curved ridges concentric with a spot at the junction of the tooth and base material. This centre is the origin of the fracture[4].

Whether the denture fractures from accidental cause (impact failure) or from forces due to masticatory or gliding movements (fatigue failure), the "strength" of the denture has been inadequate in each case. The strength of a denture depends on the shape, residual stresses, and the conditions of loading and the mechanical properties of the material [4].

The importance of the shape of the denture can best be explained by the 'notch effect'. This effect is due to the production of a local stress concentration, i.e. concentration of internal forces at the base of the notch on loading. The notch effect is an illustration of the general principle that stress concentration occurs in a loaded part wherever the surface contour changes sharply. More abrupt the changes in contour, the higher the concentration of stresses. The same considerations apply to a hole inside the material (porosity) or an inclusion such as dirt or plaster[4]. This explains the preparation of notch in the specimen, which corresponds, to the notch in the denture. The specimen fractures at the notch because that area has maximum concentration of internal forces on loading.

The residual stresses reveal themselves by crack formation, so initiate fracture[4]. This principle explains that the specimens that did not fracture with the first pendulum capacity were discarded because the stresses that developed in the specimen after the first impact are considered as residual stresses. These residual stresses lead to crack formation and weaken the specimen. So those specimens could not be used for further testing.

The intrinsic strength of the material is affected by the composition, which depends partly on the curing technique used. The principal factor in this respect is the amount of un-polymerized monomer remaining after curing[8]. For this reason, the specimens were stored in water at room temperature for two weeks so that un-polymerized monomer might leach out to impart maximum intrinsic strength to the acrylic resin denture base material.

Hence, failure due to deficiencies in design and construction contribute equally in fracture of prosthesis as do the intrinsic strength of the material[4,5]. These factors should therefore be borne in mind in assessing the reason for fracture of prosthesis practically[7].

Reinforcement of acrylic resin with various

fibres like carbon-graphite fibres[6,26,30], polyethylene fibres[12-14,16,26], ultra high molecular weight polyethylene fibres[12,14,16,26] glass fibres [11,15,17-22,25,27,28,31-36] etc. has been tried successfully. Dental applications of fibre-reinforced acrylic resin require a unique balance of properties like biocompatibility, aesthetics, the ability of the fibre to bond to the resin matrix, ease of laboratory manipulation and stability in the oral environment[35].

Reinforcement with glass fibres has been widely studied. Karacer (2003) studied the effect of length and concentration of glass fibres on mechanical properties of an injection and a compression molded denture base. They found that impact strength of injection molded denture base polymer increased significantly with the use of chopped E-glass fibres[34] . Sung-Hun Kim (2004) studied the reinforcement of acrylic resin with glass fibres. They were successful in enhancing the impact strength of acrylic resin by reinforcing with glass fibres [37].

In the present study, acrylic resin was reinforced with glass fibres in various concentrations and the impact strength was compared with unreinforced acrylic resin. Enough specimens i.e., 80 in number were prepared for the study. This number is statistically satisfactory[42] for such studies as well as comparable to the sample size taken in previous studies[12,16,35]. The number of specimens in each group also fulfils the statistical requirement. In previous studies, Jacob John et al and Ozgul K. et al. used ten specimens for each group.

The size of the specimen was decided as per the machine used for testing the impact strength. The machine (Charpy type plastic impact testing machine, Tinius Olsen, USA) accepts the specimens that are made in accordance with the specifications (ASTM A370, EN 10045, and ISO 148). For making acrylic resin specimens, the procedure followed was same as the procedure for construction of an acrylic resin denture i.e. investing, de-waxing, packing, curing etc. This procedure was followed so that we could closely resemble the procedure followed in denture construction. Other investigators in previous studies[30,31,35,38] followed same procedure. However, in some studies[9,11] specimens were processed directly in dies. In the present study, it was avoided, as there were chances of water sorption and dimensional changes[25]. In one of the studies[36], they used silicone mould for easy removal of specimens. Here, in this study split dies were used for easy removal of wax blocks. Pre-weighed glass fibres were added in concentrations of 1%, 2% and 3%. Reinforcement with different concentrations of fibres has been tried in different studies[31,33,34]. However, San-Yue Chen et al. (2001) have concluded that when polyethylene fibres incorporated were over 3% (w/w) the resin became difficult to manipulate and was aesthetically unpleasing[29] . H.D. Stipho (1998) concluded that excess of fibres lead to lateral spreading of fibres in the mould and no significant mechanical advantages were found by incorporation of higher than 5% glass fibres content[18]. Vallitu (1994) used glass fibres as acrylic resin strengtheners and varied the ratio of poly (methyl methacrylate) in the mixture and found that lesser the poly (methyl methacrylate) powder, weaker the resin[11]. Manufacturer's instructions were followed for mixing, packing, curing and cooling.

The observations obtained for impact strength

of specimens of both the categories A and B were tabulated and were represented in table 1 and 2 respectively. The mean and standard deviation of impact strength of specimens were also seen in respective tables. This shows a trend of increase in mean impact strength of acrylic resin when reinforced with glass fibres in different concentrations of 1%, 2% and 3%. As the concentration was increased, it was observed that impact strength also increased. The observations of the study shows a general trend of increase in impact strength but statistical analysis is needed to further interpret its significance.

When the mean impact strength of unreinforced acrylic resin specimen of group 1A and 1B (different thicknesses) was compared using student t-test the result was showing very highly significant difference as the p-value was less than 0.001 (Table 3). However, the overall difference between the thicknesses of specimens of two categories was 2:1 but the point at which the specimens fractured was approximately 4:1 due to the similar notch size. The results show that thicker specimens had greater impact strength than specimens that had less thickness. Tarik Kassab Bashi et al (2008) in his study found a significant difference in the strength of 1.5mm, 2.5mm and 3mm notched specimens[39]. However, he tested the transverse strength of the specimens but it clearly shows that an increase in thickness increases strength of material. Similar results were obtained when mean impact strength of reinforced acrylic resin specimen of group 2A and 2B, 3A and 3B & 4A and 4B were compared using student t-test the result was showing very highly significant difference as the p-value was 0.000 ($p > 0.001$-very highly significant) (Table 4, 5 and 6 respectively). This can be explained by the fact that longer the polymer chain, greater the number of entanglements (temporary connections) that can form among chains. Therefore, the longer the chain length, the more difficult is to distort the polymeric material. Properties such as rigidity, strength, melting point increases with increase in chain length[41].

To further delineate the significant variation between the means of impact strength of different groups, the post hoc test (Bonferroni test) was performed (Table 9 and 10). Statistical analysis revealed that the mean impact strength is significantly increased with reinforcement of acrylic resin with glass fibres in concentrations of 1%, 2% and 3%. Even when the groups reinforced in different concentrations were compared to each other the results showed very highly significant difference. This means that specimens reinforced with 1% glass fibres vary significantly from the specimens reinforced with 2% and 3% glass fibres and vice versa holds true for every group. The results comply with the results of San-YueChenin et al. (2001) who concluded that 3% weight of polyethylene fibres could be added to acrylic resin without significantly altering the physical properties of acrylic resin[21]. The fibres incorporated adhere to the matrix of the acrylic resin and the stresses are transferred from the polymer matrix to the fibre. Various other factors like strength of the interfacial bond, the shear strength of the matrix and the tensile strength of fibres play an important role[21,26]. Gutteridge (1988)[8] found that incorporated fibres could not be added over 4% weight. He found that viscosity was increased with the amount of fibre incorporated and manipulation became difficult. Also the reduction could be the result of clustered fibres and void spaces that may act

as stress concentration points in the polymer matrix and thus decrease the interfacial bonding between fibre and matrix. Higher glass fibre concentrations may have acted as inclusion bodies in the polymer and disturbed the homogenous matrix of the resin.

In the present study, we found that impact strength is reduced remarkably, when the thickness of acrylic resin specimens is reduced to half the original thickness. Impact strength is increased remarkably on reinforcing the acrylic resin with glass fibres. Maximum increase in impact strength is obtained when acrylic resin is reinforced with glass fibres in 3% concentration.

Table 9: Post Hoc Tests (Bonferroni) of category A specimen

Group	Groups	Mean Difference	p-value
1A	2A	-3.45375	0.000
	3A	-5.04425	0.000
	4A	-5.32341	0.000
2A	1A	3.453750	0.000
	3A	-1.59050	0.000
	4A	-1.86966	0.000
3A	1A	5.044250	0.000
	2A	1.590500	0.000
	4A	-0.27916	0.000
4A	1A	5.323410	0.000
	2A	1.869660	0.000
	3A	0.279160	0.000

Table 10 : Post Hoc Tests (Bonferroni) of category B specimen

Group	Groups	Mean Difference	p-value
1B	2B	-0.496700	0.000
	3B	-0.765870	0.000
	4B	-1.178280	0.000
2B	3B	-0.269170	0.000
	4B	-0.681580	0.000
	1B	0.7658700	0.000
3B	2B	0.2691700	0.000
	4B	-0.412410	0.000
	1B	1.1782800	0.000
4B	1B	0.496700	0.000
	2B	0.6815800	0.000
	3B	0.4124100	0.000

Conclusion

The present study was conducted to study the effect of glass fibre reinforcement in different concentration on impact strength of acrylic resin denture base material of various thicknesses.Based on the observations and the results, the following conclusion has been drawn:

- Impact strength is reduced remarkably when the thickness of acrylic resin specimens is reduced to half the original thickness.
- Impact strength is increased remarkably on reinforcing the acrylic resin with glass fibres.
- Maximum increase in impact strength is obtained when acrylic resin is reinforced with glass fibres in 3% concentration.

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Effects of Academic Stress on Gingival and Periodontal Health - A Questionnaire Study

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Abstract :

Background: Stress is a state of physiological or psychological strain caused by adverse stimuli, physical, mental or emotional, internal or external, that tend to disturb the functioning of to avoid an organism and which the organism naturally desires. Several corelational questionnaires have observed a positive relationship between psychological stress and periodontal diseases. This study aimed at studying the prevalence of periodontal disease and its relationship to stress in students in ITS dental college educational society campus in Ghaziabad.

Materials and Method: The study included 104 subjects between the age of 18-30 years. The subjects were informed about the study goals and also requested to sign consents. The questionnaire included parts from generic stress questionnaire for students from Ministry of social security, National Solidarity and Reforms Institutions. The clinical examination included, Gingival Index (Bleeding on probing) and Probing Pocket Depth.

Results: A significant relationship was found between gingival inflammation and psychological stress. Statistical tests of ANOVA (analysis of variance) and post Hoc bonferroni (Multiple comparison)were applied to compare and evaluate the results. However no significant difference was found between probing depth and psychological stress.

Conclusion: Result from the present study indicates that psychological variables related to stress susceptibility and current level of stress do not contribute to significant difference in clinical parameters of probing depth. Moreover, the results indicate that only stressful situations and their subjective impact have a significant correlation with gingival inflammation.

Keywords: Stress, Periodontal Disease, Gingival Inflammation, Questionnaire Study.

Introduction

Chronic Periodontitis has been defined as an "infectious disease resulting in inflammation within the supporting tissues of the teeth, progressive attachment loss and bone loss.[1] It occurs as a result of a local bacterial infection by a pathogenic micro-flora within the periodontal pocket.[2] The etiology and pathogenesis of periodontal disease are multi-factorial.[3] In addition to numerous risk factors, like uncontrolled diabetes mellitus, smoking, specific infections, age, psychological stress and certain psychosomatic conditions like anxiety and depression have been implicated.[4]

Research has also suggested that stress,

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depression, and ineffective coping may contribute to the development of periodontitis.[5] However, the mechanism by which stress affects periodontal health remains unclear. One model proposes that psychologic stress may result in immunologic and inflammatory responses that influence periodontal disease, whereas an alternative model hypothesizes that negative affective states may reduce compliance with preventive behaviors.[6] Evaluation of these potential mechanisms may help in the treatment for patients with stress or depression and periodontal disease.

Another mechanism by which psychologic factors may be associated with periodontal destruction is through alterations in behavior. Stress and depression increase at-risk health behaviors. For example, individuals experiencing stress or depression may smoke more frequently, neglect oral hygiene, or reduce compliance with dental care. Stress and depression may also result in dietary changes that cause immunosuppressant and heightened cortisol production.[7]

Over recent years several groups have discussed the hypothesis that psychological stress might be a risk factor for periodontitis.[8] Some correlation studies show a positive relationship between psychological stress assessed by means of questionnaires and several measures of periodontal diseases.[9]

Numerous questionnaires have been used to evaluate stress in previous studies Ministry of social Security; National Solidarity & Reform Institutions developed a questionnaire to evaluate academic stress in students.[10] This also helps to categorize the stress level in students as low, medium and high.

The aim of the present experimental study was to assess the effect of questionnaire based stress assessment on the gingival and periodontal health. In particular the impact of academic stress on gingival and periodontal health were comparatively analysed by psychological measures and clinical parameters.

Materials and Method

A total of 104 exam going students of both genders aged between 18 to 35 years were selected from I.T.S Dental College, Muradnagar, Ghaziabad. The study was conducted on September 2013 and commenced on October 2013.The nature and design of the study was explained to all the participants and within consent was obtained prior to the commencement of the study. A detailed Institutional Ethical Committee Approval was taken before the start of the study.

The subjects included in the study were those with good general health, who had not been treated with antibiotic therapy in the past 3 months and those without any history of systemic diseases. While the subjects who were excluded from the study included those with a history of self-reported psychiatric disorders and use of psychotropic medication, those who had received oral prophylaxis or had undergone any periodontal treatment in previous 6 months, those with current dental or orthodontic treatment and smokers.

Psychological Measures

All subjects were asked to complete series of 20 sets of psychological questions which were completed in the private setting in the clinic. These psychological questionnaires (Ministry of social security, National Solidarity & Reforms Institutions) aimed to evaluate stress in exam going students. Subjects were assured that their answers would be held in the strictest confidence to help encourage

complete and truthful self- reporting. (Table 1) Each question had 5 options (Never , Rarely , Sometimes , Often and very Often.) and each question was scored from 0 – 4, i.e. 0 for Never , 1 for Sometimes and so on.

The total stress score was calculated by adding the individual scores and students were categorized as those with No stress (Scores 0-20), Low stress (Scores 21-40), Medium Stress (Scores 41-60) and High Stress (Scores 61-80).

Clinical parameters

After completing the questionnaire, the students were subjected to clinical examination. Gingival index and pocket probing depth were measured and recorded at four sites per tooth, using William′s periodontal probe and UNC15 probe (University of North Carolina) respectively. The pocket probing depth measurements were made from free gingival margin to the base of the sulcus. The gingival index was assessed by using Loe and Sillness gingival index.[10]

Statistical Analysis

Statistical analysis was done using SPSS (Statistical package for social sciences) version 15.0 statistical analysis software. The values were represented (number %) and mean ± SD were calculated. Statistical tests of ANOVA (analysis of variance) and post Hoc bonferroni (Multiple comparison) were applied to compare and evaluate the results.

Results were analysed using ANOVA (analysis of variance) which showed that changes in gingival index scores between the three groups were found to be significant ($p < 0.05$ at 95% confidence interval) where as changes in the probing depth showed insignificant results ($p > 0.05$)

ANNEXURES

TABLE 1 Questionnaires (Ministry of social security, National Solidarity & Reforms Institutions)

STRESS QUESTIONNAIRE FOR STUDENTS
1. I cannot pay attention in the class.
2. I do not understand what my teacher teaches.
3. I am not sure if I am able to do well in school.
4. My attendance is poor.
5. I am often late in class.
6. I have too many assignment
7. I feel there is too much to do with tuition and home work.
8. I do not get enough pocket money.
9. I do not have enough money to pay my basic expenses
10. My parents control how much money i spend.
11. I have trouble getting along with my family members.
12. I have no friends/ I feel lonely.
13. I feel insecure because of too much competition in getting grades and a good job
14. I feel I am left with hardly any time for exercise
15. I have gained / lost weight
16. I am tired sleeping more / less than normal.
17. I feel sad and depressed.
18. I feel nobody cares for me.
19. I feel have I too much pressure because of my studies and examinations
20. I no longer do things once I very much liked to do

Result

A total of 104 exam going students (40 males and 65 females) were examined. The psychological questionnaires (Ministry of social security, National Solidarity &Reforms Institutions) used for stress evaluation is a 20 item Likert 3 point scale with a minimum score of 20 and maximum score of 60. Scores were categorized as those with 0- 20 points as being person with no stress at all;(21-40) points meant good management of stress; the person in danger zone included those with a score of(41-60) and finally a score of 61-80 included acutely stressed requiring counseling. Based on the above interpretation of the stress the students were graded in following stress groups: No stress (Score0-20), Low stress (Scores 21-40), Medium Stress (Scores 41-60) and High Stress (Scores 61-80).In our study, we found that 20 students were under no stress, 75 had low stress levels and 12 students were under medium stress. None of the subjects scored High Stress. Only the first three groups were used for final analysis as described below. There were no gender differences in the level of stress expressed.

Graph 1, Table 2 shows gingival index scores and its relationship with stress levels. It was found that gingival inflammation increased with increasing stress levels. The gingival index in medium stress group was 1.2± 0.2 as compared to 0.46± 0.4 in the no stress group. This difference between the groups was found to be significant.

Mean Probing depth also increased from no stress group to the medium stress group i.e from 1.68±0.2 to 1.90±0.3 which was statistically non significant.

On applying ANOVA with Post Hoc test (multiple comparisons) significant changes were observed in the gingival index scores between groups with no stress and low stress and no stress and medium stress groups ($p<0.05$) but insignificant results were found when probing depth was compared between the three groups.

GRAPH 1: Graph showing effects of stress on gingival index and probing depth.

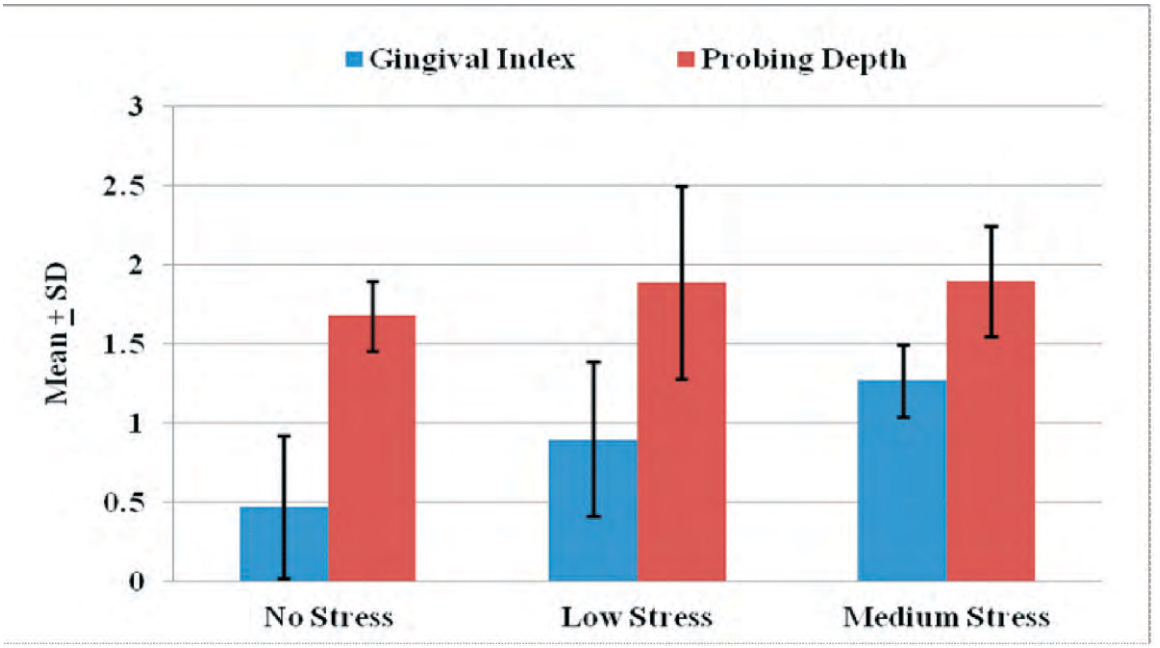

TABLE 2: Comparison of Clinical parameters among various groups (p<0.05)

CLINICAL PARAMETERS	GROUPS			P VALUE
	No stress stress	Low stress	Medium	
GI	0.46±0.4	0.89± 0.4	1.2±0.2	<0.05
PD	1.68±0.2	1.89±0.6	1.90±0.3	= 0.54

TABLE 3: Post Hoc Multiple Comparisons tests with clinical parameters among the groups (p<0.05)

Dependent Variable	Stress Groups INTERPRET	INTERPRET	Mean Difference	Std. Error	Sig.
GI	No stress	Low Stress	-.42811*	.16535	.038
		Medium Stress	-.79867*	.23886	.005
	Low stress	No Stress	.42811*	.16535	.038
		Medium Stress	-.37056	.20397	.226
	Medium stress	No Stress	.79867*	.23886	.005
		Low Stress	.37056	.20397	.226
PD	No stress	Low Stress	-.20600	.19051	.855
		Medium Stress	-.21933	.27521	1.000
	Low stress	No Stress	.20600	.19051	.855
		Medium Stress	-.01333	.23501	1.000
	Medium stress	No Stress	.21933	.27521	1.000
		Low Stress	.01333	.23501	1.000

Discussion

The aim of the present study was to assess the effect of questionnaire based stress assessment on the gingival and periodontal health. Stress is an ambivalent concept. It is a state of physiological or psychological strain caused by adverse stimuli, physical, mental or emotional, internal or external, that tend to disturb the functioning of an organism and is avoided by the organism.[11]

The result of this study involving 104 subjects has shown an association between

psychological stress with periodontal health. Academic stress was associated with an increase of plaque accumulation. Thus increasing the risk of plaque- associated disease. The particular age group (18 to 35 years) was selected because the students are more prone to psychological stress during their exams.

Stress can negatively influence the oral health status of an individual, which can lead to increased amounts of dental plaque, gingival inflammation and more severe periodontitis.[12] [13]Psychological stress was also shown to be related to periodontitis through changes in behavior, immunologic and inflammatory response.[14]

This could be due to deregulation of the immune system, mediated through the hypothalamic–pituitary–adrenal and sympathetic– adrenal medullary axis.[15].The activation of this by means of stress might result in the release of an increased concentration of the corticotropin-releasing hormone from the hypothalamus which may act on the anterior pituitary thereby resulting in the release of the adrenocorticotropic hormone (corticotropin). The corticotropin may then act on the adrenal cortex enhancing the production and release of cortisol into the circulation, leading to suppression of the inflammatory response, modifying cytokine profiles, elevation of blood glucose levels and alteration of certain growth factor levels.[16 17]

According to a study done by Denzier et al, exam going students also reported on neglect of oral hygiene during the exam period and this neglect seemed to affect thoroughness rather than frequency of oral hygiene.[18]

In our study gingival index increased with increase in the stress among the exam going students. However probing depth did not show any significant increase. The increase in gingival inflammation can also be explained by the direct influence of stress on the immune system through plaque accumulation leading to increased susceptibility to periodontal diseases.[19]

Green et al reported more periodontal disease in those with more life-events stress and a particularly strong correlation between stressors and periodontal disease in patients who also reported somatization.[20] In addition to life events, occupational and academic stress may be associated with the progression of periodontal disease.[7]

Thus the results in the present study indicate that only stressful situations and their subjective impact have a significant correlation with periodontal health in an individual.

Conclusion

Academic stress appears to affect periodontal health shown by more plaque accumulation, gingival inflammation, clinical attachment loss and increased levels of cytokines and cortisol in saliva. The significant change in the clinical data states strong interrelationship between stress and periodontal disease. From a clinical point of view, we recommend that the patients should be informed about Stress as a risk factor for periodontal diseases. In case a patient is not able to maintain oral hygiene, professional help should be rendered at short recall intervals especially during times of enhanced psychological strain.

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Change in the Frequency of occurrence in the Oral Manifestations between Controlled and Uncontrolled Type 1 & Type 2 Diabetes Mellitus- A Pilot Study

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Abstract :

Aim: To compare the oral manifestations in controlled and uncontrolled Type 1 & Type 2 Diabetes Mellitus. **Materials & Method:** A total of 40 patients were included which were divided equally into four groups: uncontrolled & controlled Type2 Diabetes Mellitus (T2DM) and uncontrolled & controlled Type1 Diabetes Mellitus (T1DM). Blood Sugar (fasting, postprandial, random), urine sugar and urine protein were done for all the patients. Oral manifestations were recorded for all the patients and patients with opportunistic infections and mucosal lesions were subjected to cytological and histopathological investigations. **Results & Conclusion:** The oral manifestations in uncontrolled diabetics are more severe and more prevalent as compared to controlled diabetics.

Abbreviations: T1DM: Type 1 Diabetes Mellitus, T2DM: Type 2 Diabetes Mellitus, DM: Diabetes Mellitus.

Keywords: Type 1 Diabetes Mellitus, Type 2 Diabetes Mellitus, Oral Manifestations.

Introduction

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. Diabetes Mellitus can broadly be divided into Type 1 Diabetes Mellitus(T1DM) and Type 2 Diabetes Mellitus(T2DM). T1DM is caused by β-cell destruction, usually leading to absolute insulin deficiency. Whereas, T2DM is a combination of insulin resistance and β-cell dysfunction along with other factors.[1]

Oral diagnosticians are the first ones to observe and note the changes in the oral cavity caused as a result of Diabetes Mellitus(DM). The common oral manifestations include inflammation of gingiva, severe periodontitis, oral ulcerations, candidiasis etc. These manifestations are the basis of identification of this disease by the oral diagnostician.

Aim & Objective

Whatever may be the type of diabetes it is associated with oral manifestations. Hence it becomes the duty of oral diagnosticians to combine their knowledge to:

1. Compare the frequency of occurrence of the oral manifestations in controlled and uncontrolled T1DM and T2DM.

2. Diagnose and educate the unaware diabetic patients on the basis of their oral manifestations so that they can avail adequate medical care in time.

With this background a pilot study was done with an aim to compare the oral

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manifestations of controlled and uncontrolled T1DM & T2DM.

Materials & Method

The study took place at the department of Oral Medicine, Radiology & Diagnosis, I.T.S-CDSR, Muradnagar, Ghaziabad, Uttar Pradesh, India and the laboratory investigations at the Hormone Care Research Centre, Ghaziabad, Uttar Pradesh, India. Ethical clearance was obtained by the departmental ethical committee prior to the study.

The study consisted of a total of 40 patients divided equally into four groups:

Group 1 (n=10) consisted of Uncontrolled T1DM patients,

Group 2 (n=10) consisted of patients with T1DM controlled,

Group 3 (n=10) had patients with uncontrolled T2DM and

Group 4 (n=10) included patients with controlled T2DM.

All the patients having controlled DM were the ones who were previously diagnosed as diabetic, and were being treated by a physician. Those included in the uncontrolled DM group were the ones who were newly diagnosed as Diabetics at Hormone Care Research Centre, Ghaziabad and who had not undergone any treatment for diabetes. All the patients were selected randomly and were age and sex matched.

Patients having either T1DM or T2DM and willing to participate in the study were included. The exclusion factors included patients with mental or secondary systemic illness, pregnant or lactating mothers, patients with deleterious habits like alcohol, smoking and patients on any form of medications except for DM.

A written informed consent was obtained from all the patients and a detailed extraoral and intraoral clinical examination was carried out. All the findings were noted in a customized performa. Blood Sugar (fasting, postprandial, random), urine sugar and urine protein were obtained for all the patients. Patients with opportunistic infections and other mucosal lesions were subjected to cytological & histopathological examination.

Results

In the T1DM group four patients were males and six were females in an age range of 3-30 years. In T2DM group five patients were males and five were females in an age range of 45-82 years. (Table 1)

Table 1: Distribution of patients with T1DM & T2DM

Type of Diabetes Mellitus	Males	Females	Age (years)
Type 1 Diabetes Mellitus	4	6	3-30
Type 2 Diabetes Mellitus	5	5	45-82

Oral symptoms were absent in all the patients with T1DM. While examining the hard tissues, dental caries were found in 90% of the patients with uncontrolled T1DM as compared to 40% of the patients with controlled T1DM. During soft tissue examination of patients with T1DM, almost all of uncontrolled T1DM complained of redness, inflammation and bleeding from gums (Fig. 1). Periodontitis was found in 70% of the patients with uncontrolled T1DM and 10% of the patients with controlled T1DM. (Table 2)

Fig. 1: Red and inflamed gingiva in patient with uncontrolled T1DM.

Table 2: Comparison of hard and soft tissue examination of patients with controlled and uncontrolled T1DM

Hard and soft tissue examination	Uncontrolled T1DM	Controlled T1DM
Dental Caries	90%	40%
periodontitis	70%	10%

Oral symptoms like altered taste and burning mouth were observed in both the controlled as well as uncontrolled T2DM patients. Altered taste was observed in 90% of the patients with uncontrolled T2DM as compared to only 20% of the patients with controlled T2DM. Burning mouth was observed in 70% of the patients with uncontrolled T2DM and only 10% of the patients with controlled T2DM.

While examining the hard tissues, dental caries was found in 80% of the patients with uncontrolled T2DM as compared to 60% of the patients with controlled T2DM. In the T2DM uncontrolled group 20% of the patients were edentulous and the rest 80% were partially edentulous, while 40% of the patients with controlled T2DM were partially edentulous. During soft tissue examination, periodontitis was observed in all the patients with uncontrolled T2DM as compared to 50% of the patients with controlled T2DM (Table 3) (Fig. 2).

Fig. 2: Periodontitis and missing lower anterior teeth in patient with uncontrolled T2DM.

Table 3: Comparison of hard and soft tissue examination of patients with controlled and uncontrolled T2DM

Hard and soft Tissue Examination	Uncontrolled T2DM	Controlled T2DM
Dental Caries	80%	60%
Partially Edentulous	80%	40%
Periodontitis	100%	50%

The oral lesions observed in the T2DM group included oral ulcers, candidiasis and oral lichen planus. Multiple oral ulcers were observed in 30% of the patients with uncontrolled T2DM (Fig. 3). Candidiasis was observed in 20% of the patients with uncontrolled T2DM and reticular lichen planus (Fig. 4) was observed in 10% of the patients with uncontrolled T2DM. (Table 4)

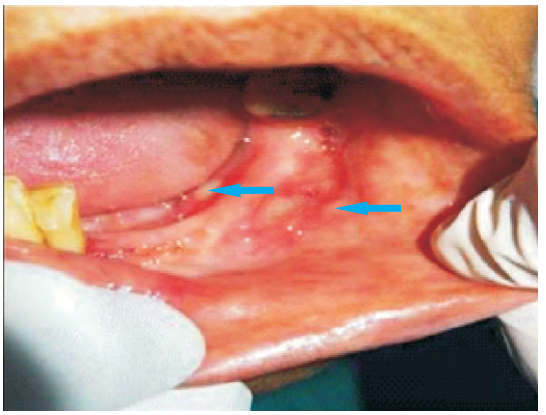

Fig. 3: Multiple ulcers in the floor of the mouth in patient with uncontrolled T2DM.

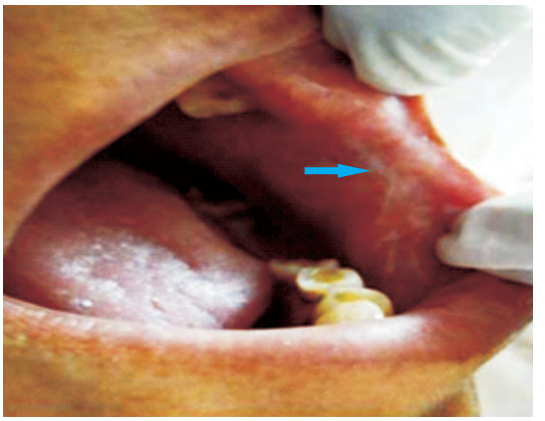

Fig. 4 : Lichen planus on the left buccal mucosa in patient with uncontrolled T2DM.

Table 4: Comparison of oral lesions in patients with controlled and uncontrolled T2DM

Oral Lesions	Uncontrolled T2DM	Controlled T2DM
Oral Ulcers	30%	0%
Oral Lichen Planus	10%	0%
Candidiasis	20%	10%

Discussion

Diabetes mellitus is a chronic metabolic disease that affects oral disease progression. In diabetic patients, the oral tissues react and produce characteristic manifestations which not only destroy the oral tissues but also produce characteristic oral manifestations. The various oral manifestations reported include dental caries, salivary dysfunction, oral mucosal diseases, oral infections such as candidiasis, taste and other neurosensory disorders.[2]

Oral symptoms and mucosal lesions were absent in patients with T1DM. This may be due to the small sample size of the patients. Increased incidence of dental caries and periodontitis was found to be more in patients with uncontrolled T1DM as compared to controlled T1DM. Which is in accordance with previous studies.[3] It has been observed that patients with T1DM have an exaggerated gingival inflammatory response to a bacterial challenge as compared to that found in non-diabetics.[4] In addition, patients with T1DM may have more Gram-negative bacteria than controls.[5]

Taste is a special function of tongue due to taste buds. Uncontrolled T2DM have an altered taste sensation which displays a degree of speciality towards glucose. Taste disturbance has also been reported to lead to poor glycemic control by inhibiting the ability to maintain a good diet.[6]

Numerous contributing factors are responsible for increased susceptibility of diabetics to periodontal diseases. Compromised polymorphonuclear leukocyte function resulting from impaired neutrophil adherence, chemotaxis, and phagocytosis prevent destruction of bacteria in the periodontal pocket and markedly enhance periodontal destruction. Abnormalities of collagen metabolism, impaired proliferation of osteoblasts and weakened mechanical properties of newly formed bone have been documented in hypoglycemic patients.[7] In the present study periodontitis was found in all the patients of uncontrolled T2DM as compared to only 50% of the patients with controlled T 2 DM.

Lichen planus is a chronic inflammatory disease of the skin and mucosa whose exact aetiology is not known. There have been studies in the past which have shown a positive correlation between T2DM & lichen planus. The association of oral lichen planus and diabetes mellitus remains a subject of research due to a common autoimmune background of both the diseases.[8]

It is important for the clinicians to understand and recognise the changing scenario in controlled and uncontrolled states. A dentist may be the first to observe changes in the oral cavity as a result of diabetic state. Also, even though the manifestations of the disease may not be evident clinically, it does not imply that the disease is absent as it may be present in its latent stage. The changing scenario in the controlled state is an important clinical indicator for good diagnosis and herein lies the importance of such studies. The present study is being actively pursued in large number of patients for better validity.

Conclusion

From the present study it is evident that the oral manifestations in uncontrolled diabetics are more severe as compared to controlled diabetics. Furthermore, intense monitoring and prevention as well as early treatment is necessary in both the controlled and uncontrolled diabetic patients to prevent the ravaging effect of diabetes.

Limitations

This study had certain limitations.

1. The sample size was small and was restricted to a limited geographic area.
2. Furthermore no correlation of the duration of DM was done with the severity of oral disease progression.
3. A case control study following the patients before start of treatment would be more appropriate.

So future studies with larger sample size over a large population are recommended to further validate the results.

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Full Mouth Rehabilitation of a Patient with Bilateral Asymmetric Posterior Open Bite: A Case Report

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Abstract:

The etiologies of posterior open bite are numerous. The usual mode of management of posterior open bite is orthodontic treatment. But certain cases involving greater number of teeth or with more posterior extension are not amenable by orthodontic treatment and they need to be managed with prosthodontic treatment. This case report describes a unique case which presented with multiple ankylosed teeth, uneven occlusal plane and asymmetric posterior open bite. Patient reported with chief complaints of unaesthetic appearance and difficulty in eating food. Clinical examination revealed worn out maxillary and mandibular anterior teeth, uneven posterior open bite and only anterior teeth in occlusion in centric relation position. A systematic approach to restore patient's esthetics, function and stable occlusion with the help of fixed dental prosthesis in maxillary arch and telescopic removable dental prostheses in mandibular arch is presented.

Keywords: Full Mouth Rehabilitation, Fixed Removable Prosthesis, Open Bite, Occlusal Cant, Overlay Prosthesis.

Introduction

Posterior open bite is defined as "the lack of posterior tooth contact in any occluding position of the anterior teeth".[1] Unilateral presentation is more frequent than bilateral one. The severity of posterior open bite determines its treatment modality. [2]

Orthodontic treatment is an effective treatment modality when the condition is caused by mechanical interferences, not in cases with primary failure of eruption.[2-4] It consists of extrusion of maxillary posterior teeth but the resisting factors for extrusion such as forces exerted by tongue, orbicularis oris muscle complex and periodontal ligament may pose a high potential for relapse. The more posterior and more number of posterior teeth involved in open bite, poorer is the prognosis for orthodontic treatment. In such cases, the possibility of ankylosis of involved teeth exists and orthodontic extrusion results in undesirable intrusion of the uninvolved teeth.[2] Combination of surgical and orthodontic treatment has also been recommended to treat such cases but it requires patient's willingness to undergo surgery. [2,4]

The purpose of this article is to describe the clinical presentation of a case of bilateral posterior open bite, strategic treatment

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planning and its prosthodontic management.

Case Description

A 28 year old male was referred to the Department of Prosthodontics from the Department of Orthodontics at AIIMS, New Delhi. The patient's chief complaint was difficulty in chewing food because his “back teeth did not meet”. History revealed no conspicuous medical findings, no history of trauma during childhood and no history of familial occurrence of the presenting condition.

Extra oral examination revealed a slight facial asymmetry with mandibular deviation to the right side during closure, prominent angles of the mandible, wide alar base, reduced OVD, as evident by the over closure of mandible with the resultant protrusive everted position of lower lip and a slight concave profile.

Intra oral examination (Fig.1a) revealed bilateral asymmetric open bite (3-4 mm on right side and 8 to 10 mm on left side), anterior edge to edge relation, attrition of maxillary and mandibular anteriors, submerged 36, rotated 24 and 25, supernumerary teeth buccal to 25 and 26, a steep occlusal cant and an exaggerated curve of Spee. The teeth 21, 22 and 27 were missing. FDI's two- digit tooth notation system has been used throughout the article.

Fig. 1a: Pre-treatment frontal view of dentition

Orthopantomographic examination (Fig. 1b) revealed the presence of impacted third molars in all the four quadrants, multiple ankylosed posterior teeth and supernumerary teeth in relation to 24 and 25, severity of occlusal cant and the exaggerated curve of Spee.

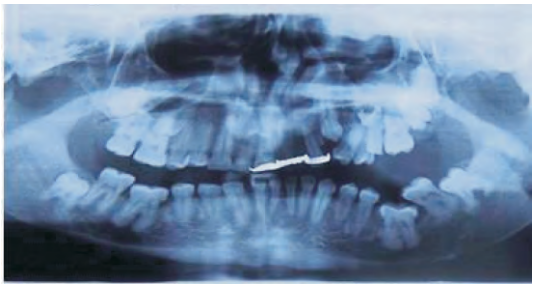

Fig. 1b: Pre-treatment OPG

The patient's freeway space was determined by Niswonger's method [5] and was found to be around 6 mm. The presence of occlusal contacts which were restricted to 12, 11, 23, 32, 41, 42 and 43 resulted in trauma from occlusion leading to grade I mobility of mandibular anteriors and incisal wear. TMJ examination revealed no positive findings.

Visual treatment objective (VTO) suggested that OVD could be increased to improve the collapsed appearance of face and to restore the maxillary and mandibular anteriors and establish anterior guidance.

Diagnosis and Treatment Planning

According to the Prosthodontic Diagnostic Index [6], patient was classified as a PDI class IV with insufficient tooth structure and guarded prognoses for some abutments and requiring re-establishment of the occlusion with a change in OVD.

A treatment plan was drawn to restore the masticatory function and improve the esthetics of the patient. Orthodontics as a mode of treatment was not possible due to ankylosis of the involved teeth and the severity of the posterior open bite was a poor prognostic indicator. It was decided to raise the OVD by 3 mm in the anterior segment that gives 1-1.5 mm separation at 2nd molar region [7]

based on the facts that freeway space of 3mm was still available for the patient and positive VTO.

Metal-ceramic crowns and 3-unit fixed dental prostheses (FDP) were planned for restoration of teeth in maxillary arch.

Metal ceramic crowns were planned for mandibular anteriors and telescopic removable dental prosthesis[8] (RDP) was planned in relation to mandibular posteriors up to 35 on left side and 47 on the right side. The involvement of 36 in the telescopic RDP design was not possible as it was submerged and lingually placed. Initially mandibular left second molar was planned for inclusion in the design. But, severe undercut was found after surveying of the master cast, that when blocked out would cause undesirable tongue annoyance. Thus, it was excluded from the design. The teeth numbers 34, 35, 44, 45, 46, 47 were planned to receive the telescopic copings that would support and retain the removable superstructure. The copings on both sides were planned to be connected to a lingual bar major connector with minor connectors.

Patient was explained in detail about the treatment plan and informed consent was obtained.

Treatment executed

Obtaining initial records:

Three sets of maxillary and mandibular impressions were made with irreversible hydrocolloid (Zelgan, Dentsply, Mumbai, India) and casts were poured with type III gypsum product (Orthokal, Khalabhai, Mumbai, India). Maxillary cast was mounted on a semi adjustable articulator (WhipMix Corp., Louisville, USA) using face bow transfer (Quick mount Facebow). Centric relation for the articulation of mandibular casts was registered by Dawson's bimanual manipulation method using Lucia jig as anterior deprogrammer.

Fabrication of Centric Stabilizing Splint: A maxillary occlusal splint was fabricated in heat cured clear acrylic resin (Travelon, Dentsply, India) on another set of mounted casts at raised OVD (3 mm at the anterior region). The occlusal contacts were adjusted intraorally to provide uniform and maximum occlusal contacts. The patient was instructed to wear it for as much time as possible for about 4 to 6 weeks with periodic corrections for accommodating changes in muscle tension. The occlusal splint assisted in deprogramming the muscles of mastication and in assessing the effect of increased OVD on the TMJ and surrounding musculature.[9]

Diagnostic wax up and mouth preparation: The diagnostic wax up (Fig. 2) was done for the anterior teeth to establish the anterior guidance tentatively. Mouth preparation included a thorough oral prophylaxis, endodontic treatment of 24, 25, 36 & 37, extraction of supernumerary teeth located buccal to 24 and 25 and surgical crown lengthening in relation to 34, 35, 46 and 47.

Fig. 2 : Anterior diagnostic wax up on articulated casts

Maxillary and mandibular teeth were prepared and temporary crowns were fabricated with

the help of silicone index of the tentative diagnostic wax up. The temporary crowns were adjusted to establish anterior guidance based on esthetics and phonetics and luted with Zinc oxide non-eugenol cement (Temp NE, 3M ESPE, St.Paul, Minnesota, USA). Maxillary and mandibular impressions were made using irreversible hydrocolloid and casts were poured with type III gypsum product. This pair of casts was used for wax up of posterior teeth.

Diagnostic wax up to establish the occlusal plane and the posterior occlusion: The mandibular posterior wax up was done using artificial resin teeth set in modeling wax at an occlusal plane determined by anatomical landmarks. The wax up of maxillary posterior teeth was done against the wax up of the mandibular teeth.

Maxillary posterior teeth were prepared for metal ceramic crowns whereas mandibular posterior teeth excluding 36 and 37 were prepared to receive telescopic copings and tempororization was done. 36 and 37 were prepared to receive metal copings only, as per the diagnostic wax up. Gingival retraction was done for all the prepared teeth with braided retraction cord preimpregnated with aluminum chloride (Ultradent Products, Jordan, USA). Secondary impression was made with polyvinyl siloxane heavy body and light body (Reprosil, Dentsply Caulk, Milford, USA) by two step technique.

The secondary impression was poured with Type IV gypsum product (Kalrock, Kalabhai, Mumbai, India) and individual dies were prepared. The casts were mounted on the semi adjustable articulator using face bow transfer and jaw relation record. Wax patterns for primary telescopic copings were prepared with cervical shoulder, surveyed to check their parallelism and were cast in chrome cobalt alloy. Metal copings for maxillary and mandibular teeth were tried in the patient to check for their adaptation and marginal fit. The telescopic copings were luted with type I Zinc phosphate cement (Fig. 3a). Porcelain application was done and PFM crowns were cemented on maxillary and mandibular anteriors using type I Zinc phosphate cement. The occlusion of maxillary posterior crowns was adjusted against the mandibular diagnostic wax up and bisque stage try-in was done.

Fig. 3a: Telescopic copings luted on mandibular posterior teeth

Fabrication of overlay metal framework for mandibular posteriors: Impression of mandibular arch was made with polyvinyl siloxane impression material using double viscosity two- step technique. The master cast was duplicated using a reversible hydrocolloid and the refractory cast was articulated against the maxillary cast using a new centric relation record.

Wax pattern was fabricated on the mounted refractory cast. The design included a lingual bar major connector and secondary copings on 34, 35, 44, 45, 46 & 47. The pattern was invested in phosphate bonded investment and cast in Ni-Cr alloy (Bellabond, Bego, Bremen, Germany). The casting was finished and a clinical try-in was done (Fig. 3b). The master

cast with the overlay metal framework was articulated against the maxillary cast using a new centric relation record (Fig. 4a). Porcelain was applied on the overlay copings against the crowns of maxillary arch (Fig. 4b). The occlusion was refined to provide posterior disoccclusion on mandibular protrusion and posterior group function on the working side.

Cementation of fixed prosthesis and delivery of removable prosthesis: The crowns were luted with type 1 Zinc phosphate cement and the overlay RDP was delivered to the patient (Fig. 5a, 5b). Fig. 6a and 6b show smile view and OPG of the patient after the delivery of final prostheses. Post insertion instructions were given that included regular flossing of interproximal areas and removal of overlay RDP during sleep to allow rest for the supporting tissues. The patient was put on a six monthly follow up regimen.

Fig. 3b: Try in of telescopic RDP framework (mirror image)

Fig. 4a: Mounting with silicone bite record

Fig. 4b: Final restorations on articulator

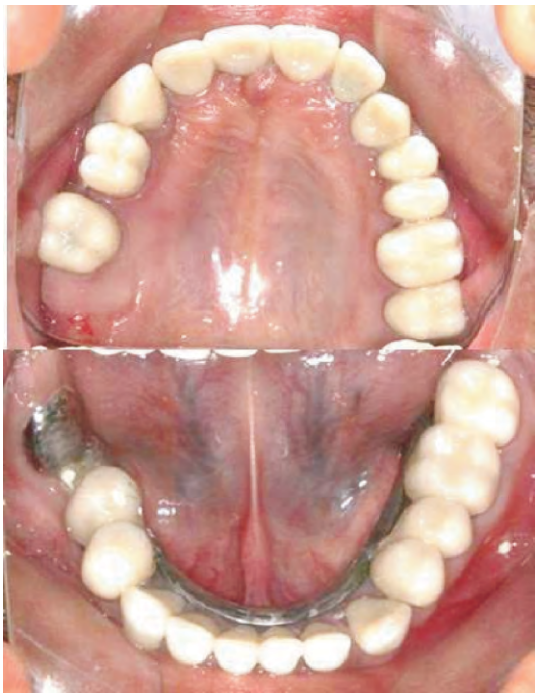

Fig. 5a, 5b: Final restorations in mouth (mirror view)

Fig. 6a, 6b: Post treatment smile and OPG

Discussion

Telescopic RDP is a viable and simple treatment modality for management of posterior open bite that is not amenable to orthodontics. Telescopic RDP provides, through its major connector, cross arch stabilization that counteracts the cantilever forces that the telescopic crown abutments may be subjected to during the eccentric mandibular movements. Existing dentition is used with minimal alteration and correction of occlusal plane achieves increased functional occlusion. [3]

In this case, extraction of the 36 and 37 were not considered to avoid subsequent bone loss as well as taking into account the patient's preference for a non surgical method of management.

The teeth 26 was restored with crown, but left out of occlusion due to two reasons. One was steep occlusal plane, which would have necessitated a long crown with undesirable crown root ratio. Second was to improve the esthetics by bringing the teeth in level with the adjacent teeth.

FDP was not considered as a treatment option for the mandibular arch due to the presence of unequal amount of open bite which might lead to undesirable lateral cantilever forces because of abnormal crown root ratio if they would have been restored with individual crowns. Posterior group function occlusion was given as it enhances mandibular stability during eccentric movements.

In the immediate post insertion period, the patient complained of difficulty in speech which got better with time and effort from the patient. The patient reported with good oral hygiene maintenance and improved chewing efficiency at subsequent follow up visits.

Conclusion

Proper diagnosis and strategic treatment planning play a crucial role in management of complex cases. Patient presented above had asymmetric posterior open bite, severe cant of occlusal plane and multiple ankylosed teeth. Orthodontic treatment was not feasible. So, telescopic prosthesis was given which improved patient's esthetics, oral function, and established a more favorable plane of occlusion. Patient's self-confidence also increased significantly as a result of the dental treatment.

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A Combination Prosthesis -Magnet Retained Lip Plumper- A Case Report

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Abstract :

Acquired defects of the orofacial structures must be analysed as to the specific cause and the consequent objective of rehabilitation. Resection of tumors of the orofacial structures results in functional disability and cosmetic disfiguration which present a major challenge to the rehabilitation team. To restore functional efficiency and aesthetics in such instances by a prosthesis is often preferred over a surgical procedure. But such a device has to be made bulky resulting in increased weight and discomfort to the patient. However this can be overcome by fabricating two piece prosthesis. This paper discusses the prosthodontic rehabilitation of an acquired mandibular defect patient with conventional cast removable partial denture modified with magnetically attached lip plumper to provide lip support, prevent lip biting and improve the patient's oral competency.

Keywords: Mandibulectomy, Lip Plumper, Removable Partial Denture, Esthetics, Magnets.

Introduction

Odontogenic ameloblastoma (OA) of the jaws is found to be a rare neoplasm of oral cavity constituting 0.78 %. Within the oral cavity, its prevalence is 5 times more in the mandible than in the maxillae, with the molar region and the ascending ramus being the most affected areas[1].

Therapeutic management of oral carcinoma patients include extermination of the new growth and rehabilitation of the patient to normal function and form [2]. Surgical excision of the lesion is the preferred route when compared to chemotherapy, radiation therapy, curettage and cryosurgery in case of oral cancer[3]. However surgical protocol may involve removing osseous elements which support intra and extra oral soft tissues. Hence oral cancer patients are often concerned about post operative disfigurement, masticatory inefficiency, speech impairment, uncoordinated chewing, rotation and deviation of jaw during movements and parasthesia of the site. Therefore the primary challenge to the prosthodontist, while managing the post surgical defect of oral carcinoma patient is not only to restore the function with prosthesis but also to bring back the original facial form and esthetics. Many methods are employed to modify the basic prosthesis so that the contour of the face is maintained without making the former bulky and heavy.

A two piece device is more convenient and acceptable to the patient because it meets with the patient's needs at appropriate time. Improved instrumentation has offered magnets as suitable attachments for intra oral

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prostheses. Magnetic technology is constantly improving: currently available magnets based on Nd-Fe-B are small (which allows them to be incorporated into dentures) and have attractive forces that enable them to provide retention. Although magnets have disadvantage of being corroded in long term service, they are far superior to springs, suction cups, clips, and studs in medical applications[4]. This clinical report describes the procedure associated with the fabrication of a combination prosthesis which includes removable partial denture with magnet retained lip plumper.

Case Report

A 32 yr old male patient, name Balu Nayak reported to the department of Prosthodontics, Mamata Dental College with complaints of missing teeth and disfigured face. Patient gave a history of mandibular resection for intra oral growth followed by bone graft at NIMS Hospitals, Hyderabad. Extra oral examination revealed a 22cm post surgical scar, 6 cm below the right ear extending to 5cm beneath the left corner of his mouth. He also presented with 1.5cm deep mentolabial fold and puckering of chin (Fig. 1). On intra oral examination, there was loss of residual ridge and a saucer shaped defect extending from the mesial aspect of the right mandibular first molar to that of left mandibular first molar (Fig. 2). Anteriorly the labial sulcus was missing and mucosa of inner aspect of lower lip and that covering the alveolar ridge was at the same level. Labial frenum was missing, and edentulous space appeared shrunken and reduced. Support for the lower lip was lost and was pulled inside.

Full complement of maxillary arch and molars on the either side of the mandibular arch were present. Class I molar relation was observed.

The panoramic radiograph revealed that the base of the mandible was reconstructed with bone graft (Fig. 3). On enquiry patient revealed that a piece of bone was taken from right leg.

The intermaxillary space in the region of the surgical resection was excessive. To restore such large space would require a heavier prosthesis which might enhance resorption of the grafted area. In addition to excessive intermaxillary space, the skin over mentolabial fold was pulled inside due to cicatrisation and presented disfigured appearance.

Fig. 1: Puckering of chin without prosthesis

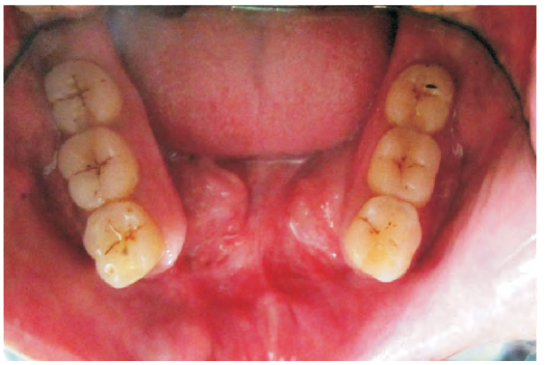

Fig. 2: Loss of residual ridge and saucer shaped defect.

Fig. 3 : Panoramic radiograph revealing reconstruction with bone graft

Available treatment options to restore the missing teeth were a fixed partial denture, implant prosthesis and a removable partial denture. Although the first two options could result in an excellently stabilized prosthesis, they would not have provided lip support and restore normal facial profile. A removable prosthesis with a modified acrylic flange might provide the required support to the lower lip. A diagnostic wax build up was tried in increments in the intercanine region to assess its aesthetic affect. Patient's approval was sought. After the patient's acceptance was obtained, a treatment plan was made to restore edentulous area with six anterior teeth and left first premolar. Because of uneven resorption and healing of the residual ridge, a compromise in arrangement of lower teeth regarding the midline was made after informing the patient.

To provide the lip support the labial flange is needed to be modified without causing unfavourable sequelae either to the soft tissues or to the foundation. With this in mind, a single unit bulky labial flange was avoided and a sectional prosthesis jointed by magnets was planned. Magnets (MAGFIT DX-800 Dental Magnetic Attachment Aichi Steel Corporation, Aichi- Ken, Japan) used in this case had a Magnetic Field Leakage of 0.002T, and attractive force of 7.7N which has superior retentive force compared to other retentive aids. A sectional prosthesis would also have an advantage of easy retrieval whenever the patient would not need lip supporting component.[5] Magnets were preferred over other attachment devices owing to their easy cleansability and simplicity, no difficulty during placement by the patient because of its automatic reseating nature, and long lasting retention even with number of cycles.[4]

Titanium alloy was chosen to provide metallic frame work of removable partial denture.

Diagnostic impressions were made with irreversible hydrocolloid (Zelgan 2002; Dentsply-India, Gurgaon, India) and initial survey was done. Mesial occlusal rests on 36 and 46 with embrasure clasps for 37, 38 and 47,48 were designed. Embrasure clasp assemblies in this design would also provide indirect retention. Because of restricted lingual sulcus in anterior region, lingual bar with extended minor connector over the ridge area and into labial sulcus was considered (Fig. 4).

Fig. 4: Lingual bar with extended minor connector

This would provide enough surface for the acrylic portion of the labial flange and fixing of the magnet along with its yoke and outer lip (MAGFIT DX-800 Dental Magnetic Attachment Aichi Steel Corporation, Aichi-Ken, Japan). Keeper of the magnet assembly (MAGFIT DX-800 Dental Magnetic Attachment Aichi Steel Corporation, Aichi-Ken, Japan) would be in the plumper section (Fig. 5).

Fig. 5 : Magnets and magnetic keepers in to the denture base and template respectively

As per design occlusal rest seat preparation, guiding planes and abutment tooth modifications were included in mouth preparation before a final impression was made. A custom tray in acrylic resin was constructed on the diagnostic cast. The definitive cast was prepared from a dual impression of the mandibular arch with silicone impression material (AFFINIS Precious, Regular; coltene whaledent). Metal framework was fabricated and tried for retention, stability and comfort. Acrylization was done after necessary jaw relations and try-in. On insertion it was seen that only function could be restored but not the facial form (Fig. 6).

Fig. 6 : Frontal view after insertion of removable partial denture alone

Wax was added in increments on the labial surface of the definitive prosthesis until aesthetics was improved and accepted by the patient. Added wax was indexed in the putty which was further supported by dental plaster (Fig. 7).

Fig. 7: Wax added in incremental is indexed by Putty index

Wax was removed and cold cure clear acrylic template was fabricated. Magnet keeper was incorporated in the template and magnets in the definitive prosthesis at equidistance from midline. Factor II Inc. A-2186 silicone elastomer (medical grade) was mixed in a 10:1 ratio by weight. Floccules, intrinsic strains, sealant, thixotrophic agent were added in proportions until desired color and consistency were obtained. Care was taken to minimize air entrapment during mixing and the mix was loaded in the putty index and on to the template and placed against the prosthesis in situ on the master cast. Index was held until complete set of silicon material (Fig. 8). Modified partial denture (Fig. 9) was inserted to check for occlusion in centric, phonetics, and aesthetics (Fig. 10). The opinion on patient's immediate relative was also considered regarding aesthetics. Patient's approval was obtained.

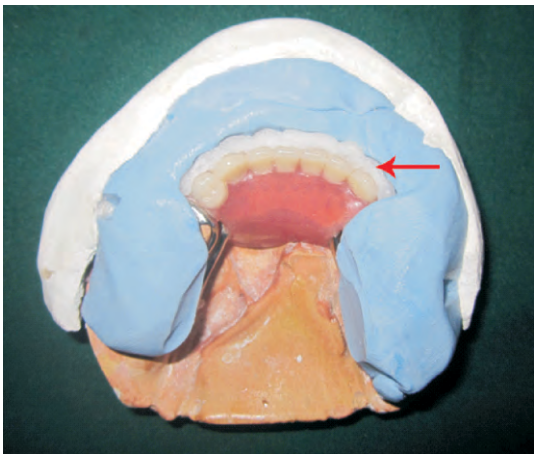

Fig. 8: Silicon material loaded within the putty index and placed against removable partial denture

Fig. 9: Removable partial denture and lip plumper

Fig. 10: Frontal view of the patient with lip plumper prosthesis

Discussion

Surgical excision of oral lesions may lead to loss of bone and may cause facial disfigurement. In the reported case, the patient underwent a procedure where by mandibular teeth from 35 to 45 were extracted along with bulk of supporting bone. Discontinuity was repaired with fibula bone graft. Cicatrization and loss of teeth pulled mentolabial fold inward. Patient desired the oral function as well as facial appearance to be restored. A sectional prosthesis with silicon lip plumper attached with magnets was fabricated. This was the most economical way to meet the demands of functional efficiency, comfort, and aesthetics for such a clinical condition.

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An Unusual Case of Juvenile Psammomatoid Ossifying Fibroma Presenting as a Soft Tissue Growth: A Case Report

Gothe P[1], Chidambaram YS[2], Rudagi BM[3], Holikatti K[1]

Abstract :

Juvenile Ossifying Fibroma (JOF) is an fibro-osseous lesion which is further classified as Juvenile Psammomatoid Ossifying Fibroma (JPOF) and Juvenile Trabecular Ossifying Fibroma (JTOF). Juvenile Psammomatoid Ossifying Fibroma (JPOF) has been distinguished because of its location, clinical behaviour, and age of occurrence. It is generally seen in younger age group and occurs more commonly in paranasal sinuses, orbits, and fronto-ethmoidal complex. The lesion has showed a potential to proliferate, invade and destroy tissues extensively. It is also important to note that this lesion has a very strong tendency to reoccur. Complete excision of the lesion is the treatment of choice and it can be curative. In this case paper we are describing an unusual case of JPOF involving the posterior mandible and clinically presenting as a soft tissue overgrowth.

Keywords: Fibro Osseous Lesion, Juvenile Ossifying Fibroma (JOF), Psammomatoid, Trabecular.

Introduction

Ossifying fibromas (OF) of the craniofacial skeleton, as described in WHO classification of odontogenic tumors are benign fibro-osseous neoplasm's characterized by the replacement of normal bone by a fibrous cellular stroma containing foci of mineralized bone trabeculae and cementum-like material that vary in amount and appearance[1]. Ossifying Fibromas are classified in to Conventional OF and Juvenile OF. The juvenile ossifying fibroma is also known as “Aggressive ossifying fibroma or Active ossifying fibroma”.[2] It has been distinguished from the larger group of ossifying fibroma on the basis of age of occurrence, most common site of involvement and clinical behaviour. [3]

Juvenile ossifying fibroma (JOF) is further divided into juvenile trabecular ossifying fibroma (JTOF) and juvenile psammomatoid ossifying fibroma (JPOF). JPOF has been distinguished because of its location, clinical behaviour, and age of occurrence. It is generally seen in younger individuals and occurs overpoweringly in paranasal sinuses, orbits, and fronto-ethmoidal complex where as JTOF has fondness for the jaw bones especially the maxilla[4]. In this case paper we are describing an unusual case of JPOF involving the posterior mandible and clinically presenting as a soft tissue overgrowth.

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Case Report

A 42 year old female patient presented with a chief complaint of swelling in the right side of the face since from 3 years. The patient was well built and she was a known diabetic since 2 years. She had no other relevant medical history. Intraoral examination revealed a single large growth measuring about 2 x 4 cm is seen in the right side of the alveolar ridge over 45, 46, 47 & 48 regions. The growth was smaller in size initially and has grown gradually to the present size. Overlying mucosa was erythematous and the growth was sessile and confluent with the underlying hard tissue. Growth was firm in consistency and nontender on palpation. Clinically 45, 46 & 47 were missing and 48 was firm but showed slight displacement posteriorly (Fig.1). Patient gave the history of exfoliation of the missing teeth 2 years back. Radiograph showed a radiolucent area with focal radioopacities. Incisional biopsy revealed cellular connective tissue consisting of stellate and spindle shaped cells. Multiple foci of acellular osteoid were noted which resembled the psammoma bodies (Fig. 2). Diagnosis of Psammomatoid ossifying fibroma was arrived at and surgical excision of the lesion was carried out.

Fig. 1: Intraoral photograph showing swelling on the mandibular right alveolar ridge

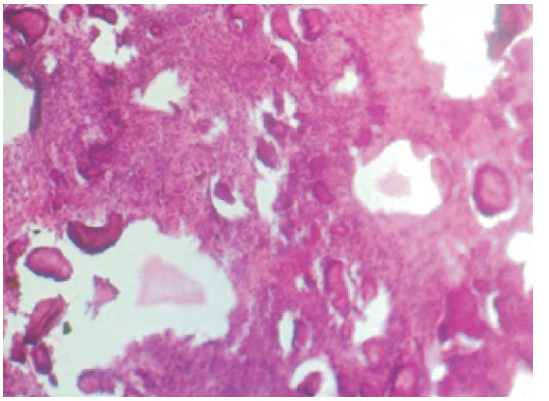

Fig. 2: Low power photomicrograph showing multiple round ossicles resembling 'psammoma' bodies interspersed in a cellular connective tissue stroma (100X).

Discussion

JOFs are benign, potentially aggressive fibro-osseous lesions of the craniofacial bones. The word "Psammomatoid" is derived from Greek word "psammos" which means sand [4]. JPOF shows fondness for the orbit and paranasal air sinuses accounting for about 72% of cases followed by calvarium, maxilla, and mandible[5]. Among the sinuses, JPOF generally involves the ethmoidal sinus followed by the frontal sinus, maxillary sinus and sphenoid sinus[6].

JPOF occurs most commonly occurs in males and in the younger age group[7].The lesion has showed a potential to proliferate, invade and destroy tissues extensively[8]. It is also important to note that this lesion has a very strong tendency to reccur and reccurence rates as high as 30%-56% are reported [9].The present case was a middle aged female patient with swelling on the right posterior mandible, which makes it a rare presentation since JPOF occurs in younger age group and mainly occurs in the bony walls of the paranasal sinuses[1].

Radiographically, JPOFs show mixed radiolucent and radiopaque areas depending

up on the degree of calcification. The lesion can cause root resorption, cortical expansion as well as perforation[10]. Juvenile ossifying fibromas tend to be more radiopaque than conventional lesions and sometimes may have a 'ground glass' appearance or may form dense lobulated masses.[11]

Histologically JPOFs show densely cellular connective tissue stroma that has a whorled appearance composed of uniform, stellate, and spindle shaped cells. Multiple small acellular calcified structures, round and uniform and with concentric lamellar calcification, are observed which resemble the typical "psammoma bodies". They may have a peripheral brush borders which was also seen in our case (Fig. 3). The psammomatoid bodies are basophilic and bear superficial resemblance to dental cementum, but may have an osteoid rim.[12] Mineralization is often not complete so that only areas of hyalinized collagen or osteoid are seen. Elsewhere the psammoma bodies may be densely mineralized and basophilic with resting and reversal lines or they may fuse into globular masses. Sheets of osteoblast-like cells resembling osteoblastoma may also be seen and scattered normal mitoses are encountered. Occasional psammomatoid calcifications will often be seen in the trabecular variant and

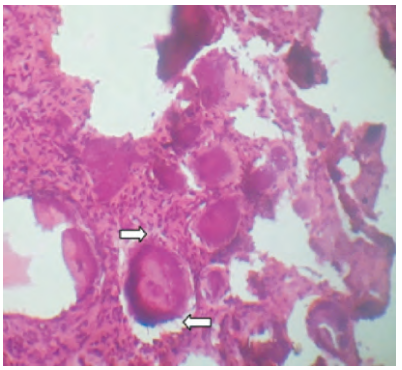

Fig. 3: High power photomicrograph showing the brush border of the ossicles(arrows)(400X).

trabeculae are often seen in psammomatoid lesions, especially towards the periphery.[11] Cystic degeneration and aneurysmal bone cyst like formation is commonly reported.[13]

The clinical differential diagnoses include aneurysmal bone cyst, central giant cell granuloma, osteogenic sarcoma, osteoblastoma, odontogenic cysts and tumors.

Histologic differential diagnoses include focal cemento osseous dysplasia (FCOD), fibrous dysplasia (FD), psamomatous meningioma and central cementifying fibroma.

FCOD is a non-neoplastic process that occurs around the roots of mandibular teeth and fails to expand bone. Instead OF is a potentially aggressive lesion that causes cortical expansion and often causes divergence of adjacent teeth. Both lesions may show similar histological features with trabecular bone and cementifying areas.

In contrast to FD, JPOF shows osteoclasts and osteoblasts characteristically lining the trabeculae, which are composed of entrapped lamellar bone.

Psammmatous meningioma is histologically indistinguishable from JPOF. However both can be distinguished by immunohistochemistry. Epithelial membrane antigen (EMA) is frequently negative in JPOF however few cases have reported positivity. JPOF is negative for S100, CD34 and cytokeratins. Thus the diagnosis should be based on morphological, clinical and radiographic findings. [4,14,15]

Central cementifying fibroma consists of fibrous stroma with dense cellularity and small spherical basophilic calcifications (cementicles).

Complete excision of the lesion is the treatment of choice and it can be curative. Radiotherapy is generally contraindicated

because of the risk of malignant transformation and the potentially harmful late effects in children.[16]

Conclusion

JPOF is an aggressive neoplasm that is most commonly encountered in children, however it can rarely occur in elderly individuals and seen mainly as intrabony mass. In the present case it was mimicking as a soft tissue growth. Hence it becomes important to diagnose such cases accurately and treat accordingly. Histologic criteria for the accurate diagnosis remain controversial since many other lesions share the similar histologic features. Diagnosis should be based on morphological, clinical, radiographic and histologic findings. Complete resection is advised since partial removal of tumor is associated with the risk of recurrences.

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Twin Block Appliance Therapy in the Management of Class II Patients: A Clinical Report

Bhullar MK[1], Uppal AS[2], Kochhar GK[3], Uppal BS[4]

Abstract:

Dental malocclusion can be due to underlying skeletal discrepancies or dentoalveolar discrepancies. When the malocclusions are secondary to abnormal skeletal development the approach in treating such malocclusions changes from being an orthodontic one. Such malocclusions in growing patients can be treated with functional appliance therapy or orthopaedic appliance therapy. The decision whether to treat the patient with functional appliance or an orthopaedic appliance depends upon the cause of malocclusion. Functional appliances are mostly used in cases where the malocclusion is due to restricted growth of the jaws. In case of class II malocclusion it can be used to facilitate the growth of mandible and help achieve a balance in maxillomandibular relations.the functional appliance therapy aims to improve the functional relationship of dentofacial structures by eliminating unfavourable developmental factors and improving the muscle environment. The aim of this paper is to provide an insight into the mechanism of action, design and treatment steps of the most commonly used functional appliance, the twin block appliance.

Keywords: Class II malocclusion, Functional Appliance, Twin Block Appliance.

Introduction

Functional orthopedics evolved based on the fundamental principle that function modifies anatomy.[1] The challenge of functional therapy is to maximize the genetic potential of growth and guide the growing face and developing dentition towards a pattern of optimal development. Functional appliance therapy aims to improve the functional relationship of dentofacial structures by eliminating unfavourable developmental factors and improving the muscle environment enveloping the developing occlusion through alteration of the position of the teeth and supporting tissues; A new functional behaviour pattern or engram is established that can support a new position of equilibrium. Functional appliances harness the natural forces of the orofacial musculature and transmit these to teeth and alveolar bone through the medium of the appliance. These appliances modify growth to intercept and treat jaw discrepancies.[2] These appliances bring about orthopaedic, dentoalveolar and muscular changes.

Twin Block Appliance

The twin block appliance was developed by Clark in 1977. Twin block is a two piece appliance designed for full time wear. Twin blocks are occlusal inclined planes that

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effectively modify and achieve rapid functional correction of malocclusion. Upper and lower bite blocks interlock at seventy degrees and take advantage of functional forces applied to the dentition. Occlusal inclined planes give greater freedom of movement in anterior and lateral excursion and cause less interference with normal function. Occlusal forces transmitted through the dentition provide constant proprioceptive stimuli to influence the growth rate and adaptation of the trabecular structure of the supporting bone.[3]

Bite Registration: In growing children, with overjet as large as 10mm, the bite may be activated edge to edge on the incisors with a 2mm interincisal clearance. In vertical dimension, 2mm of interincisal clearance is equal to approximately 5 or 6 mm of clearance in the first premolar region.[3] The bite of the patient is taken with the help of exactobite registration gauge. Banks P Wright J, O'Brien K[4] showed that incremental bite advancement produced no advantages over maximum advancement.

Occlusal inclined planes: the position and angulation of the occlusal inclined planes are crucial to efficiency in correcting arch relationships. The inclined planes are angled at 70 degrees to the occlusal planes and this angulations effective in guiding the mandible into occlusion in a forward position.

Lower inclined plane: the position of the inclined plane is determined by the lower block and is important in the treatment of deep overbite. The inclined plane must be clear of the mesial surface contact of the lower first molar. Thus, the inclined plane on the lower bite block is angled from the mesial surface of the second premolar or second deciduous molar.

Upper inclined plane: it is angled from the mesial of the upper second premolar to the mesial of the upper first molar. The flat occlusal portion then passes distally over the remaining upper posterior teeth in a wedge shape, reducing in thickness as it extends distally.

Treatment stages:

The treatment is done in two stages:

Active phase: twin block uses posterior inclined planes to adjust the vertical dimension and correct the malocclusion by functional mandibular protrusion.

Support phase: An anterior inclined plane is used to retain the corrected incisor relationship until the buccal segment occlusion is fully established.

Case Report

A 15 years female patient reported to the OPD with the chief complaint of forwardly placed teeth (Fig. 1,4). The patient presented with Angles Class II malocclusion (Fig.2,3). Patient had an ANB angle of 6 degree, saddle angle134 degrees, and FMA 12 degrees. Patients showed stage 5 CVMI status. Patient was treated with standard Twin Block appliance with full time wear. The molar relation changed to Class I after five months of appliance wear (Fig. 6,7). The twin block appliance therapy also resulted in the correction of overjet and overbite (Fig. 5,8). There was improvement in patients profile (Fig 9,10). This was followed by fixed orthodontic therapy to align upper and lower arches and establish inter-arch relations with reverse inclined plane to preserve the changes achieved with twin block. This shows that twin block appliance can be used successfully in late functional appliance treatment cases where other removable functional appliances are sometimes not that effective.

Fig. 1: Pre-treatment Frontal View showing increased overbite

Fig. 2: Pre-treatment Right Profile View showing Class II molar and canine relation

Fig. 3 : Pre-treatment Left Profile View showing Class II molar and canine relation

Fig. 4 : Pre-treatment Overjet View showing increased overjet

Fig. 5 : Post-treatment Frontal View showing corrected overbite

Fig. 6 : Post-treatment Right Profile View showing Class I molar relation

Fig. 7 : Post-treatment Left Profile View showing Class I molar relation

Fig. 8 : Post-treatment Overjet View showing corrected overjet

Fig. 9 : Pre-treatment Extra oral Profile View

Fig. 10 : Post-treatment Extra oral Profile View

Discussion

This case showed favourable changes with twin block appliance in late functional appliance treatment in a maturing patient. Lund DI, Sandler J[5] showed corrective changes with twin block appliance therapy resulting in reduction in overjet and forward movement of mandible. Mills CM, McCulloch KJ[6] evaluated the twin block appliance cases cephalometrically and showed favourable changes in the magnitude and direction of skeletal growth. Mills CM, McCulloch KJ[7] further established that the changes achieved during the active phase of twin block therapy are still retained post treatment when the patient matures into the permanent dentition. Cozza P, Baccetti T, Franchi L et al[8] assessed the scientific evidence on the efficiency of functional appliances in enhancing mandibular growth in class II subjects. They showed that Herbst appliance showed highest coefficient of efficiency followed by Twin Block appliance. O'Brien K, Wright J, Conboy F et al[9] evaluated the effectiveness of Twin Block appliance therapy with the timing of treatment and found that treatment with Twin Block appliance in children 8-10 years of age produce more of dentoalveolar changes. Baccetti T, Franchi L, Toth LR, McNamara JA[10] showed that optimal timing for twin block therapy of class II disharmony is during or slightly after the onset of pubertal peak in growth velocity.

Conclusion

The diagnosis and case selection are critical for successful treatment. The twin block appliance selected for a particular patient should be adapted to the type of growth pattern, direction and amount of growth required. These appliances are definitely one of the most powerful weapons in the arsenal of the orthodontist that can accomplish things not possible without such appliances.

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A Novel Technique to Fabricate a Customized Jig using Light Cured Resin Tray Material

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Abstract :

One of the most important determinants of the fit of an implant restoration is the accuracy of the impression. An accurate implant level impression would entail the correct three-dimensional recording of the implant position within the arch to the adjacent teeth and soft tissues and the transfer of this relation to the working cast. The complexity of the impression procedure is increased in cases involving multiple implants. Numerous techniques of impression making for multiple implants have been documented in the literature.

This paper is a clinical report which describes a quick, simple and cost effective technique of splinting the implant impression copings to help transfer the coping accurately in the impression procedure for a case involving multiple implants.

Keywords : Customized Jig, Splinting, Implant Impression Copings.

Introduction

An accurate reproduction of the implant positions onto the master cast is essential for a passive and accurate fit of the superstructure. Factors such as the impression technique, design of the impression copings, technique of pouring of the impression, and properties of the impression material, may contribute to discrepancies and thus misfit of the framework. Misfit of the restoration leads to unequal distribution of forces over some of the implants, which would manifest as crestal bone loss, screw loosening, fracture of the abutment screw, prosthesis or the fixture itself. [1-4]

Two types of impression techniques are commonly used for impressions of multiple implant situations – open tray (direct, pick-up) and closed tray (indirect, transfer) techniques. However, for cases involving multiple implants, the open tray technique is preferred.[5] The open tray technique allows the implants to be splinted and picked up with the impression, minimizing the error induced by repositioning of components in the closed tray technique.

Many techniques have been documented in the literature that involve splinting of the implant impression copings to help transfer the copings accurately into the impression.

Materials like dental floss,[6,7] orthodontic wire,[6] impression plaster,[4] autopolymerising [4,6,8] resins have been used in

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the past, all having their set of advantages and shortcomings.[4,10]

Lee in his review article evaluated different parameters like splinting of impression copings, types of impression techniques, impression material, coping modifications and the angulation of implants.[5] He concluded that more studies reported greater accuracy with the splint technique than the non-splint technique for multiple implants (more than 4). Studies reported higher accuracy with pick-up impression technique and that Vinyl Polysiloxane and Polyether were the recommended materials for implant impressions. He also mentioned other factors like different connection levels (implant and abutment levels), different implant trays, implant depth and time delay for stone pouring play a role in the accuracy of the impression. However, studies done on these factors were inconclusive due to their number.[5,11]

The conventional method used includes autopolymerising resin to splint the open tray impression copings by adapting the resin around the copings within the mouth. The resin bars connecting the copings are then sectioned to release stresses that were induced due to the polymerization shrinkage. These segments are then rejoined with additional resin.[5]

The drawback with this technique is the increased amount of chair side time required to accurately place the resin around the implants carefully avoiding any or minimal contact with the oral mucosa.

This clinical tip demonstrates a simple technique of making a jig using light cured acrylic resin tray material that simplifies the impression technique, reduces chair side time, splints the impression copings and helps in transferring their relation accurately into the impression.

Case Report

A 70 year old male patient was referred by his general practitioner to Department of Prosthodontics and Implantology, M.A.Rangoonwala Dental College and Hospital, for specialist treatment regarding his prosthodontic rehabilitation. The patient reported that he had been provided with a set of complete denture, which he described as 'loose'. This was patient's second set of complete denture since being rendered edentulous for five years and he had found both unsatisfactory. Upon oral examination the patient was found to be completely edentulous with 4 implants along with gingival formers placed in the mandible in the region of 33, 35, 43, 45 (Fig. 1) The implants were 3.7mm in diameter and varied between 10 and 13mm in length. (Uniti implants, Equinox Medical Technology, The Netherlands). Following discussion with the patient a treatment plan of a bar supported overdenture for the patient was considered.

Fig. 1 : Pre treatment presentation.

Procedure

1. The gingival formers were removed and open tray impression copings (Uniti, Equinox Medical Technology, The

Netherlands) were placed onto the implants and an alginate impression (Vignette, Dentsply, U.S.A) was made (Fig.2). The negative replica of the impression copings in the retrieved impression was poured in self-cure acrylic resin (Acryln `R`, Asian Acrylates, India) and the rest of the cast was poured in dental stone (Fig. 3) (Kalabhai Karson Pvt. Ltd., India) .

Fig. 2 : Primary impression

Fig. 3 : Cast with impression coping relicas poured in self cure acrylic

2. Spacer such as a thin layer of wax was added around the acrylic impression copings and on the crest of the ridge of the mandibular cast. This creates adequate space for easy retrieval of the jig and also blocks out undercuts present on the re-produced impression copings.
3. A custom tray was fabricated using tray compound material and upon retrieval the wax was boiled out. Following which the custom tray was trimmed 2mm short of the sulcus.
4. The open tray impression copings were screwed onto the implants after removing the healing abutments. The light cure resin (Profibase-VOCO, Germany) was adapted around the impression posts and cured intraorally using a halogen lamp (3M Curing light 2500, 3M ESPE, USA) for 10 seconds and minor adjustments were made (Fig. 4). Care was taken to avoid any contact of the jig with the soft tissue.

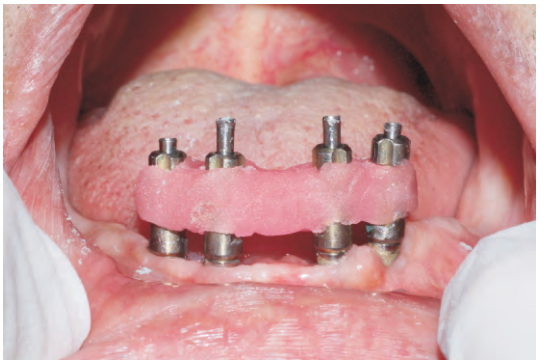

Fig. 4 : Splinting of the impression copings with light cured resin tray material in situ.

5. The custom tray was adjusted intra orally and the fitting was verified. The custom tray was coated with tray adhesive (3M ESPE) and left to dry for 3 minutes prior to impression making. Single step border molding was done using Polyivnylsiloxane putty (Express, 3M ESPE, Seoul Korea). Thereafter, Polyvinylsiloxane monophase impression material (3M ESPE, Seoul Korea) impression material was used for the impression. The impression material was first syringed around the impression copings using an impression syringe by the clinician and the tray loaded with the same material was seated onto the

mandibular arch. Care was taken to ensure that the impression coping screws were visible during impression taking to allow access to them once impression material was set. Once all the impression copings were unscrewed, the impression was removed from the mouth (Fig. 5).

Fig. 5 : Final impression

Discussion

The technique described here is a simple yet accurate technique for making an open tray impression for multiple implants. The light cured tray material used here is easily adaptable to the impression posts in the mouth and can be easily cured with a simple halogen light. It results in a rigid splinting of the impression copings which prevent any movements between them during the impression procedure and subsequently during connection of laboratory analogs. It eliminates the need of cumbersome procedures of using dental floss and pattern resin within the oral cavity for splinting of impression copings.

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Retrieval of Separated Instruments from Apical Third of Root Canal of Maxillary Central Incisor Using Masserann Technique – A Case Report

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Abstract:

One of the most frequent endodontic mishaps is the separation of the endodontic instrument in the root canal. It often results from incorrect use or overuse. A fractured instrument inside a root canal can affect the outcome of an endodontic treatment as it interferes with the proper debridement and shaping procedures as well as with irrigation of the canal portion apical to the level of obstruction. One of the orthograde approaches recommended to manage a separated instrument is its removal from the root canal. Masserann Kit is one such device for orthograde removal of intracanal metallic obstructions. A Masserann kit is a hollow tube device specially designed for the removal of intracanal metallic objects from the root canal. This article presents a case report of successful retrieval of separated instrument from the apical 3rd of root canal of right maxillary central incisor using Masserann kit.

Keywords : Masserann Technique, Separated Instrument, Endontic Mishap.

Introduction

Fracture of endodontic instruments in a root canal is an unfortunate occurrence that may hinder the root canal procedure & negatively impact the endodontic treatment outcome[1]. Fracture instrument itself may not cause treatment failure. However, fragments present in the root canal can hinder proper preparation of root canal space[2]. The overall endodontic prognosis following instrument separation is likely to depend on the stage and degree of canal preparation and disinfection at the time of instrument fracture, the main prognostic factor in such cases is reported to be the existence or nonexistence of a preoperative periradicular pathosis.[1] Masserann kit is one of many devices that have been proposed for fractured fragment removal.[3]

A Masserann kit is a hollow tube device specially designed for the removal of intracanal metallic obstruction with a reported success rate of 55%. It consists of a series of trepan burs that are used to prepare a space around the most coronal part of an obstructing object and two sizes (1.2 and 1.5 mm in outer diameter) of tubular extractors, which are inserted into the created space and mechanically grip the object. It consists of a series of trepan burs that are used to prepare a space around the most coronal part of an obstructing object and two sizes (1.2 and 1.5 mm in outer diameter) of tubular extractors, which are inserted into the created space and

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mechanically grip the object.

This case report is about the successful retrieval of a separated file wedged in the apical 3rd root canal dentin of a maxillary right central incisor using Masserann technique.

Case Report

A 35-year-old male patient was referred to the Department of Conservative Dentistry and Endodontics with the complaint of pain in right upper front tooth region for past two months and also he gave the history of root canal treatment done of the same tooth. The patient had no significant medical history. Clinical examination revealed that the tooth was slightly sensitive to percussion. The periodontal probing was within normal limits.

A diagnostic radiograph was made, which revealed the presence of a separated instrument in apical third of canal (Fig.1).

Fig. 1 : Preoperative IOPA X-Ray

First, the length of the working space to the coronal end of the fragment was determined Radicular access to the coronal end of the fragment was straightened by funnelling the root canal with sequential use of Gates –Glidden drills.

The pre-selected trephan with a diameter of 1.2mm was latched into contra angle hand piece and run in an anticlockwise direction to create a trough around the coronal end of the fragment by ditching the dentin. The centering of the trephan over the fragment was ensured radiographically.

During troughing, canal was simultaneously irrigated with normal saline. This decreased the heat generated within the root canal and therefore lowered the damaging effects on periodontal tissues.

The extractor tube with a diameter of 1.2mm was slid into the trough to sleeve the fragment and the plunger rod was turned manually, inside the extractor tube in a clockwise direction to grip the fragment against its wall. It took many pains taking attempts of sleeving and gripping the fragment and in one such attempt, when the tightest grip was felt by the tactile sense, the entire assembly was rotated in an anticlockwise direction to unscrew the fragment from the dentin and withdrawn to see the fragment retrieved (Fig. 2). Canal free of the fragment was evident radiographically (Fig. 3).

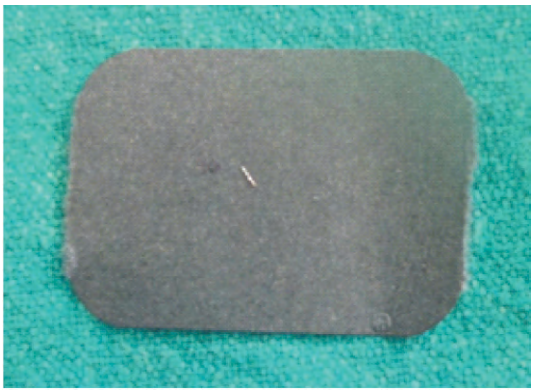

Fig. 2 : File retrieved

Fig. 3 : IOPA showing file retrieved

The time taken to retrieve the fragment was approximately 1½ hour. In the subsequent visits, canal cleaning and shaping was completed and obturation was carried out.(Fig. 4).

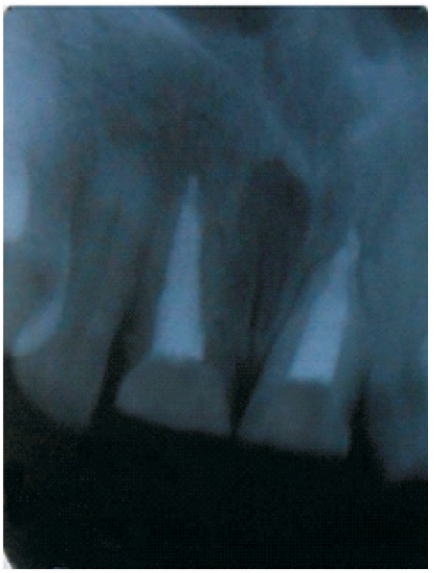

Fig. 4 : Obturation after file retrieval

The access opening was restored permanently with composite restoration followed by crown preparation and cementation of porcelain fused to metal crown. (Fig. 5)

Fig. 5 : Porcelain fused to metal crown cemented

In the follow up visit, the tooth was found asymptomatic without any radiographic changes.

Discussion

Separated instruments in the canal usually prevents access to the apex, impedes thorough cleaning and shaping of the root canal, thus may compromise the outcome of retreatment[3-5]. In such a case, it is said that the prognosis depends on the condition of the root canal, canal anatomy, periapical status, amount of cleaning and shaping at the time of separation, the level of separation in the canal and type of fractured instrument[6].

Recommended management of a fractured instrument involves an orthograde or a surgical approach. Orthograde approach consists of bypassing the instrument and removing the instrument. Retrieval may lead to successful non-surgical treatment or retreatment, which is the more conservative approach[4]. The orthograde retrieval depends on cross sectional diameter, length, curvature, dentin thickness and morphology of the root, length, location and amount of binding or impaction of the fragment in the canal.

Masserann Kit has been used for over 30 years as a device for removing broken instruments and a success rate of 73% had been reported

regarding its use in anterior teeth. However, it has limited application in posterior teeth, teeth with thin roots, curved roots or more apically, as the use of relatively large and rigid trephans lead to removal of considerable amount of root dentin and weakening of the teeth or risk of perforation.

In this case, the separated file was tightly bound in the straight, apical 3rd of the maxillary central incisor. Masserann technique was employed. Obtaining of straight line access to the fragment facilitated centering of the trephan over the fragment. This ensured circumferential freeing of the coronal end of the fragment with safe cutting of the peripheral dentin around the fragment. This promoted tight gripping of the fragment and its retrieval along the long axis of the root, thus allowing regular retreatment[5].

Conclusion

Prevention of the instrument separation is the best strategy. In case of separation, safe retrieval or bypassing should be carried out. Among the retrieval methods, Masserann technique is risky and time consuming, yet by tactful applicability and within its clinical limitations, a separated file was retrieved from maxillary central incisor.

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Orofacial Dystonic Movements mimicking as Recurrent Temporomandibular Joint Dislocation – A Case Report

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Abstract:

Oromandibular dystonia is a type of focal dystonia that is extremely rare in its incidence. It accounts for various clinical presentations like abnormal perioral, tongue to oropharyngeal movements. These muscular movements are short and sustained resulting in uncontrolled mouth opening or closure, jaw deviation and facial expressions. This disorder is usually missed by the clinician and is being misunderstood as recurrent temporomandibular joint dislocation. One of this rare case reported to our department with the same chief complaint of recurrent temporomandibular joint dislocation and was earlier treated with the same intervention as being followed for temporomandibular joint disorders. Later a thorough clinical history, radiographic findings, neurosurgical consultation and family history of the patient helped us to make a conclusive finding of it as an oromandibular dystonia.

Keywords: Dystonia, Oromandibular Dystonia, Temporomandibular Joint Disorders.

Introduction

Oromandibular dystonia (OMD) was first being reported by a French neurologist Henry Meigh in 1910[1] OMD is a type of focal dystonia which leads to the altered or sustained movements of perioral muscles, tongue and pharyngeal muscles. In these musles involuntary and repetitive movements results in altered facial expressions, closure or opening of jaw, deviation of jaw and leading to poor social acceptance of the patient.[2] Dystonia can also be classified according to its etiology as idiopathic and inherited or familiar. OMD accounts for 6.9/100000 persons in United States. The disease onset is between 30 to 70 years of age and 2 times it is more common in females.[1] OMD can be further classified as jaw opening type, jaw closing type, lateral movement type, out of which jaw opening type is most common type.[3] OMD have varied etiologies ranging from long term use of neuroleptic drugs, organic brain lesions and any kind of dental maneuver which could lead to periphery injury.[2] Our case was of OMD with altered facial expressions and involuntary opening of jaw. The patient came to us with a complaint of recurrent jaw dislocation and was with the help of history, diagnostic modalities and neurosurgeons consultation diagnosed as oromandibular dystonia.

Case Report

A 60 years old male patient reported to our department of oral and maxillofacial surgery

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with a chief complaint that he is not able to close his mouth (Fig. 1). Before coming to our department he visited a dentist who advised him barrel bandage and prescribed him analgesics for symptomatic relief. Patient was then referred to our department and here clinically perioral altered movements were noticed with inability to close his mouth and abnormal speech and lisping was noticed. These episodes were not continuous and used to relieve after few minutes. In the family history it revealed that patient's father also had an undiagnosed disease of neuromuscular disorder, as could be Parkinson's disease if clinical symptoms are to be correlated. A routine panoramic radiograph and TMJ open and close view was done and it showed normal articular eminence and condylar morphology (Fig. 2a and 2b). So it was provisionally diagnosed as a case of TMJ dislocation with a differential diagnosis of oromandibular dystonia. CT scan and MRI brain were done for the patient which revealed no soft tissue or hard tissue abnormality and MRI showed no brain lesion or abnormality (Fig. 3a and 3b). Correlating the clinical features, familiar history and radiographic findings we came to a definitive diagnosis of oromandibular/perioral dystonia. Arch bars were applied and elastics were given to the patient. Tab. Alprazolam 0.25 mg was prescribed once in a day at night. Patient again reported to our department with broken elastics but had some improvement in his general clinical features. This time heavy elastics were put and patient was recalled after every 3 days. A neurophysician was consulted and he also diagnosed it as a case of perioral dystonia. Neurophysician prescribed him Tab. Trihexyphenidryl Hydrochloride 4mg TDS, Tab. Clonazepam 0.5 mg TDS, Tab. Haloperidol 1.5 mg BD and Tab. Tetrabenazine 25 mg BD for 10 days (Fig 4).

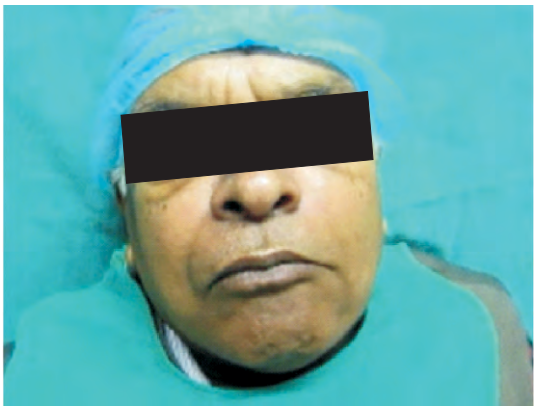

Fig. 1 : Pre operative photos showing dyskinetic movement of lip and jaws.

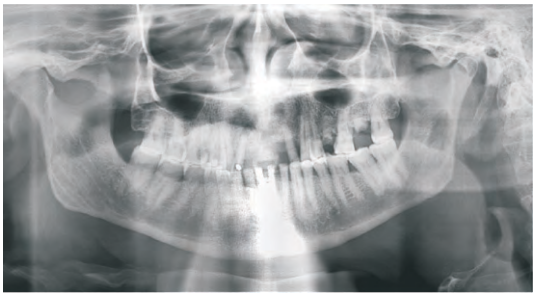

Fig. 2 a : Pre-op Orthopantomogram showing no sign of B/L intra articular changes.

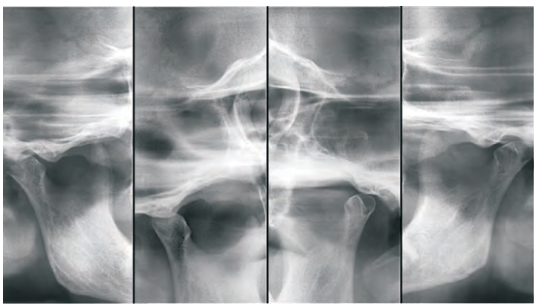

Fig. 2 b : TMJ open and closed view showing no sign of dislocation.

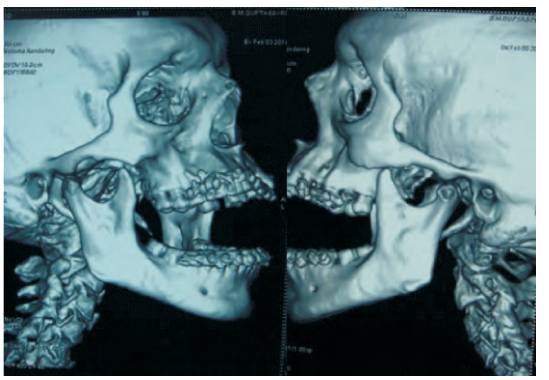

Fig. 3 a : Pre-op 3-D CT revealing no sign of condylar pathology and articular eminence in normal limit.

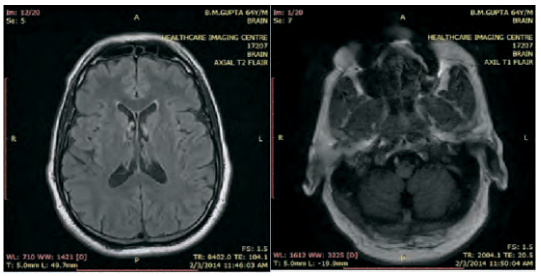

Fig. 3 b : MRI Brain- no pathology detected in basal ganglion.

Fig. 4 : Post Operative photo – improved condition.

Discussion and Conclusion

Oromandibular dystonia is a rare condition and is often misdiagnosed as bruxism, spontaneous temporomandibular disorders, hemimasticatory or hemifacial spasm and any psychological expression.[1] Meige's syndrome a rare type of focal dystonia can also be present which have clinical symptoms of bilaterally involuntary activity in the facial and mandibular muscles in combination with blepharospasm.[4] The correct early diagnosis of this disease is required for the early relief of the patient. The other common possibilities like temporomandibular joint disorders have to be ruled out clinically and with the aid of radiographs. In our case the panoramic radiograph showed that the condylar head and articular eminence were normal and showed no abnormalities. Further CT scan was advised and it revealed no hard or soft tissue abnormality in the peri - articular temporomandibular joint region. After the evaluation of these findings it was clearly diagnosed as a case of oromandibular dystonia. For any central etiology MRI brain was advised to the patient which was also normal and thus a neurophysician consultation was taken. Neurophysician finally also declared it that it is a case of OMD pertaining as temporomandibular joint dislocation. EMG studies were not done for the patient as such initial treatment protocol followed by us relieved the patient. The pharmacological treatment was done for the patient which included the use of anticholinergics and benzodiazepines that is usually the first line of treatment for OMD.[3] In the reported literature it has been said that fabrication of prosthesis had also temporarily relieved the symptoms but no long term follow up studies are present which proves it to be an efficient method.[5] Botulinum toxin had also been proven to be a superior treatment regime.[4] After these medicinal treatments are not being able to give effective results so surgical treatment is being opted. Thus an effective treatment planning lead to the proper pharmacological treatment of the patient as such long term follow up of the patient is to be done to check the efficacy of the pharmacological treatment.

However besides the treatment protocol which could be followed for the patient with OMD the thing which is of prime importance is the correct and early diagnosis of the disease which we achieved in our present case.

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Foreign Material in Root Canals: A Series of Two Cases

Kaur T[1], Kochhar GK[2], Bansal B[3], Chachra S[4]

Abstract: Self injurious behavior is a deliberate alteration. Children often have a habit of inserting everything that comes in their hand. This case report portrays self introduced unusual foreign body and its retrieval from the root canals of the two primary maxillary anterior teeth.

Keywords: Foreign body, Pen nib, Pencil lead, Self injurious behavior.

Introduction

Foreign bodies may be deposited in the oral cavity either by traumatic injury or iatrogenically. This condition is more common in children as it is a well known fact that children more often tend place foreign objects in the mouth. Sometimes the foreign objects get stuck in the root canals of the teeth which is not very often observed by parents also. These foreign objects may cause painful conditions by acting as a potential source of infection.

The occurrence of foreign bodies such as metal screws[1], staple pins[2], darning needles[3], pencil leads[4], beads[1] and tooth picks lodged in the exposed pulp chambers of carious or traumatically injured deciduous and permanent teeth has been reported.[5]

Diagnosis of these cases is often made accidentally on the radiographic examination or may be associated with pain, swelling and recurrent abscesses.

Size, location and the type of the foreign object can only be confirmed by clinical and radiographic examinations.[5] Retrieval of foreign objects in the root canal is a challenging part in pediatric practice.[6]

This paper discusses the presence of unusual foreign body- a pen nib, in the root canal of the primary central incisor and its management.

Case Report

Case 1

A 4 year old male child reported to the Out Patient Department of Pedodontics and Preventive Dentistry, Swami Devi Dyal Hospital and Dental College, Barwala, Panchkula with the chief complaint of blackish discolouration and occasional pain in the upper front teeth. Pain was spontaneous, dull aching, intermittent and localised with no associated aggravating and relieving factors.

Clinical examination revealed grossly decayed primary maxillary central incisor (61). It was associated with a sinus on the labial mucosa over the tooth. (Fig.1)

Intra oral periapical radiograph revealed periapical radiolucency associated with 61 along with an unusual radio-opaque linear foreign body which appeared like a post in the root canal. (Fig. 2)

There was no history of previous dental

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treatment. On further exploration the parents confirmed that the patient had the habit of inserting foreign objects in the tooth to remove the food debris. Diagnosis of irreversible pulpitis associated with #61 along with foreign body lodgement was made.

Fig. 1: Intra-oral photograph showing the foreign object in the canal and sinus opening.

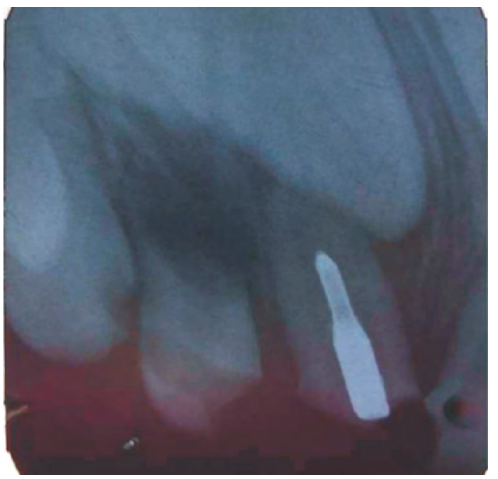

Fig. 2: Preoperative radiograph showing radiopacity in the root canal of 61 likely a foreign body.

Patient was advised to undergo endodontic therapy following the retrieval of foreign object. The food debris and the necrotic contents were removed from the pulp chamber. The foreign body was visible but it was inaccessible for removal. The object was engaged with the twizzer and pulled coronally. Pen nib approximately 1 cm long was retrieved. (Fig. 3) Canal was cleaned; dried and closed dressing was given. In the subsequent visit canal was obturated with Endoflas paste and pulpectomy with #51 was also done. (Fig. 4)

Fig. 3 : Pen nib retrieved from the canal.

Fig. 4: Post-operative radiograph with obturated 51 and 61.

Patient was kept under observation and recalled after at an interval of 3, 6 and 12 months until subsequent healing occurred.

Case 2

A 4 year old male child with the chief complaint of pain in the upper front teeth reported to the Out Patient Department of Pedodontics and Preventive Dentistry, Swami Devi Dyal Hospital and Dental College, Barwala, Panchkula. Pain started few days

back which was localized, spontaneous, dull aching, and intermittent in nature. Once started pain lasted for 5-7minutes and relieved by itself. No postural variations were present. Clinical examination revealed complicated Class IX fracture with a large carious cavity of primary maxillary central incisor #61 (Fig. 5).

Fig. 5 : Intra-oral photograph showing the foreign object in the canal and fractured inscisors.

The tooth was associated with sinus on the labial mucosa. Intra oral periapical radiograph revealed large periapical radiolucency in relation to #61. An atypical radio-opaque object appearing like a silver point was observed in the root canal of #61. (Fig. 6)

Fig. 6: Preoperative radiograph showing radiopacity in the root canal of 61 likely a foreign body.

History revealed that the patient had the habit of introducing everything into the mouth. The case was diagnosed as irreversible pulpitis with respect to #61 along with foreign body lodgement. Endodontic therapy was planned for #61. Following caries removal access was obtained and subsequently the food debris and necrotic contents were removed. Foreign body was visible but not approachable. The foreign body was engaged in the twizzer and pulled coronally. 0.8mm long pencil lead was retrieved (Fig. 7).

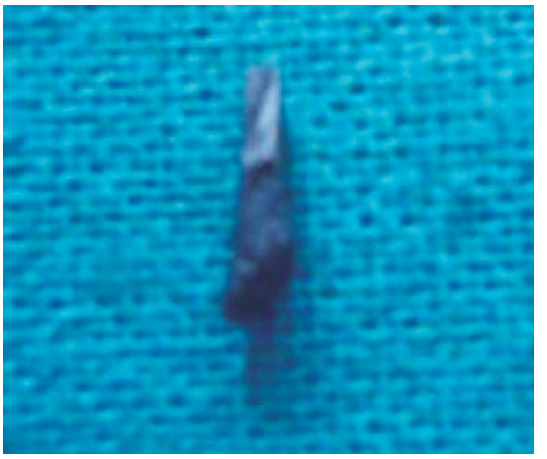

Fig. 7: Pencil lead retrieved from the canal of 61

Canal was cleaned and dried and closed dressing was given. In the successive appointment obturation was done with Endoflas paste. (Fig. 8) Patient was kept under regular observation.

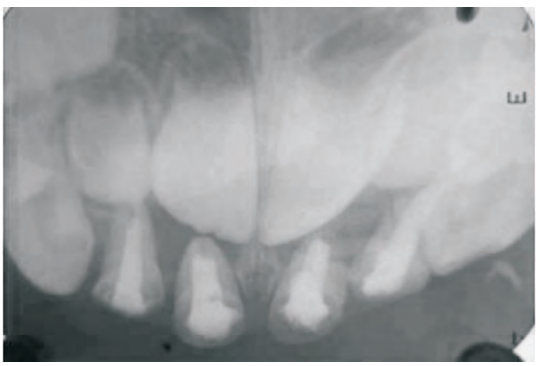

Fig. 8: Post-operative radiograph with obturated 51, 52, 61, and 62.

Discussion

Self-inflicted oral injuries can be premediated or accidental or can result from an uncommon habit.[1]

Foreign bodies discovered from the root canal have varied from radiolucent objects like wooden tooth pick, plastic chopstick, and fingernail to radio-opaque materials like staple pins, sewing needles, pencil lead etc. children often tend to insert foreign objects in their mouth, therefore it is more common to find these objects in children's teeth.[7] Impaction of foreign bodies in the teeth can cause pain, bleeding and infection.[8]

These foreign objects may act as a potent source of infection and painful conditions. To localize a radio-opaque object various radiographic methods such as Parallax views, Vertex Occlusal views, Triangulation techniques, Stereo Radiography and Tomography were suggested McAuliffe.[5] Moreover, Radiovisiography, 3D CAT scans can also help in the localization of the exact position of these foreign objects.[9]

Method of retrieval of the object from the tooth canal depends on the position where the foreign object is present. It is difficult when it is lodged in the periapical region. Prabhakar suggested the various orthograde techniques which can avoid the need for surgery or intentional reimplantation for successful recovery of a foreign object located in the apical portion of an immature root canal. Whereas, Shrivastav and Vineeta have proposed periapical surgery or intentional reimplantation to remove such foreign objects.[9]

Nadkarni reported a case of 12 years old child who presented with afractures sewing needle in the palatal root canal of the maxillary first molar. The fractured needle was removed with a tweezers. So removal of the foreign object was carried out causing minimal damage to the root structure. [10]

In our case the pen nib was visible but the grip could not be made for removal so the removal was done using a tweezer with narrow beak. Stegiltz forceps have also been described for the removal of silver points from the root canal.[5] Different methods used for the retrieval of foreign bodies from root canal include Masserann kit and modified Castroveijo needle holders. Some researchers recommended the use of the operational microscope with ultrasonic filing for the retrieval of metallic objects. McCullock suggested the removal of small amount of tooth structure to get the entrapped foreign object free.[7]

Conclusion

Though the presence of foreign objects retrieved from the root canal and pulp chambers of the permanent teeth have been reported, the presence of such objects in the deciduous teeth is an uncommon situation. Timely diagnosis and management of the foreign object embedded in the tooth should be done to avoid further complications.

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Overlay Removable Partial Denture - Case Report

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Abstract:

Tooth wear in elderly individuals may occur due to physiologic and pathologic processes. Consequently, it is possible to observe loss of the occlusal vertical dimension (OVD), occlusal instability and absence of an effective anterior guide, due to excessive dental wear, damaging function and aesthetics. Overlay removable partial dentures are presented in this case report as economic alternatives to extensive full mouth rehabilitation fixed prosthodontics. Apart from the economy of treatment the partial overlay dentures also offer reversibility as an advantage when compared to full mouth rehabilitation with fixed bridge work. This article reports a case of severe occlusal wear managed with maxillary and mandibular cast partial overlay dentures.

Keywords: Overlay Partial Dentures (ORPDS), tooth wear, Vertical dimension, Occlusal splint.

Key Message: *The overlay denture is a simple, inexpensive and minimally invasive form of treatment modality offering the advantages of preservation of tooth structure, hygiene, shorter and lesser number of clinical appointments, all together translating into an economically viable alternative option for the elderly.*

Introduction

Prolonged tooth retention by the aging population increases the likelihood that clinicians may treat patients with advanced levels of wear. Tooth wear occurs as a natural physiological process; the average wear rates on occlusal contact areas were estimated to be 29 mm per year for molars and 15 mm per year for premolars.[1] Consequently, it is possible to observe loss of the occlusal vertical dimension (OVD), occlusal instability and absence of an effective anterior guide, due to excessive dental wear, damaging function and aesthetics. The rate of wear may be greater depending on factors such as: age, gender (the rate of tooth wear varies between men and women), occlusal conditions, parafunction, gastrointestinal disturbances, excessive intake of citrus fruits or beverages with a low pH, environmental and salivary factors, congenital anomalies such as amelogenesis imperfecta and dentinogenesis imperfecta.[2] In situations where the tooth wear is excessive, evaluation of the vertical dimension of occlusion (VDO) is necessary. In some cases, the VDO is maintained by means of some compensatory mechanisms (continuous tooth eruption and alveolar bone growth). Treatment options obviously vary depending on the extent and nature of tooth wear.

This article reports the management of tooth wear in an elderly female by means of cast metal partial overlay dentures.

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Case Report

A 65yr old lady reported difficulty in chewing and speaking due to worn out teeth and a few missing teeth. She also complained of occasional cheek biting. Her general health was good and there was no significant medical history. She was not aware of any clenching/grinding habit. She never consumed soft drinks or carbonated beverages nor did she have any symptoms of reflux.

On examination, the maxillary and mandibular arches were partially edentulous with teeth#1,2 missing in the maxillary arch and tooth# 18 missing in the mandibular arch. Generalised attrition was evident from attrition facets on all teeth (Fig. 1,2). Most of her teeth had occlusal restorations showing wear. She presented an anterior deep bite which compounded the attrition of anteriors, wearing out the lingual surfaces of maxillary anteriors.

Fig. 1: Generalised attrition

Fig. 2: Severe attrition in mandibular arch

During TMJ examination it was observed that her jaw deviated to the left upon closure and the midline was shifted by 3mm. There was no click in the TMJ and masticatory muscle palpation elicited no pain. The vertical dimension at rest (VDR) and at occlusion (VDO) was assessed using facial measurements and phonetics. The difference between them was 5mm. She was diagnosed as a case of occlusal wear with non-compensated tooth surface loss (TSL). Full mouth rehabilitation with fixed restorations was indicated here . Upon the patient's request for an economical alternative, a cast metal overlay denture was suggested as a treatment option.[3] Maxillary and mandibular overlay partial dentures were planned to address the attrition as well as the replacement of missing teeth. Primary impressions were made in alginate (Tropicalgin, Zhermack) and diagnostic casts were mounted using a centric relation record at an increased vertical dimension. An interim acrylic occlusal splint was given to assess her adaptability to an increase in the VDO, which she was advised to wear for three weeks prior to commencement of the mouth preparation for final impressions. Mouth preparation consisted of minimal occlusal reduction and beveling of functional cusps of all posterior teeth. Maxillary and mandibular elastomeric impressions were made after mouth preparation (Express, 3M ESPE) A bite registration record was made in bite registration elastomer (Futar Occlusion, Kettenbach GmBH) at the required vertical dimension.

Design of the Partial Overlay Dentures

Maxillary Arch (Fig. 3): Kennedy Class II - open horse shoe major connector, with the major connector plate overlying the occlusal

surfaces of maxillary posteriors and the lingual surfaces of maxillary anteriors.

Fig. 3: Cast metal ORPD in maxillary arch

Mandibular arch (Fig. 4,5) Kennedy Class III – The chrome –cobalt framework was designed to cover the occlusal aspect of mandibular premolars and molars A lingual bar major connector was planned. Metal pontics were designed as part of the overlay denture to replace the missing premolars.

Fig. 4: Cast metal ORPD in mandibular arch

Fig. 5: Post-op intra-oral view

The metal frameworks were tried and adjusted to fit without rocking on the occlusal surfaces. An interocclusal wax record was made. Maxillary posteriors were arranged and the framework was acrylised. The occlusion was adjusted using an articulating paper (Bausch Artifol 12 micron). The anterior teeth made light contact against the palatal metal. She was placed on monthly recall for 3 months and the result was satisfactory following the increase in vertical dimension.

Discussion

Occlusal overlay splints have been used in diagnostic and treatment phases of excessive occlusal wear since many decades. Overlay RPD s when used for diagnostic purposes have the same function as that of an occlusal splint but, provide an immediate improvement in esthetics and function. Apart from the economy of treatment the partial overlay dentures also offer reversibility as an advantage when compared to full mouth rehabilitation with fixed bridge work. While ORPDs are used widely there is not much scientific evidence on ORPDs in the literature. Unlike tooth-retained conventional overdentures or implant-retained overdentures, there are virtually no longitudinal studies or clinical trials of ORPDs. The only evidences in the literature on ORPDs are mostly in textbooks, narrative reviews, and clinical reports. Patel M and Bencharit S briefly reviewed indications for ORPD in current literature and presented a clinical report on the use of ORPDs as an interim and a permanent prosthesis in a patient with severely worn dentition.[4] According to them the three main indications of ORPDs are:

- As interim prostheses [5]
- To correct severe malocclusions like skeletal class III, open bites[6]

- As an alternative treatment option in cases where medical or financial limitations contraindicate extensive fixed restorations.[7,8]

In the case presented here surgical crown lengthening and fixed crowns were suggested to correct occlusal plane and restore the occlusion. But the patient insisted on an alternative economic option.

The minimal mouth preparation offered the obvious advantage of tooth preservation. The simplicity of the treatment modality allowed the procedure to be completed within a short time frame while the gingival surgery and fixed restorations would have involved considerable time and a number of visits.

Some authors have successfully treated cases of localized wear with the traditional or modified Dahl appliance and even direct composite restorations. [9,10] But these methods were less relevant in the present case as the attrition was generalized and also the absence of posterior occlusion warranted replacement of posterior teeth .

Conclusion

The overlay denture is a simple, inexpensive and minimally invasive form of treatment modality offering the advantages of preservation of tooth structure, hygiene, shorter and lesser number of clinical appointments all together translating into an economically viable alternative option for the elderly. The reversible nature of this treatment also lends it to be utilized for diagnostic purpose and as an esthetic interim restoration for cases requiring extensive fixed prosthetics.

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Basal Cell Adenocarcinoma of Palate- A Case Report

Sharma M[1], Sharma GK[1], Bajaj P[2], Sulatan KT[3]

Abstract:

Basal cell adenocarcinoma (BCAC) of minor salivary gland is a rare salivary gland carcinoma, which have occasional reports in English literature. Due to insufficient data, this entity is of great concern as it should be differentiated from other basaloid tumors like basal cell adenoma, adenoid cystic carcinoma and basaloid squamous cell carcinoma. Here we report a case of basal cell adenocarcinoma of palate arising from minor salivary glands with special emphasis on histopathological parameters of diagnosis.

Keywords: Adenocarcinoma, minor salivary gland, Palate, Basal Cell Adenoma.

Introduction

Basal cell adenocarcinoma (BCAC) is a rare neoplasm of salivary glands and affects specifically parotid and other major salivary glands.[1] BCAC has limited reports in English literature. Due to insufficient data in literature and rare incidence of this tumor, it is often difficult to diagnose this entity.[2] Ellis and Gnepp defined the histopathologic features of BCAC in 1988 and delineate its existence from other basaloid tumors like basal cell adenoma (BCA), adenoid cystic carcinoma (ACC) and basaloid squamous cell carcinoma (BSCC). Basal cell adenocarcinoma comprises of 1.6% of all salivary gland neoplasms and 2.9% of malignant salivary gland neoplasms.[3] BCAC is considered as malignant counterpart of basal cell adenoma with invasive growth pattern and destructive nature.

This article exemplifies a rare case of BCAC of posterior palate arising from minor salivary glands in 48 year old male patient with special emphasis on its diagnostic clinicopathologic features.

Case Report

A 48 year old male presented to department of oral pathology in January 2013 with a seven months history of a persistent swelling on his right side of posterior palate. During this period patient has no other symptoms of nasal sinus obstruction and dysesthesias. A unilateral firm smooth surfaced mass was seen on right side at the junction of hard and soft palate. Mass was 5x3 cm in size and extended from right second premolar to 1 cm beyond right third molar, swelling was tender on palpation. There was no sinus opening or ulceration associated. CT scan image revealed an enhancing soft tissue mass with limited palatal bone resorption. On the basis of clinical parameters a possible diagnosis of salivary gland neoplasm specifically mucoepidermoid carcinoma was given. An excisional biopsy was sent for histopathologic examination (Fig.1). Microscopically the

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lesion showed sheets and strands of proliferating basaloid cells having hyperchromatic nuclei. Lesion showed characteristic tubulo-trabecular, cribriform and solid patterns of basal cells (Fig. 2 and 3). The bulk of solid nests and trabeculae were formed by two types of basal cells, peripheral dark stained basaloid cells with palisidation and central pale basophilic cells (Fig. 4). Lesion was devoid of encapsulation and penetrating deep to the edges into muscles. The connective tissue stroma was collagenous and vascular. Prominent atypia and mitotic figures were seen in few basal cells. Perineural infiltration was not much evident. Based upon the clinicopathologic features final diagnosis of basal cell adenocarcinoma was established. A surgical excision with wide margin was performed to ensure complete removal of the lesion and patient has remained without recurrence since 14 months of his operation. No radiotherapy was implemented.

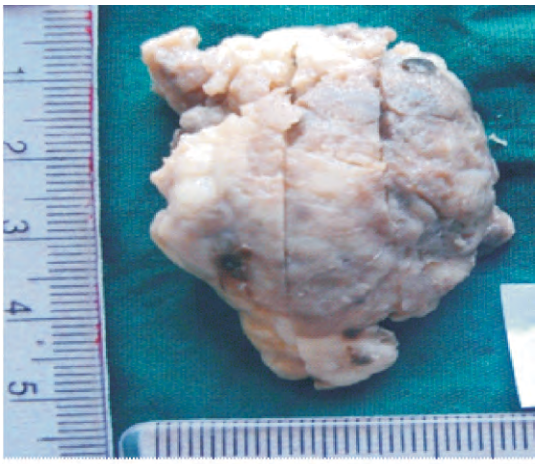

Fig. 1: Tissue specimen from right side of palate

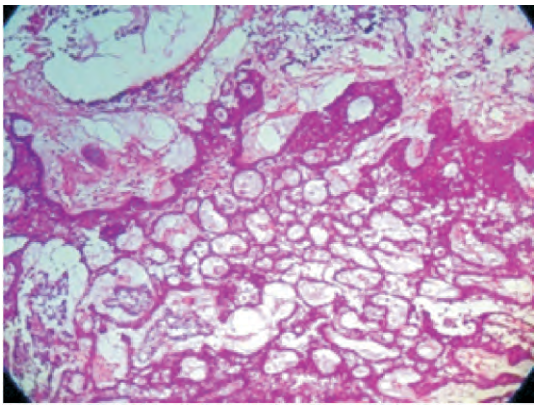

Fig. 2: H& E stained section showing cribriform pattern with infiltrating margin

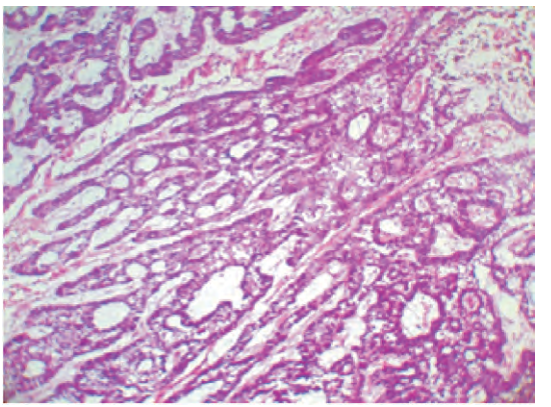

Fig. 3 : H& E stained section showing trabecular pattern.

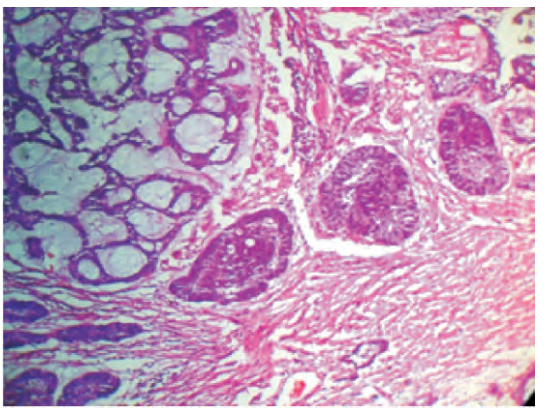

Fig. 4: The solid pattern of basal cell adenocarcinoma. The tumor is composed of basaloid cells, which show two-cell morphologies and some palisadation at the periphery.

Discussion

Basal cell adenocarcinoma of minor salivary glands is a comparatively rare slowly growing neoplasm with an infiltrating growth pattern.[4] Basal cell adenocarcinoma was classified as low grade tumor in WHO 2005 classification.[5] BCAC comprises of 1.6% of all salivary gland neoplasms and 2.9% of malignant salivary gland neoplasms.[3] BCAC is considered as

malignant counterpart of basal cell adenoma with invasive growth pattern and destructive nature. Due to fewer published data in English literature, it is difficult to distinguish this tumor from other basaloid tumors like basal cell adenoma and adenoid cystic carcinoma.[2]

The origin of BCAC is still unknown, but some authors propose it develop from preexisting basal cell adenoma while others believe it is a de novo lesion.[6,7] BCAC is supposed to originate from pluripotent ductal reserve cells.[8] The most of BCAC occur in parotid gland (90%), followed by submandibular and minor salivary glands rarely.[2,8] The age incidence in BCAC ranges from 24-73 years with a mean age incidence of 55.1 years.[3] In our case the age of patient was 48 years nearly to average age of occurrence. Each gender is equally affected. BCAC of minor salivary glands of palate clinically appear as asymptomatic swelling of longer duration.[8] Present case had seven months old swelling of palate with tenderness which may be due to infiltration of nerves by tumor.

Microscopically BCAC has four major patterns: tubulotrabecular, cribriform, solid and membranous.[9,10] All patterns usually have two types of basal cell population. Smaller cell with scant cytoplasm and dark nuclei and polygonal cells with eosinophilic cytoplasm and pale basophilic nuclei. The most common pattern is solid nests in collagenous stroma. Each nests vary in shape and size, composed of central polygonal cells and smaller peripheral cells with palisidation.[2,10] BCAC is difficult to differentiate from basal cell adenoma and adenoid cystic carcinoma.[9] BCAC consider as malignant counterpart of basal cell adenoma because most BCAC originate from preexisting basal cell adenoma. The diagnostic feature of BCAC is thought to be infiltrative growth rather than pushing or multifocal growth (features of basal cell adenoma), neural invasion, vascular invasion and cellular atypia with mitosis.[3] Basal cell adenoma doesn't have these histopathological features except the pattern similarities. BCAC which are arises from preexisting basal cell adenoma may show diagnostic dilemmas, so caution should be taken by studying serial sections of tumor. Second differential diagnosis of consideration is adenoid cystic carcinoma due to the poorer prognosis. Major criterias to differentiate are -

- Presence of dark hyperchromatic angulated nuclei in ACC.[6]
- High mitotic index with necrosis in solid pattern in ACC.[6]
- Small lumens in cribriform pattern with thick interluminal wall and two cell population in ACC.[8]
- Zigsaw puzzle appearance of cells in solid pattern with peripheral palisidation in BCAC.[8]

Third lesion to distinguish is basaloid squamous cell carcinoma (BSCC) which shows squamous differentiation as major feature that involve mucosal epithelium.[6]

BCAC is considered as low grade malignancy with good prognosis. They are locally infiltrative and propensity to recur. Surgical excision with wide margin is primary approach to treat BCAC.[9] Radiotherapy is applicable for BCAC with invasion to neural and vascular elements. Metastasis is rare, only 10% in BCAC, if occur prognosis will be poor.[4]

Conclusion

Basal cell adenocarcinoma is malignancy of low grade with favorable prognosis. Although it is a rare pathology, BCAC should be in

consideration of basaloid cell malignancies of salivary glands. They required local excision so need to be distinguish from adenoid cystic carcinoma and basaloid squamous cell carcinomas which needed aggressive clinical approach and usually metastasize. According to some studies the local recurrence rate of BCAC is 25-30 %.[4]

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Source of Support: NIL
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Dilemma of Midline Diastema: A Case Report

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Abstract:

Midline Diastema is a well defined multifactorial clinical entity with several treatment options available for correction. This case report describe orthodontic approach towards correction of midline diastema. In these cases Retention planning plays an important role for the long term stability of the achieved goals.

Keywords: Midline diastema , Bonded appliance, Bonded Retainer, Retention.

Introduction

There are many etiological factors in the development of a median diastema and most have been investigated to some degree. These factors include Physiological (ugly-duckling stage), Anodontia, tooth- size discrepancy, supernumerary teeth or high frenum attachment.[1,2] Midline diastema (or diastemas) occur in approximately 98% of 6 year olds, 49% of 11 year olds and 7% of 12–18 year olds.[3]

There have also recently been reports of self-inflicted pathological cases of diastema caused by tongue piercing. In many of these cases, orthodontic treatment alone can help close a diastema. Adjunctive orthodontic treatment in association with restorative and oral surgery techniques are recommended in diastemas associated with tooth size discrepancies, supernumerary teeth and high labial frenum.[4,5]

Case Report

A 23 year old female presented with the complain of a large unesthetic space between her upper front teeth. Complete clinical examination was performed, including intraoral and extraoral photographs and a review of periodontal status. The patient had class I skeletal base and average vertical facial proportion and competent lips. Molar relationship were recorded class I on both left and right side. Oral hygiene was good.

There was a spacing of 3-4 mm between maxillary central incisors. After explaining all treatment options (Direct composite restorations, All ceramic crowns and fix orthodontic treatment) patient opted for fix orthodontic treatment. Debonding of bonded appliance was undertaken twelve months after fixed appliance therapy began.

Following placement of full bonded appliance (0.022 preadjusted brackets) and initial levelling and alignment the diastema was closed using medium elastic power chain on 0.016 round stainless steel archwire. The orthodontic treatment was progressed as anticipated. The resulting final occlusion was retained with palatally bonded multistranded

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stainless steel wire retainer.

Fig. 1: Pre-treatment intaoral photograph

Fig. 2 : Mid treatment with bonded appliance in place

Fig. 3 : Post treatment photograph

Fig. 4 : Palatal bonded retainer in place

Discussion

When a treatment approach of a maxillary midline diastema is to be implemented, the first and probably most important stage of treatment is the diagnosis of the cause of the problem. The dentist should evaluate several parameters to reach a sound diagnosis, which includes chronological and dental age of the patient, associated malocclusion, tooth size discrepancy, presence of abnormal oral habit and any underlying pathology.

When the diagnosis is established, the appropriate therapy should include management of the causative factors, along with the diastema correction and the permanent retention of the result. This is the only way to fully satisfy the patient's needs and maintain long-term stable results.

As a general guideline, only maxillary midline diastema exceeding 2 mm are unlikely to close spontaneously following the eruption of permanent lateral incisors and canines, while an initial diastema less than 2 mm hardly ever remains.[5] Therefore, the treatment of the maxillary midline diastema is usually postponed until the eruption of the permanent canines, but it may start earlier, depending on the cause of the diastema or in cases with a relatively large diastema. The treatment of the maxillary midline diastema may start before the eruption of permanent canines in cases where the diastema is due to congenitally missing lateral incisors, the presence of a mesiodens, odontoma or other pathology in the midline, or small teeth. Main indications for early closure of a maxillary midline diastema, i.e. during the stage of mixed dentition, (a) an urgent aesthetic demand by the patient and (b) a central incisor position that inhibits the eruption of the lateral incisors or canines, since the lateral incisors might have been displaced into the space where canines normally erupts.[6]

Retaining the result of treatment is a particularly difficult issue, especially if lateral incisors and canines have not yet erupted.

For diastema closure of more than 2 mm the bodily movement of adjacent teeth with fix appliances is required . Prognosis in such cases is better when only mesiodistal and not palatal repositioning is required. It should always be kept in mind that when tipping takes place, it usually results in diastema relapse therefore it is indispensable to apply permanent retention.[7]

In some cases, closure of a maxillary midline diastema or other diastemas in the maxillary anterior region may be achieved with minimal preparation veneers or through teeth restorations with composite resin. However, the long-termprognosis of these therapeutic approaches must be further investigated. In particular, the cases where these options can be performed are when:

a) The patient does not want to undergo orthodontic treatment,
b) There are other aesthetic problems present as well (e.g. amelogenesis imperfecta or discoloration), and
c) Treatment requires combined orthodontic and restorative treatment, in cases with a very large diastema.

Retention of the Result

The reason for relapse in patients with midline diastema is the placement of teeth in a position where no equilibrium exists with their functional environment.[8] In most of these cases, the factor disturbing this equilibrium is still present after treatment.

Shashua and Artun (1999)[8] concluded that the most important risk factors for relapse are the increased pretreatment width of the midline diastema, the presence of a family member with a similar condition, and the presence of more than one diastema in the maxillary anterior region.

In general, orthodontic closure of diastema is likely to relapse after treatment therefore permanent retention for long duration or even for life is usually recommended.

Long term retention to prevent relapse in these cases is usually provided by the palatally bonded multistranded stainless steel wire.[9] These multistrand wires are easy to bond and maintain the physiological mobility of bonded teeth.

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Peripheral Ossifying Fibroma – A Case Report

Indu M[1], Rathy R[2], Edward J[3], John J[4]

Abstract:

Peripheral ossifying fibroma (POF) a is reactive gingival hyperplasia which originates from cells of the periodontal ligament. Clinical presentations of POF are similar to that of other gingival hyperplasias and definitive diagnosis requires histopathological examination. We report a case of POF in maxillary gingiva. The lesion was asymptomatic, slow growing, reddish pink in colour and histopathologically revealing stratified squamous epithelium and foci of mineralization in the form of bony trabeculae in the connective tissue. This article highlights the nomenclature, clinicopathological features and pathogenesis of POF.

Keywords: Reactive Lesions, Gingival Hyperplasia, Fibroma, Ossification, Peripheral Ossifying Fibroma.

Introduction

Gingival swellings are common lesions that are observed in our day to day practice. Peripheral ossifying fibroma (POF) is a part of the spectrum of such reactive lesions occurring in gingiva. POF is a distinct clinicopathological entity which should not be confused as the peripheral counterpart of the intraosseous neoplasm with similar terminology known as central ossifying fibroma.[1] Although POF is non-neoplastic and innocuous lesion, it is important to know about this entity because of its similarity with other localized reactive hyperplastic lesions of gingiva.

Case Report

A 42 year old male patient reported with a slow growing gingival swelling. The swelling was first noted nearly 6 months back. On intra oral examination a pinkish red roughly oval pedunculated swelling was noted labial to maxillary left first molar, 1.5 ×1 cm in size, firm in consistency and non tender (Fig.1). Provisional diagnosis of pyogenic granuloma was given. Radiographic examination revealed no significant evidence. Patient's past medical and dental history was not significant.

Fig. 1: Pinkish red growth on gingiva in relation to maxillary left first molar.

Excisional biopsy was performed. The hematoxylin and eosin(H&E) stained section showed stratified squamous parakeratinized

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epithelium overlying a fibrocellular stroma. The stroma showed fibroblastic proliferation and centres of ossifications deep into the connective tissue in the form of bony trabeculae (Fig. 2). A final diagnosis of peripheral ossifying fibroma was given based on microscopic findings.

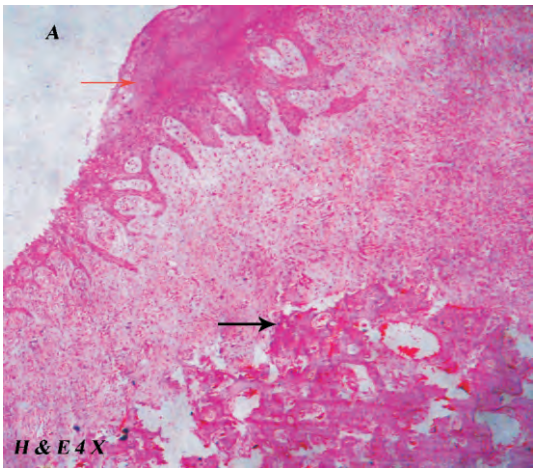

Fig. 2 : Photomicrograph showing stratified squamous epithelium and bony trabeculae deep in the connective tissue. [H & E (4 x), Red arrow indicating the surface epithelium and black arrow showing trabeculae of bone]

Discussion

Connective tissue reactive lesions of oral cavity include irritational fibroma, pyogenic granuloma, peripheral giant cell granuloma (PGCG); denture induced fibrous hyperplasia and papillary hyperplasia, myosperulosis and nodular fasciitis. POF is such a reactive lesion that must be associated with gingival tissues, and this terminology cannot be used for lesions at other oral sites. It was first reported by Shepherd in 1844 as "alveolar exostosis"[1] and in 1982, Gardner coined the term "peripheral ossifying fibroma".[2] Other terminologies of POF include ossifying fibroid epulis, peripheral fibroma with calcification, calcifying fibroblastic granuloma and peripheral cementifying fibroma (depending on whether bone or cementum is seen microscopically). Peripheral odontogenic fibroma and POF were used synonymously, but now peripheral odontogenic fibroma is considered as a separate entity.[3]

POF presents as a painless, hemorrhagic, and often lobulated mass of the gingiva especially in maxilla, perhaps with large areas of surface ulceration. POF accounts for 3.1% of all oral tumors and 9.6% of gingival lesions.[4]

Early lesions are quite irregular and red, but older lesions can have a smooth salmon pink surface and may be indistinguishable clinically from the more common irritation fibroma. Although this tumor occurs at any age, peak incidence is at 2nd and 3rd decades. POF shows female predilection. Most POFs are 1 to 2 cm in size. Radiographs occasionally show irregular, scattered radiopacities.[1,3]

Pathogenesis of POF is uncertain and it is considered to be a reactive lesion rather than a neoplasm. It has been suggested that these lesions originate from the cells of the periodontal ligament as it exclusively appears in the gingival tissue close to the periodontal ligament.[5,6] The pluripotent cells of the periodontal ligament have the apparent ability to transform or metaplastically change into osteoblasts, cementoblasts, or fibroblasts.[1]

Immunohistochemical studies support the fibroblastic-myofibroblastic nature of the lesion.[7] Hormonal influences can be considered as an etiological factor because of high female predilection, rare occurrence in the first decade, and decline in incidence after 30 years of age.[5,6] Other factors that have been implicated in the etiopathogenesis of POF are trauma and local irritants such as plaque, calculus, ill fitting dental appliances and microorganisms.[6,7]

Definite diagnosis of POF is through histopathologic examination. Microscopic picture of POF includes stratified squamous epithelium and fibrous proliferation in association with mineralized materials. If the epithelium is ulcerated the surface is covered by a fibrinopurulent membrane with a subjacent zone of granulation tissue.[3]

The connective tissue is often cellular with fibroblasts and myofibroblasts. Mineralized material can be mature, lamellar or woven bone, cementum-like material, or dystrophic calcifications. Usually, the bone is woven and trabecular in type, although older lesions may demonstrate mature lamellar bone. Dystrophic calcifications are characterized by multiple granules, tiny globules, or large, irregular masses of basophilic mineralized material. Occasionally multinucleated giant cells can be seen.[3,8]

Although reactive lesions of gingiva appear to be similar clinically, they can be differentiated histopathologically. Some gingival masses may contain large areas of classic pyogenic granuloma, irritational fibroma, PGCG or POF like areas. In such cases, the pathologist should make appropriate diagnosis based on the predominant lesional type.[1] (Table 1)

Table 1: Differential diagnosis of reactive lesions of gingiva

Lesions	Differentiating features	
	Radiographic features	Histologic features
Pyogenic granuloma	_	Vascular spaces lined by plump endothelial cells.[1,3]
Irritational fibroma	_	Highly fibrous, no areas of calcification.[1,3]
PGCG	Cupping resorption of underlying bone.[1,3]	Osteoclast like giant cells Foci of hemorrhage with liberation of hemosiderin pigment.[1,3]
POF	Irregular, scattered radiopacities/ slight bone resorption.[1,3]	Fibrous proliferation associated with the formation of a mineralized product (trabecular bone/ cementum like material/ dystrophic calcification).[8]

Osteogenic sarcoma may mimic POF clinically. Osteogenic sarcoma is less frequent gingival lesions compared to POF. A band like asymmetric widening of the periodontal ligaments of involved teeth is another finding suggestive of osteogenic sarcoma. Individual cells must be carefully examined for dysplastic changes to rule out osteosarcoma.[1,3]

Giant cell fibroma is another lesion of concern. But giant cell fibroma contains entirely of relatively avascular fibrous connective tissue. The hallmark is the presence of large, stellate fibroblasts within the superficial connective tissue. Few cells may contain multiple nuclei.[1]

Oral soft tissue metastasis is common in gingiva and it resembles hyperplastic / reactive lesion. But metastatic lesion may cause pain, bleeding, halitosis etc. Radiographically it is characterised by destruction of underlying alveolar bone. Although a slight bony resorption may occur beneath the POF, more worrisome bony changes typically are seen with malignant lesions. Microscopically metastatic lesions show resemblance to tumor of origin.[9]

Peripheral odontogenic fibroma is a tumor of odontogenic ectomesenchyme with or without odontogenic epithelium. This uncommon lesion of the gingival tissue is histologically similar to the WHO type of odontogenic fibroma. One may occasionally encounter dysplastic dentin, ovoid cementum–like calcifications, or spicules of osteoid within the lesional tissue. But unlike peripheral ossifying fibroma these lesions have a significant amount of odontogenic epithelium associated with its fibroblastic proliferation.[4]

Treatment of choice of POF is surgical excision including periosteum. Thorough scaling and root planing of adjacent teeth and removal of other sources of irritants should be accomplished. Recurrence rate of 8 to 16 % has been reported. Malignant transformation has not been reported for this lesion.[3,10]

Conclusion

POF is a slow growing gingival mass with comparatively high rate of recurrence. Pathologists should be aware of various aspects of POF as it can be easily confused with other reactive gingival hyperplasia clinically.

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Giant Sialolith of Submandibular Gland: A Case Report

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Abstract:

Sialoliths are common in submandibular salivary gland duct and rarely do they occur in the submandibular gland proper. Very rarely the stones within the gland achieve a gigantiform size, imposing difficulty for the oral physician to differentiate it from a calcified submandibular lymphnode. Fine Needle Aspiration Cytology, computed tomography and ultrasonography provides additional information in such instances. Here we report a case of giant sialolith in the submandibular gland.

Keywords: Computed Tomography, Giant Sialolith , Submandibular Gland.

Introduction

Sialolithiasis is one of the most common diseases of salivary glands.[1-3] More than 80% of the sialoliths occur in the submandibular gland or its duct, 6% in the parotid gland and 2% in the sublingual gland or minor salivary glands. Simultaneous lithiasis in more than one salivary gland is rare, occurring in fewer than 3% of cases. The submandibular gland hosts the largest stones with the largest reported one being 6 cm in length.[3] Most submandibular stones are found in the salivary ducts. Factors tend to favor submandibular gland stone formation are the longer, tortuous and the larger caliber duct and slower flow rates in the submandibular gland; the fact that saliva flows against gravity in the submandibular gland; the presence of more alkaline saliva; the high mucin and calcium content of the saliva in the submandibular gland.[2,4,5] We describe a patient with a giant sialolith in the submandibular salivary gland.

Case Report

A 55 year old male patient presented to oral medicine and radiology department with chief complaint of swelling on the right lower jaw since ten years and pain and pus discharge from the floor of the mouth since twenty days. History of present illness revealed that the growth started as the small swelling of a peanut size and increased progressively with time. There was neither pain nor increase or decrease in the size of the swelling whilst chewing food. His medical history was unremarkable. On clinical examination, a firm swelling measuring approximately 4x4 centimeter was present in the right submandibular region (Fig.1). Intraorally, area of submandibular duct was tender and purulence was expressed on milking the swelling bimanually. A shallow ulcer was seen on the floor of the mouth in the lingual vestibule in relation to the molars. A provisional diagnosis of acute submandibular

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sialedinitis was made. Differential work up included chronic submandibular lymphadenitis. Panoramic radiograph showed a large radiopacity measuring 2x2 cm overlapping the antegonial notch of the right angle of the mandible (Fig. 2). Mandibular lateral cross sectional occlusal radiograph revealed a large radiopacity lying medial to the arch. To rule out calcified lymph node or sialolith, further investigations were carried out. Non contrast computed tomography showed a large irregular hyperdense lesion measuring 16x10mm in its greatest diameter located in the right submandibular gland. The gland itself was edematous and enlarged measuring around 26x24 mm. (Fig. 3). High resolution ultrasonography revealed a large mass with ill defined margins in the submandibular gland with no significant lymph nodes in the neck (Fig. 4). Fine needle aspiration cytology of the swelling revealed few clusters of round to oval cells with the background of lymphocytes suggesting chronic sialadinitis. Patient was prescribed antibiotics and analgesics for two weeks and surgical excision of the entire gland and calcified mass was performed by oral surgeons.

Fig. 1: Extraoral photograph of a 55 year old male patient showing firm swelling measuring approximately 4x4 centimeter present in the right submandibular region. (Black arrow)

Fig. 2: Panoramic radiograph demonstrating a large radiopacity measuring approximately2x2 cm overlapping the antegonial notch of the right angle of the mandible. (White arrow)

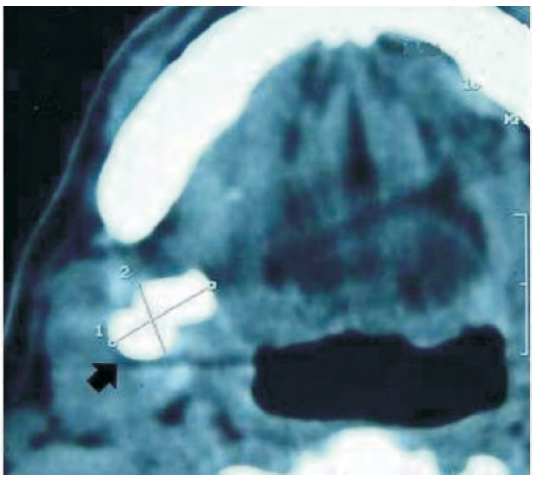

Fig. 3: Non contrast computed tomography demonstrating a large irregular hyperdense lesion measuring 16x10 mm in its greatest diameter located in the right submandibular gland. (Black arrow)

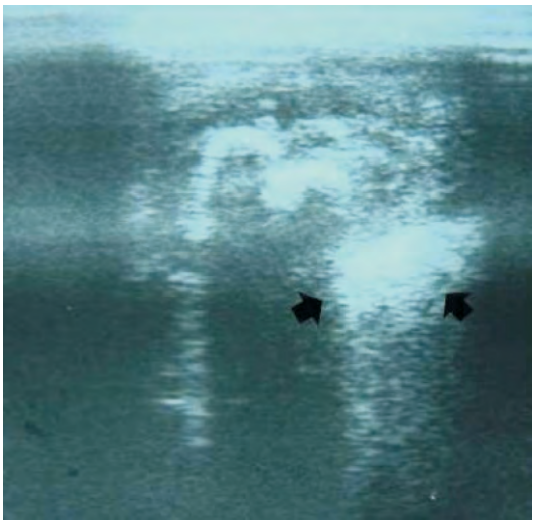

Fig. 4: Longitudinal Ultrasonogram revealing a large mass with ill defined margins in the submandibular gland with no significant lymph nodes in the neck. (Black arrow)

Discussion

Salivary calculi are typically composed of calcium phosphate or calcium carbonate in association with other salts and organic material such as glycoproteins, desquamative cellular residue and mucopolysacchrides.[3] They are usually small and measure from 1 mm to less than 1 cm. They rarely measure more than 1.5 cm. Mean size as reported in literature is 6 to 9 mm and it is also believed that calculus may enlarge at the rate of approximately 1 to 1.5 mm per year.[2] In our case sialolith measured 1.6mm in greatest diameter.

Sialolithiasis is usually seen in middle aged males. Females are less commonly affected. There is no left or right predominance. Recurrent pain and swelling of the associated gland during meals are the common symptoms as the stone usually does not block the flow of saliva completely.[6,7] However, large sialoliths in the body of salivary glands usually are asymptomatic, causing difficulty to exclude calcified lymph nodes.[2] These large calculi may perforate the floor of the mouth by ulcerating the duct as seen in our case or may result in a skin fistula by causing a suppurative infection.[2,8]

Careful history and examination are important in the diagnosis of sialoliths. Bimanual palpation of the floor of the mouth, in a posterior to anterior direction, reveals a palpable stone in a large number of cases of submandibular calculi formation.[1,2,4,9] In the absence of clinical signs and symptoms difficulty exists in ruling out calcified lymph node masses. In such instances ultrasonography, Fine Needle Aspiration Cytology and computed tomography provides additional information as seen with our case report.

Computed tomography and ultrasound can demonstrate sialoliths with high accuracy and can correctly localize them anatomically. Ultrasound is less accurate than computed tomography in distinguishing multiple clusters of stones from single large stones. Computed tomography can provide additional information about the total size of the gland. Currently, Magnetic Resonance Sialography obtained in two or three dimensional images is suggested for diagnosis of sialoliths. However, these methods are not suitable to visualize the inner duct system of the salivary glands. Sialoendoscopic system can be used for both diagnostic and treatment purposes.[2] Some authors have recommended that preoperative technetium-99m pertechnetate scintigraphy be obtained to determine how functional the gland is and thus to determine its treatment. Sialography is contraindicated in the acute setting of sialadinitis and should be restricted to a very few number of cases when clinical assessment, serology, conventional radiography (especially when the stones are radiolucent) and computed tomography cannot facilitate the diagnosis in chronic sialadinitis cases. MR sialography can replace conventional sialography.[3]

Different treatment options may be selected according to the size and location of the sialolith. If the stone is small, conservative management may be attempted with local heat, massage and sialogogues. Infection should be treated with antibiotics and these cases should be combined with simple sialolithotomy when required. If the stone lies in the distal one third of the duct, a simple surgical release can be performed. For giant sialoliths, alternate methods of treatment include piezoelectric extracorporeal shock wave lithotripsy or endoscopic intracorporeal shock wave lithotripsy. Once the diagnosis of

an intraglandular salivary stone with destruction of the gland is established, removal of the entire submandibular gland through an extraoral approach is recommended. However, excision of the submandibular gland carries a risk of permanent or temporary marginal mandibular nerve palsy.[2,9,10] In our case, as the infection was extensive and the total size of the gland has enlarged phenomenally, complete excision of the gland and calculus was planned.

Conclusion

Management of large sialoliths remains a diagnostic and therapeutic challenge to the clinician. The choice of surgical treatment and the preservation of the submandibular gland require careful consideration when dealing with larger sialoliths. Patients should be educated regarding the mechanism of their underlying pathology and also emphasis should be given on the value of hydration and excellent oral hygiene preventing further complications.

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Rehabilitation of Resorbed Mandibular Ridge with Implant Supported Overdenture- A Clinical Report

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Abstract:

Statement of Problem: Complete denture rehabilitation can restore a patient's appearance and perceived social role, but many edentulous patient experience problems with their dentures, especially lack of stability and retention, together with a decrease of chewing ability and continued alveolar bone loss.

Aim: This article presents a case report where rehabilitation of mandibular resorbed ridge was done using 2 implant supported mandibular overdenture with ball attachment.

Materials And Method: A 68 years old female reported with a chief complaint of old loosened and unstable mandibular denture. The patient also complaint of severe gagging and discomfort in previous maxillary denture. The patient was advised to have implant supported overdenture for mandibular ridge and metal palate maxillary complete denture.

Results: The patient was satisfied with the prosthesis in terms of retention, stability, function and esthetics. The patient's complaint of gagging was taken care of by metal denture and the retention and stability in lower ridge was enhanced by implant supported overdenture.

Conclusion: Edentulous patient may experience a wide range of denture problems, including functional complaints related to the mandibular denture. Implant overdenture treatment (IOT) is generally considered to be an effective treatment modality in these cases.

Keywords: Edentulism, implant supported overdenture, rehabilitation, resorbed ridge.

Introduction

When an edentulous patient presents for treatment, the usual treatment modalities include a conventional removable complete denture. Complete denture rehabilitation can restore a patient's appearance, but other aspects of impaired oral functions may not be fully compensated.[1] Stability and retention of lower complete denture is well recognized as a potentially difficult treatment to achieve. Looseness and discomfort are the most frequent complaints reported by patients. Many concepts have been put forward to increase stability and retention of mandibular complete denture including the mechanical principles[2,3], biometric guides[4] etc. These techniques have been challenged and found insufficient. These techniques fail to restore function, aesthetics and comfort in patient with severely atrophic mandibular ridges (Atwood's Class V).[5] Implant overdenture treatment (IOT) is generally considered to be an effective treatment modality in these cases.[6]

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The feasibility of implant-supported overdentures was first tested at the University of Toronto, in early 1980's. Early positive observations lead to further studies establishing the efficacy and effectiveness of implant supported overdentures. An implant supported mandibular overdenture (ISO) with two implants is a simple treatment option for edentulous patients. Since the past 20 years, a variety of options have become available for retention of these implant retained prosthesis e.g. Magnets, clips, bars and ball attachments. Many reports on patient – base assessment of the outcome and functional effects of such therapy have shown greater patient satisfaction, comfort, stability, better chewing and speaking performance, higher jaw closing force and less residual ridge resorption as compared to the conventional mandibular dentures.[6]

This article presents a case report where rehabilitation of mandibular resorbed ridge was done using two implant supported mandibular overdenture with ball attachment.

Case Report

A 68 years old female reported to the Department of Prosthodontics, D J College of Dental Sciences and Research, Modinagar with a chief complaint of old loosened and unstable mandibular denture. The lower ridge was highly resorbed while the upper ridge was clinically acceptable. The patient also complaint of severe gagging and discomfort in previous maxillary denture. The patient was advised to have implant supported overdenture for mandibular ridge and metal palate maxillary complete denture. (Fig. 1)

Procedure

A detailed clinical examination was done and her previous dentures were evaluated for stability and retention. The old denture was found to be unstable and unretentive. The lower ridge was highly resorbed as told earlier and the upper ridge was fine (Fig. 2). The patient had gagging because of the thickness of acrylic in upper denture.

Fig. 1: Extra-oral pre operative photograph of the patient

Fig. 2: Intra-oral pre operative photograph

- Primary impressions were made using impression compound (DPI Pinnacle functional impression compound) with edentulous stock trays.
- Closely fitting custom tray were fabricated and the border moulding was performed with low fusing type I impression compound, green stick (DPI Pinnacle tracing sticks) to represent muscle activity, recording functional depth and width of sulcus.
- The final wash impression was made with zinc oxide eugenol paste (DPI impression paste) and master cast was poured with

dental stone (Gypstone, Type III). Acrylic spacer was adapted on upper cast.

- The upper cast was duplicated in reversible hydrocolloid material, agar-agar (Bego-Castrogel), and poured in investment (refractory cast) (Neoloy Products, USA).
- A wax pattern for the metal framework was then made and the casting was done.(Fig.3) The metal framework was finished, polished and tried in the patient's mouth.(Fig. 4)
- The maxillary temporary denture base was completed using self cure acrylic resin (DPI Rapid Repair) and the occlusal rim was then fabricated.
- The lower temporary denture base and occlusal rim was fabricated in conventional manner.
- Tentative jaw relations and facebow transfer was then done and teeth setting was done on the articulator. Dentures were tried in patient's mouth.
- The trial dentures were then waxed up and processed in heat cure acrylic resin (DPI). After finishing and polishing, the dentures were inserted in patient's mouth for corrections and an appointment for implant surgery was given.
- Implants (Alpha- Bio) (4.2 × 10 mm) were inserted bilaterally in the mandibular canine region after marking the implant site using indelible pencil (Fig. 5).
- After 3 months of healing, gingival formers and subsequently ball abutments were placed.
- The abutment site was marked with indelible pencil in patient's mouth and these markings were transferred to lower denture (Fig. 6). The denture was relieved from that area and metal encapsulator was incorporated and then again tried on to the abutment for proper fit.
- Then O ring was placed and the dentures were evaluated for fit, retention and stability. Patient was recalled after one week, 3 weeks, 3 months, 6 months for further evaluation (Fig.7 and Fig. 8).

Fig. 3: Fabrication of wax pattern

Fig. 4: Finished and polished metal framework

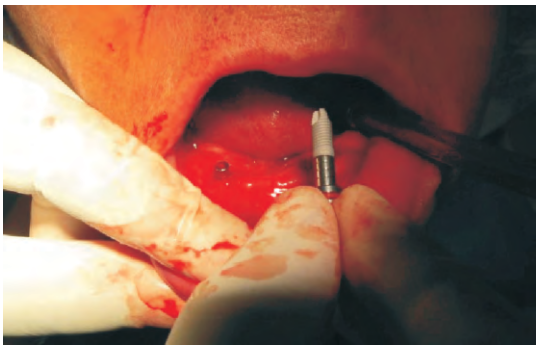

Fig. 5: Implants placed

Fig. 6: Markings transferred to mandibular denture

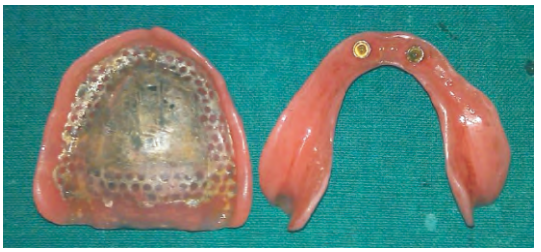

Fig. 7: Intaglio surface of final dentures

Fig. 8 : Post insertion

Discussion

The goal of modern dentistry is to restore the patient to normal function, speech, health and aesthetics, regardless of the atrophy, disease, or injury of the stomatognathic system. Dental implants are increasingly used as suitable prosthodontic substitutes for natural teeth. Mandibular implant overdenture treatment has gained considerable acceptance. It has effectively replaced the tooth-borne version of this treatment for many practitioners and has been recommended as the new standard-of-care treatment when compared with conventional mandibular complete dentures.[7,8] Many reports on patient – base assessment of the outcome and functional effects of such therapy have shown greater patient satisfaction, comfort, stability, better chewing and speaking performance, higher jaw closing force and less residual ridge resorption as compared to the conventional mandibular dentures.[9]

Conclusion

Mandibular complete overdenture treatment uses a removable completedenture that overlies retained teeth, tooth roots, or dental implants.[8] Severe loss of alveolar bone often presents a challenge in fabrication of prosthesis.[10] Implant supported overdenture is the treatment of choice in such cases. This case was evaluated and treated keeping in mind the DE VAN principle of PRESERVATION. The patient was satisfied with the prosthesis in terms of retention, stability, function and esthetics. The patient's complaint of gagging was taken care of by metal denture and the retention and stability in lower ridge was enhanced by implant supported overdenture.

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Central Giant Cell Granuloma: Case Report with Review of Literature

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Abstract:

Central Giant Cell Granuloma is a non-neoplastic intraosseous lesion and constitutes about 10% of benign jawbone lesions. Etiology of the lesion is not well defined. Approximately one-third of CGCG exhibit local aggressive behaviour with bone destruction and a tendency to recur. Diagnosis of CGCG poses a diagnostic challenge for oral physician as it may mimic many other solitary cysts like radiolucencies which may or may not be contacting teeth. A case of a 26yr old female with CGCG in mandible is presented along with review of literature.

Keywords: Giant Cell Lesion, Nonodontogenic Tumours of Jaws, Central Giant Cell Granuloma, Giant Cell Tumour, Calcitonin, Imatinib, Interferon-Alpha.

Introduction

Central giant cell granuloma (CGCG) is an uncommon, benign proliferative bony lesion. Its etiology is not well defined and its biological behavior is also poorly understood.[1] CGCG is usually present in the jaw bones i.e. mandible and maxilla, in contrast to other giant cell tumors of bone.[2] The World Health Organization has defined it as "an intraosseous lesion consisting of cellular fibrous tissue that contains multiple foci of hemorrhage, aggregations of multinucleated giant cells and occasionally trabeculae of woven bone".[3]

In 1953, Jaffe described this lesion as a "giant-cell reparative granuloma". The term 'reparative' has been abandoned due to the differentiation of central giant cell lesions between aggressive and non-aggressive lesions.[4] Chuong et al defined aggressive giant cell lesions as exhibiting size greater than 5 cm as well as rapid growth, tooth displacement, root resorption, cortical bone thinning, perforation or recurrence after curettage, equal to or greater than 5cm and/or that recurred after curettage. Nowadays, it is classified as "central giant cell granuloma" or "central giant cell lesion".[3,5]

Approximately 70% of CGCG lesions have the biological behaviour of a non-aggressive, asymptomatic, slow-growing lesion, whereas the remaining 30% show an aggressive and increasingly destructive behaviour. The aggressive biological behaviour of some CGCG is reminiscent of that of giant cell tumour of bones (GCTB), and it has been proposed that CGCG and GCTB belong to the same spectrum of lesions.[6]

Case Report

A 26 year old female patient visited

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Department of Oral Medicine & Radiology with a chief complaint of pain & swelling in the right lower back tooth region since two yrs. Patient gave history of extraction with respect to mandibular first molar five months back following which she developed swelling which gradually increased in size & subsided partially on medication.

Extra oral examination revealed a localized swelling on the right side of mandible, approximately [2 x 2] cm in size, hard & tender on palpation.

On intra oral examination a diffuse swelling pink in color was observed in the vestibular aspect extending from mesial aspect of right lower second premolar to distal aspect of right Lower second molar. Swelling was tender on palpation without any associated pus or blood discharge.(Fig. 1)

Fig. 1: Diffuse swelling pink in color at vestibular area w.r.t 46

Based on the history & clinical features a provisional diagnosis of residual cyst was made in relation to missing mandibular first molar.

IOPA & Panoramic radiograph revealed a well-defined tear drop shaped unilocular radiolucency between second premolar and second molar surrounded with a sclerotic border. Slight displacement of roots with loss of lamina dura on the side involved of both teeth was seen along with resorption of the distal aspect of root of second premolar (Fig. 2 & 3).

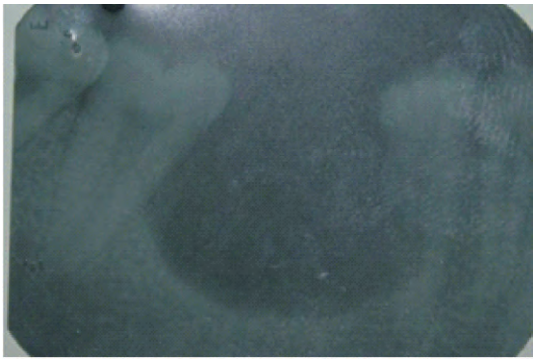

Fig. 2: Intra Oral Periapical Radiograph

Fig. 3: Orthopantomogram

IOPA & OPG reveals tear drop shaped unilocular radiolucency with sclerotic border &resorption at distal aspect of root of 45

Fine needle Aspiration yielded blood. Routine blood counts revealed all parameters within normal limits.

The lesion was surgically removed under local anaesthesia and the specimen was sent for histopathological examination which revealedloss of fibrous connective tissue stroma with plump fibroblast and multinucleated giant cells of varying size containing upto 20 nuclei. Scattered hemosiderin pigments & extravasated RBCs were also seen. Based on the histopathologic examination a diagnosis of central giant cell granuloma was made.

Patient was recalled for monthly follow up (Fig. 4). Radiopacity at the lesion site suggested adequate bone healing. Healing was observed at the end of sixth months and there was no sign of recurrence (Fig. 5 & 6).

Fig. 4: Postoperative image after removal of 45

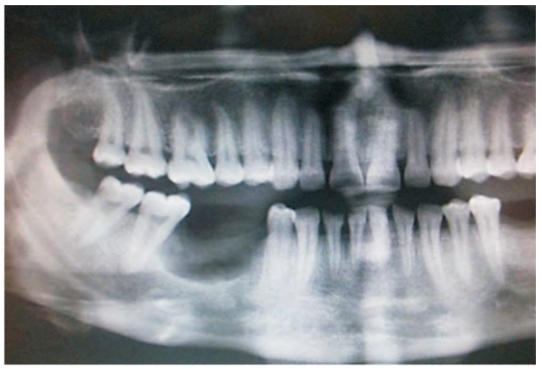

Fig. 5 : 1st month follow up

Fig. 6 : 6th month follow up

Discussion

CGCG account for about 10% of all benign lesions of the jawbones (Waldron, 1995).[7] All age groups can be affected, but most cases are observed in patients below the age of 30 years.[7] Women are more affected than men (F/M=2.4:1).[8] In the studies conducted by Stavropoulos and Katz J no correlation was found between the size of the lesions, their location and the appearance in different age groups, although the size of the lesion was largest in the younger age group (<30 years).[9] This may be explained by the increased metabolic rate and associated hormonal effects in adolescents. However, scientific evidence to support this hypothesis is not currently available. Lesions occur commonly in the anterior portions of the jaws and the mandibular lesions frequently cross the midline; however in our case lesion was found posterior to molars.[10]

Clinical differential diagnosis include post-extraction sockets, residual cysts, traumatic bone cysts, lingual mandibular bone defects, odontogenic keratocysts, primodial cysts, ameloblastomas, primary and secondary hyperparathyroidism, early cement-ossifying fibromas.

The exact process behind pathogenesis of CGCG remains unknown. While the giant cell remains to be the most prominent feature of these lesions, it is actually the mononuclear spindle cell which is the proliferating cell. This is indicated by the expression of the cell cycle protein Ki-67 in CGCGs. It is believed that this spindle cell recruits monocytes from the vascular system and induces them to differentiate into osteoclastic giant cells through release of cytokines. It has been proposed that this spindle cell takes its origin from the mesenchyme of marrow and an epigenetic event signals them to release cytokines and finally the osteoclastic giant cell causes bone resorption making the hallmark feature of CGCG.[11,12]

Another theory is the vascular hypothesis that suggests that CGCG belongs to the spectrum of mesenchymal proliferative vascular primary jaw lesions. Perhaps the most widely held view is that the initial CGCG is an

endosteal hemorrhage.[13] El- Labban in the year 1997 studied CGCG and observed that majority of vessels showed intravascular fibrin thrombi and endothelial cell damage with gaps in the cell walls. She also noted that one of the gaps in a vessel had been sealed by a giant cell. The author suggested that the presence of the giant cell closed the gap and stopped haemorrhage and the main purpose for the presence of the stromal cells is the repair not only of the hematoma but also of its contributing vessels.[14]

Choung et al. (1986) and Ficarra et al. (1987) defined the lesion into two types, based upon its clinical and radiographic features-[15]

1. Non aggressive lesions make up most cases, exhibit few or no symptoms, demonstrate slow growth and do not show cortical perforation or root resorption of teeth involved in the lesion.
2. Aggressive lesions are characterized by pain, rapid growth, cortical perforation, and root resorption. They show a marked tendency to recur after treatment, compared with the nonaggressive types.

In our case, patient had pain, swelling, root resorption, suggestive of aggressive lesion with a tendency to recur and therefore patient was kept on regular follow ups for a period of 6 months.

CGCG occur initially as a unilocular, cystlike radiolucency, but as it grows larger, it frequently develops an architecture that causes a soap-bubble type of multilocular radiolucency.[16] An imaging feature characteristic associated with CGCG, is the presence of subtle granular bone pattern at the periphery of the expanded bone.[17]

Generally, if the lesion is located anterior to the permanent molars and possibly crossing midline, with a multilocular radiographic pattern with the patient under 30 years of age, a provisional diagnosis of CGCG can be considered.[18]

Kaffe et al. (1996) in their study on 80 cases found that 51% of the lesions were multilocular, 44% were unilocular, 5% were not loculated, and 68% of all multilocular lesions were seen in Mandible.[19] They also established a statistically significant correlation between the locularity of lesions and their increasing size. Root resorption was observed in 24% male patients and only 6% of female patients.[19]

The radiological differential diagnosis can include Ameloblastoma, odontogenic keratocyst and Aneurysmal Bone Cyst, and sometimes also odontogenic myxoma and central haemangioma of bone (the latter two often exhibit more of a honey-combed appearance though). For patients in the young age range for CGCG, ameloblastic fibroma, cemento ossifying fibroma (early stages), and adenomatoid odontogenic tumor.[18]

Histologically, CGCG consist of loosely arranged spindle-shaped stromal cells in a fibrous stroma, hemosiderin deposits, macrophages and varying amounts of inflammatory cells.[7] The hallmark of CGCG is the multinucleated giant cells that are located especially in the hemorrhagic areas. Metaplastic bone formation is also seen, and mitoses might be abundant.[6]

Various conditions 'mimic' the histological presentation of CGCG including peripheral giant cell granuloma, Giant cell tumor, Brown Tumour of hyperparathyroidism, Cherubism, Aneurysmal bone cyst and Fibrous dysplasia.[18]

The management of CGCG can include

conventional surgery with or without medical adjunctive treatment or resection en-bloc for the aggressive variant. Radical surgery leads to more aesthetic and functional faults and requires anatomical reconstruction and rehabilitation, which in most cases has a poor functional outcome.[19] A number of studies have reported recurrence rates ranging from 10% to 50%.[20] Although most common therapy is surgical curettage but high recurrence rate has raised concern and led to a search for other treatment options.[21,22]

Jacoway et al were the first to describe the application of intralesional steroids.[23] Intralesional steroid injections into bone cysts result in growth of fibrous connective tissue and reossification by inhibition of lysosomal proteases and the apoptosis in osteoclasts.[24] However, the application of Intralesional steroids has controversial findings.[21] Patients suffering from diabetes, peptic ulcers, infections and immune-compromised and pregnant individuals are not suitable for intralesional treatment. The use of calcitonin was proposed in 1993 by Harris, based on the similarity that exists between CGCG and the tumours of the hyperparathyroidism at histological level.[25] Although the calcitonin's mechanism of action remains unclear, it is suggested that it has a direct inhibitory effect of the osseous reabsorption through the osteoclasts, increasing the absorption of calcium of the bones and favouring the osseous cicatrisation. Reported disadvantages of calcitonin include the long term treatment with the daily injections, high costs and adverse effects.[22] Interferon alpha is known for its inhibition of the angiogenesis in the tumours and its application has recently been instituted in these types of lesions.[26] Imatinib was recently suggested as a treatment option for CGCG. Imatinib is a protein tyrosine kinase inhibitor that specifically inhibits the growth of cells of the monocyte macrophage lineage by abrogating signal transduction through c-fms.[22]

Conclusion

The relatively high frequency of CGCGs in the population makes it important for clinicians to under-stand their clinic-radiologic presentation and clinical behaviour. Classifying these lesions as 'aggressive' or `nonaggressive' can help in choosing the most appropriate treatment. We suggest that the `nonaggressive' counterparts can be managed effectively with conservative surgical approach. However, in cases of `aggressive' lesions seen more often in a younger population, instead of more morbid surgical procedures, an alternative or adjuvant therapy can be relied upon.

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Autologous Platelet-Rich Fibrin: A Boon to Periodontal Regeneration - Report of Two Cases

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Abstract:

Oral health continues to be a major health problem worldwide, chronic periodontitis being one of the most prevalent oral diseases. The pathologic hallmark of periodontitis is the destruction of the supporting structures of the teeth involved. The first goal of periodontal therapy is the complete healing of inflammatory condition and next is the regeneration of all lost structures. One of the most important and currently unsolved problems in clinical periodontics is the covering of multiple adjacent recessions and predictable successful treatment of furcation defects. Currently, no single regenerative material can be considered the gold standard in the treatment of periodontal defects. Recently, importance has been given to the use of platelet-rich fibrin (PRF) for predictably obtaining periodontal regeneration. PRF is an intimate assembly of cytokines, glycan chains, and structural glycoproteins, which are enmeshed within a slowly polymerized fibrin network; it has the potential to accelerate soft and hard tissue healing. The purpose of this article is to present the clinical results of a Grade II mandibular furcation defect and Millers Class I gingival recession treated with PRF.

Keywords: Platelet Rich Fibrin, Periodontal Regeneration, Furcation Defect.

Introduction

Periodontal disease is an inflammatory disease that destroys the periodontium, including the alveolar bone, and if left untreated, can lead to tooth loss. Dental surgeons are constantly looking for an "edge" that jump starts the healing process to maximize predictability as well as the volume of regenerated periodontal tissue. Therefore goals of conventional periodontal therapy, both non surgical and surgical, have aimed at improving the health of the periodontal tissues and at arresting the periodontal disease, but this therapy does not replace the lost tissues.[1] Over the years, there has been a growing interest in exploring the ability to regenerate the tissues lost to the disease, and thereby not only arresting the disease, but in reversing it.[2] The clinical attachment loss seen in periodontal diseases can be manifested as pocket and recession accompanied with bone loss.

Marginal tissue recession is due to the displacement of the gingival margin apical to the cementoenamel junction with exposure of the root surfaces to the oral cavity. It may be a common cause of concern for the patient for a number of reasons like esthetic considerations, root hypersensitivity or root caries. Numerous periodontal plastic surgical

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procedures have been proposed in gingival recession treatment with varying predictability and success rates. One of the most widely employed procedures to cover denuded roots is the coronally advanced flap (CAF) procedure.[3] The predictability can be increased by combining CAF with other regenerative techniques such as a connective tissue graft, enamel- matrix derivative, synthetic allograft, autologous platelet concentrates including platelet-rich fibrin (PRF) etc.

It has been reported that molars with furcation involvement, caused by periodontitis, have a higher rate of periodontal breakdown and respond less favorably to periodontal therapy than molars without furcation involvement or single-rooted teeth.[4] This can be explained by an anatomy that impedes accessibility for individual oral hygiene in the molar region and professional root debridement.[5] Multiple approaches have been used to resolve furcation defect including autografts, demineralized freeze-dried bone allografts (DFDBAs), bovine-derived xenografts, barrier membranes, and combinations of membranes and bone grafts.[6] Although these regenerative materials are still used today, the introduction of biomimetic agents, such as enamel matrix derivatives, platelet rich plasma (PRP), platelet-derived growth factor, and bone morphogenetic proteins, has given new promise for better outcomes in furcation treatment.

Platelet- rich fibrin is a second generation platelet concentrate and is defined as an autologous leukocyte and platelet-rich fibrin biomaterial. It was first developed by Choukroun et al (2001).[7] Unlike other platelet concentrates like PRP, this technique does not require anticoagulants nor bovine thrombin or any other gelifying agent. PRF is a strictly autologous fibrin matrix containing a large quantity of platelet and leukocyte cytokines.

The crux of PRF synthesis lies in the attempt to accumulate platelets and release cytokines in a fibrin clot. The PRF clot is yielded by a natural polymerization process during centrifugation, and its natural fibrin architecture seems responsible for a slow release of growth factors (such as transforming growth factor 1β, platelet derived growth factor and vascular endothelial growth factor) and matrix glycoproteins (thrombospondin-1) during ≥7 days.

PRF promotes angiogenesis because as it has low thrombin level optimal for the migration of endothelial cells and fibroblasts. PRF entraps circulating stem cells due to its unique fibrin structure. This property of PRF finds application in healing of large osseous defects where there is migration of stem cells differentiating into osteoblast phenotype. PRF also helps in facilitating adhesion and spreading of cells, regulates gene expression of growth factors, growth factor receptors, proteins, and determines the outcome of a cell's response to growth factors due to the presence of collagen, fibronectin, elastin, other non-collagenous proteins, and proteoglycan in the extracellulat matrix of PRF.[8]

PRF in various surgical procedures like, degree II furcation,[9] sinus floor augmentation during implant placement,[10] with coronally displaced flap in multiple gingival recessions[11] and in facial plastic surgery procedures[12] have been shown to provide promising results.

This report presents a case of single gingival recession treated by combined CAF-PRF

novel technique and a case of grade II furcation defect treated with PRF and bone graft.

Case 1

PRF in Gingival Recession

A 32-year-old male was referred by his general dentist for an evaluation of recession over the buccal prominence of the maxillary left canine. At the time of presentation, clinical examination revealed 4 mm of clinical attachment loss. The distance between the cemento-enamel junction and gingival margin was 2 mm and the distance between the gingival margin and the base of the pocket was 1 mm. (Fig.1)

Fig. 1: Class I Recession in relation to canine.

Pre Surgical Therapy

The surgical procedure was explained to the patient and the informed consent obtained. Preparation of the patient included scaling and root planing of the entire dentition and oral hygiene instructions. The following parameters were recorded before and after surgery.

Probing Pocket Depth

Gingival recession (GR), by measuring the distance between the cemento – enamel junction (CEJ) to the free gingival margin.

PRF Preparations

The PRF was prepared in accordance with the protocol developed by Choukroun et al.[13] The patient's venous blood sample was taken before surgery in a 10 ml glass test tube without anticoagulant and centrifuged at 3000rpm for 10 minutes.

The resultant product consist of 3 layers

- Top most layer consisting of acellular PPP
- PRF clot in the middle
- RBCs at the bottom

Because of the absence of an anticoagulant, blood begins to coagulate as soon as it comes in contact with the glass surface. Therefore, for successful preparation of PRF, speedy blood collection and immediate centrifugation before the clotting cascade is initiated, is absolutely essential. PRF can be obtained in the form of a membrane by squeezing out the fluids in the fibrin clot. (Fig. 2)

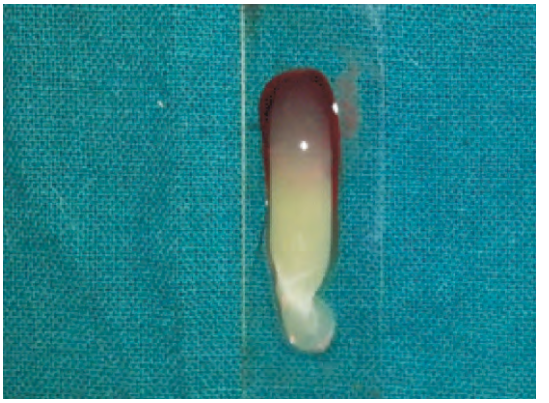

Fig. 2 : Platelet rich fibrin separated from RBC clot

Surgical Procedures

The concept of coronally advanced flap was introduced by Pini Prato et al.[14] Following induction of local anaesthesia, the exposed and the intra sulcular root were gently planed with Gracey curette 7-8 to reduce root convexity. Immediately after this the root surface was washed with water spray for 60 seconds. The horizontal were made mesial and distal to the defect at the level of CEJ to the adjoining tooth terminated not less than 0.5mm away from the gingival margin of

adjacent teeth. Two oblique incisions were carried out from the mesial and distal extremities of the horizontal incisions. An intrasulcular incision was made connecting the horizontal incision. (Fig. 3) A full thickness flap was raised towards the mucogingival junction. Then a partial thickness was performed to a level that would permit adequate coronal positioning of the flap (Fig. 4). The root surface was carefully debrided using hand instrument. The PRF membrane was placed over the denuded root and stabilized (Fig. 5). The flap was slided to completely cover the membrane and secured using interrupted suture (Fig. 6).

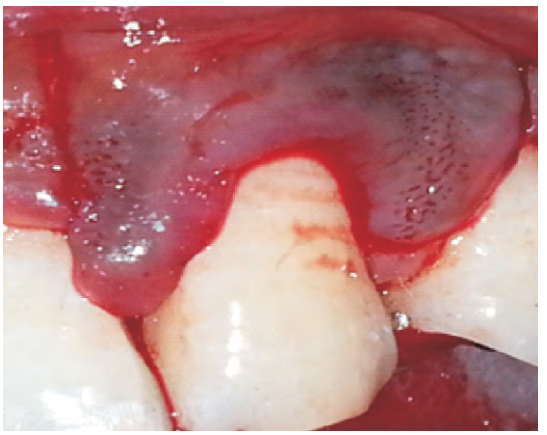

Fig. 3: Incisions given

Fig. 4: Flap reflected

Fig. 5: PRF placed

Fig. 6: Flap coronally displaced and sutured

Post Operative Care

Patients were placed on 0.12% chlorhexidine digluconate mouthrinse for four weeks. Systemic antibiotics were prescribed and advised to follow routine post-operative periodontal mucogingival instructions, with minor modifications. They were warned to avoid pulling on their lips to observe the surgical site. The surgical site was repacked after 1 week. Both dressings and sutures were removed 10 days after surgery.

Results

The patient was examined weekly up to 1 month after surgery and then at 3 months. Soft tissues healed within normal limits, and no gingival recession was noted after treatment (Fig. 7).

Fig. 7: Healing after 3 months

Case 2

PRF in Grade II Furcation

A 36-year-old female patient presented with mild pain and sensitivity of a lower left back tooth. The probing pocket depth (PPD) on the mid-buccal aspect of the tooth #36 (first molar) was 7 mm, while the clinical attachment level (CAL) was 8 mm, without tooth mobility. A Grade II furcation involvement was noted on the buccal side of #36 with a horizontal probing depth (PD) of 4 mm detected using Naber's probe. The tooth was vital. A periapical radiograph was taken using the standardized techniques, which revealed the presence of radiolucency in the furcation area of tooth #36. After a thorough Phase I therapy using ultrasonic scaler and standard Gracey curette, reevaluation was done after 8 weeks. The mid buccal PD of tooth #36 was 5 mm and the CAL was 6 mm. The horizontal PD in the furcation showed no change, with the persistence of Grade II furcation from the buccal side. Therefore, regenerative periodontal surgery using autologous PRF was planned, and informed consent was obtained for the same.

PRF Preparations

PRF was prepared in accordance with the protocol developed by Choukroun et al[13] as described above.

Surgical Procedure

After induction of local anesthesia, buccal vertical and sulcular incisions were made, and mucoperiosteal flaps reflected (Fig. 8). Meticulous defect debridement and root planing were carried out using area specific curettes. Bone graft was introduced into the furcation defect (Fig. 9) and then PRF membrane was placed over it (Fig. 10). The mucoperiosteal flaps were repositioned and secured in place by sling sutures by using 4-0 non-absorbable black silk (Fig. 11).

Fig. 8 : Grade II Furcation Involvement in mandibular molar

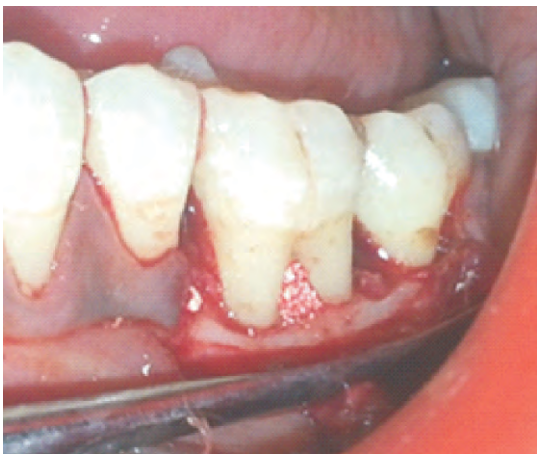

Fig. 9 : Bone Graft placed

Fig. 10 : PRF membrane placed

Fig. 11: Flap sutured

The surgical area was protected and covered with periodontal dressing. Postoperative instructions were given, and the patient was prescribed amoxicillin 500 mg t.i.d and paracetamol 500 mg T.I.D for 5 days. The sutures were removed after one week. Surgical wounds were gently cleansed with 0.2% of chlorhexidine digluconate, and patients were given instructions for gentle brushing with a soft toothbrush. Healing was reviewed in subsequent visits at 1, 3, and 6 months.

Results

The patient was examined weekly up to 1 month after surgery and then at 3 and 6 months. Soft tissues healed within normal limits, and no gingival recession was noted after treatment. Re-examination at 6 months after the periodontal surgery revealed reduction in PPD (from 7 mm to 3 mm) and CAL (from 8 mm to 4 mm), with no sign of bleeding on probing and significant radiographic bone formation in the Grade II furcation defect.

Discussion

The aim of periodontal therapy is to arrest and control the periodontal infection and ultimately regenerate lost periodontal structures. The present paper evaluates the clinical efficacy of PRF in the treatment of Grade II furcation defect and Millers Class 1 gingival recession. The uneventful healing in the patients was in agreement with the findings of previous studies, thus supporting the excellent ability of autologous PRF to enhance periodontal wound healing. PRF afforded a great improvement in soft and hard tissue regeneration. The findings in the presented cases were in accordance with those of previous studies done by Pradeep *et* al.[9] in the treatment of mandibular Grade II furcation and those of Aroca et al.[15] in the treatment of multiple adjacent gingival recession. A report of clinical trails comparing the growth factors content of PRF and PRP was presented by Dohan and Diss at the second international Symposium on growth factors held in May 2005.[16] Combining the growth factors has been shown to accelerate bone repair and promote fibroblast proliferation, and increase tissue vascularity, rate of collagen formation, mitosis of mesenchymal stem cells and endothelial cells, as well as osteoblasts, playing key roles in the rate and extent of bone formation. This activity, together with increased vessel ingrowth, is mediated by PDGF and TGF.[17]

Chang et al.[18] conducted a study to present the clinical and radiographic changes of a patient with periodontal intrabony defects treated

with PRF. From a clinical and radiologic point of view at 6 months after surgery, the use of PRF as the sole grafting material seems to be an effective modality of regenerative treatment for periodontal intrabony defects. Pradeep et al[19] conducted a study to explore the clinical and radiographic effectiveness of autologous PRF v/s PRF+HA (Hydroxyapatite) in treatment of intrabony defects in chronic periodontitis subjects. It resulted in significant improvements of clinical parameters compared with baseline. HA when added to PRF increases the regenerative effects observed with PRF in the treatment of human three wall intrabony defects.

The current case report assesses the clinical and radiographic parameters useful for evaluating the effect of autologous PRF on soft and hard tissue. In addition to the claimed benefits of using the PRF membrane in soft tissue wound healing, our results show the beneficial effects of using a PRF membrane for root coverage procedures. PRF preparation is simple, easy, fast, and cost-free, without the use of any anticoagulant. It causes sustained release of growth factors. Therefore, PRF is considered the leader in fibrin technology.

Conclusion

Due to its peculiar properties, the natural fibrin biomaterial PRF has great potential for surgical wound healing. PRF has been shown to be an effective regenerative material in the management of Grade II furcation, displaying greater reduction in pocket depths and gain in clinical attachments with significant radiographic evidence of bone fill. Similarly, for the treatment of multiple gingival recessions, PRF can be considered as a viable cost-effective option.

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SCREWONOMICS……Way to Implant Success

Gupta S[1], Bhargava A[2], Bansal S[3], Sahajwani A[4]

Abstract:

Screw loosening is one of the most common and serious problem associated with the implant restorations. In order to prevent and solve this problem, the clinician must understand the screw joint mechanics. This article presents an overview on different types of implant screws, screw tightening mechanics, recommended torque values, causes, sign and symptoms of screw loosening.

Keywords : Dental implant, Preload, Torque, Screw Mechanics, Screw loosening.

Introduction

Screw loosening is one of the most common and serious problems associated with the implant restorations. There is no consistent data available on the incidence of screw loosening. Some studies report that 2% of all the screws loosen, while others report a frequency of up to 40%[1-3]. Naert et al reported higher frequency of screw loosening in full arch restorations as compared to single tooth restorations.[3] Jemt et al reported 26% loosening of gold retaining screws and 43% loosening of abutment screws over the first year on single tooth implants.[4] Becker and Becker reported 38% loosening of single implant restorations in the posterior maxilla and mandible.[5] As screws are used for securing abutments to implants, screw loosening may be an early warning sign of inadequate biomechanical design and/or implant occlusal overload.[6-8] In order to prevent and solve the problem of loose screws, the clinician must understand the screw joint mechanics.

Two types of screws are commonly used for implants i.e. abutment and lab screws. Abutment/prosthetic screws are the screws used for securing abutments to implants. They can be made of pure Ti / Titanium alloy / Gold alloy. They can be coated or non-coated (Fig. 1). Lab screws are titanium screws designed to be used during the laboratory fabrication procedures where they retain abutments to the lab analogs. This is to ensure the final abutment screws are not stretched or damaged during the manufacturing process.[9]

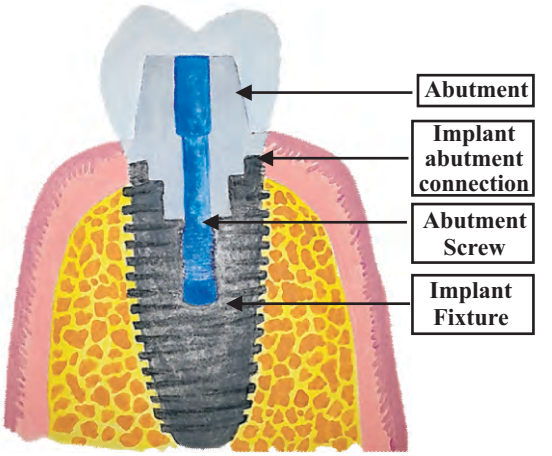

Fig. 1 : Longitudinal section of Implant-abutment connection

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Mechanics of screw tightening

When screw is tightened by applying torque, a force develops within the screw called the preload. As a screw is tightened, it elongates and produces tension. Elastic recovery of the screw pulls the abutment and implant together, creating a clamping force. Opposing the clamping force is a screw joint-separating force, which attempts to separate the screw joint. Screw loosening occurs when the screw joint-separating forces acting on the screw joint are greater than the clamping forces holding the screw unit together.[10]

The amount of preload present at the threads of a screw depends on the applied torque,[5] the presence and type of lubricant, the physical properties of the materials in contact, and the settling of the screw after initial torquing.[11] Surface imperfections lead to increased friction and decreased preload. Removal and retorquing of the screw reduce surface imperfections, and the use of lubricants decreases friction; both result in increased preload. Increasing the preload maximizes the stability of the screw joint by increasing the clamping force.[12,13]

Recommended Torque Values[14]

Type of screw	*Recommended torque*
Cover screw/Healing abutment	5-10 Ncm using manual screw driver
Lab screw	5-10 Ncm using manual screw driver
Abutment screw	30-35 Ncm using torque wrench

Causes of Screw loosening[15]

There are multiple reasons for screw loosening such as inadequate tightening, improper prosthesis fit, excessive loading and screw settling. In an effort to decrease friction and increase preload, titanium screw surface have been treated with gold, tungsten carbon carbide and nitrides coating.

Signs and symptoms of screw loosening[16]

a. Loose implant-supported crown.
b. Mobility of the crown/bridge abutment with or without gingival inflammation.
c. Possible redness or swelling of the surrounding tissues.
d. Pain severity: there may or may not be any pain or discomfort around the crown; usually minimal or moderate pain.
e. Manipulation of crown may illicit some rotational and possibly slight vertical movement.
f. The bite may feel different or high on the implant restoration.

Screw loosening in different types of implant-abutment connections

Most in-vitro studies have demonstrated that internal connection implants are more stable than external connection implants. Sahin et al conducted a study to evaluate which type of implant abutment connection shows least occurrence of screw loosening. They found that morse tapered geometries of connections present a better harmony and stabilization which may avoid extreme deformation of mating surfaces and microleakage.[17]

Conclusion

To prevent the problem of screw loosening, implant screws should be re-tightened 10 minutes after the initial torque application as a routine clinical procedure to help compensate for the settling effect. Mechanical torque gauges should be used instead of hand drivers to ensure consistent tightening of implant components to torque values recommended by implant manufacturers.[18]

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EXPODENT INTERNATIONAL INDIA, 2014
26,27, 28th December 2014,
Pragati Maidan, New Delhi
www.expodent-india.com

INDIA INTERNATIONAL DENTAL CONFERENCE (IIDC)
Venue- Nehru Centre, Mumbai, India
Dates- 13th-15th Feb 2015
http://www.iidc.in/

AEEDC, DUBAI
17 – 19th February 2015
Dubai International Convention & Exhibition Centre
www.aeedc.com

ACADEMY OF OSSEOINTEGRATION ANNUAL MEETING,
March 12-14, 2015
Moscone Convention Center, San Francisco, California
http://www.osseo.org/futureMeetings.html

APEC'S 18TH SCIENTIFIC CONGRESS, DEAD SEA, AMMAN - JORDAN
Wednesday, 08 April 2015 8:00 AM to Friday, 10 April 2015 5:00 PM
18th Scientific Congress of Asia Pacific Endodontic Confederation (APEC) April 8 - 10, 2015
King Hussein Bin Talal Convention Centre,Dead Sea, Amman - Jordan
www.apec15.jo

APDC 2015 — The 37th Asia
Pacific Dental Congress
03 Apr 2015 → 05 Apr 2015
Singapore, Singapore
http://apdc2015.sg/

I.T.S
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I.T.S-The Education Group

Organises

One Day Workshop on "Current Trends in Education & IQA"

6 CDE Point

Date: 20th Dec 2014

Venue

Main Auditorium

Hosted By:

I.T.S Centre for Dental Studies & Research,
Delhi-Meerut Road, Muradnagar, Ghaziabad-201206, (U.P.)

I.T.S DENTAL COLLEGE & HOSPITAL

Recognized by DCI & Affiliated to C.C.S. University, Meerut
47, Knowledge Park-III, Greater Noida-201 308 Ph. : 0120-2331082 / 83 / 89 Fax : 0120-2331083
Mob. : 07838555877, 07838555878, 07838555879 E-mail : dentalgn@its.edu.in
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BDS

(Bachelor of Dental Surgery)

IXth Batch

100 Seats

NAAC Accredited Dental College

Highlights:

- Well equipped OPD with state-of-the-art equipment
- Highly qualified, committed and competent faculty
- Regular conductance of National Conferences, PG Conventions, CDE programmes and Workshops at college campus.
- 100 bedded multi speciality hospital within the campus
- Four Dental Satellite Clinics
- More than 450 patients treated everyday
- Round the clock internet & Wi-Fi connectivity
- Free treatment & transport to poor patients

MDS
27 seats
in all nine
specialities

Intellectual Resources

Dr. Anmol S. Kalha, Director-PG Studies
Has a total experience of 36 years in the field of Dental Education, Practice and Research. He has served around the world with distinction with the Indian Armed Forces for over 2 decades. He is an invited faculty at Leeds Dental Institute, UK and a visiting professor at the University of Health Sciences, Phnom Penh, Combodia.

Dr. Puneet Ahuja, Principal has a experience of more than 20 years in academic.

College OPD: Clinical exposure is the most important milestone for the budding dentists future and thus a robust OPD is a prime requisite. The college boasts of a daily OPD of more than 450 patients. The OPD is equipped with state-of-the-art equipment for diagnosis and treatment. The college has also established four satellite clinics at Village Ghodi Baccheda, Bilaspur, Noida, Greater Noida Medical University and Bulandshar Jail.

Our students perform better: Kriti Puri got gold medal for securing first rank in University in B.D.S course for the academic year 2011. Gold medal was presented by Vice-Chancellor of C.C.S University, Meerut.

Foreign Collaboration: The college has an Academic Collaboration with University of Leeds (U.K), to facilitate mutual sharing of knowledge through student exchange programme.

I.T.S

ESTD. 2000

CENTRE FOR DENTAL STUDIES & RESEARCH

Recognized by Dental Council of India and Affiliated to C.C.S. University, Meerut

Murad Nagar, Ghaziabad - 201 206

Ph. 01232-225380/81/82 Fax : 01232-225382, Mob : 8447753520/21/22, Email : dental@its.edu.in

www.its.edu.in www.facebook.com/ITSdentalcollege.Ghaziabad

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"A" Grade NAAC Accredited Dental College

BDS

(Bachelor of Dental Surgery)

XV^th^ Batch

100 Seats

Highlights:

- One of the best Dental College with patient inflow of more than 750 patients per day which give our students a good clinical exposure.
- First Dental College in Northern India with air conditioned OPD.
- Regular conductance of National Conferences, PG Conventions, CDE programmes and Workshops at college campus.
- Best pass percentage of students in the University which Includes top rank positions in the University exams.
- 100 Bedded multi-speciality hospital within the campus.

MDS
50 seats
in all nine specialities

Dr. Hari Parkash - Director General

Intellectual Resources

Strong workforce of faculty and staff under the able guidance and leadership of Director-General, Dr. Hari Parkash who has previously worked for 36 years at All India Institute of Medical Sciences (AIIMS).

Principal: Dr. Vinod Sachdev (MDS, Pedodontics). He has 26 years Academic Experience. Former Faculty PGIMER, Chandigarh.

Vice-Principal: Dr. Devicharan Shetty (MDS, Oral Pathology). He has 15 years Academic Experience.

1. We give greater Academic Exposure to our students in the form of Conferences/Workshops
2. Academic Collaboration with Foreign University
3. We encourage students at Sports & Cultural Activities
   Celebrities from Bollywood, Sports etc. regularly invited to share their success stories Ram Gopal Verma, Ayushmaan Khurrana, Kunaal Roy Kapoor, Piyush Chawla @ I.T.S and Dr. Palash Sen (Euphoria Band) performing at Annual Cultural Fest "Occlusion"
4. Convocation & Alumni Meet
5. 
   Top rank in University - Megha Nagpal got Gold Medal for securing 1st rank in CCS University in BDS Course(2008-2013)

6 Satellite Centres At

*Village Rawli
*Village Arthala, Mohan Nagar, Ghaziabad *Dasna Jail, Ghaziabad
*District Hospital, Sanjay Nagar *MMG Hospital, Ghaziabad
*Nandgram, Ghaziabad

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(Estd. : 1995)

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CAMPUS - 2 (Estd. 2000)

- BDS
- MDS
- BPT
- MPT
- B.Sc. (Biotech)
- M.Sc. (Biotech)
- B.Pharm
- M.Pharm
- Ph.D (Pharmaceutical Science)

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E-mail : pharmacy@its.edu.in
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- B.Tech • CS • EC • ME • EE • Civil
- M.Tech • CS • EC
- MBA
- PGDM

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E-mail : itsim@its.edu.in
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CAMPUS - 4 (Estd. 2006)

- BDS
- MDS

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