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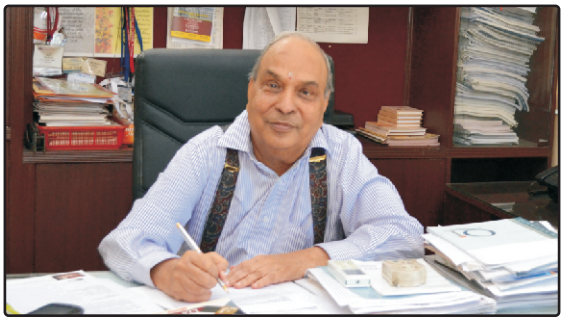

In today's world from routine life to the use of complex equipment, digital technology has taken a front seat in every aspect of our lives and similarly digitalization has also paved its way into the field of dentistry.

From diagnosis of diseases to treatment planning in case of implants, orthodontic treatment or a simple single unit crown to restoration of oral health and function using milled restorations, digitalization has become a very integral part of every branch of dentistry.

With the rapid developments in the field of computers and technology, newer methods of image acquisition and processing are available, which have been made very easy to perform. These systems utilize electronic media to record the image and advanced computer software to process the acquired image and also to modify it according to our needs. The technological changes taking place in this era of dentistry is totally revolutionizing the way of fabricating restorations. The development of CAD-CAM has enabled us to utilize the power of computer design and fabricate highly aesthetic, precise and durable restorations.

The rate at which new technologies are entering the marketplace and the limited amount of knowledge regarding the relationship between the physical characteristics and clinical outcomes, sustain a high demand for diagnostic efficacy testing.

In advertisements and dental journals, computer based procedures are often praised as safer and being more economically efficient, comfortable, precise and nearly defect free restorations than their predecessors. While the other benefits associated with computer aided design-computer aided manufacturing (CAD-CAM) dental restorations include industrially prefabricated and controlled materials, an increase in quality and reproducibility , data storage commensurate with a standardized chain of production. However all these benefits of CAD-CAM have to be balanced against the high initial cost of installing these gadgets and also the need of additional expertise required by laboratory personnel to operate this equipment efficiently.

Markets are changing across the board, and the dental industry is no exception. The catalysts for change in this industry have been the digital platforms that have been developed. Working in concert with the economic situation, we find ourselves in today meaning that dental technologists have to embrace the new technologies to stay in a job. For the dental materials scientist, these technologies will throw up a whole new way of materials processing and with it the opportunity to use a whole new range of materials.

So it's high time to get digital technology passionately, as all these innovative technologies will continuously change and challenge present ways of practicing dentistry. But for institutions, teaching of conventional ways of fabricating various prosthesis are still very essential to familiarize the students with the basic science of laboratory techniques before shifting to digitalization.

Dr Hari Parkash
Editor-in-Chief

Survey on Public Perception Towards Oral Health and Oral Hygiene Practices in Muradnagar, India.

Singh A[1], Sharma A[2], Dixit A[2], Arora D[2], Dhaginakatti AS[3], Kote SK[4]

Abstract :

Public perception towards oral health and oral hygiene practices plays an imperative role in planning dental care by Dental Professionals. **Aim:** To study and compare perception towards oral health and oral hygiene practices among patients attending outreach dental programs in rural areas of Muradnagar. **Materials and Method:** Cross Sectional survey was conducted on patients aged above 18 years who attended 28 rural outreach dental programs during April-June 2013, conducted by Public Health Dentistry Department, I.T.S Dental College, Muradnagar. 543 patients with participatory consent on explaining the purpose of study were recruited by convenient sampling method. Data was recorded in a pretested, validated, structured, close ended questionnaire through interview by 3 calibrated interviewers. The questionnaire included variables on socio demography, perception towards oral health and oral hygiene practices. Data was analysed by SPSS 18.0. Chi square test (p value < 0.05 at 95% CI as significant) analysed the association between variables. **Results: P**redominant perceptions were tooth extraction as the only remedy for painful tooth, followed by bleeding of gums as normal while tooth brushing in 68% and 65% of patients. Difference in perception towards oral health ($p<0.001$) and oral hygiene practices ($p< 0.01$) were found between age group and level of education. **Conclusion:** This study shows false public perception towards oral health and oral hygiene practices more noticeable in older age, illiterate and low socioeconomic class. Interventions to alleviate false perception towards oral health among public needs to be considered for narrowing the effort and effect gap in oral health promotion.

Keywords: Perception, Oral Health, Oral Hygiene Practices, Rural, Outreach Dental Programmes.

Introduction

Oral health goals 2020 targets on not only to increase the proportion of population with access to oral health care but also to increase the proportion of population with adequate information. Oral disease is the fourth most expensive disease to treat[1] in many low – income countries of the developing world, the total cost of traditional operative dental care would exceed the cost for entire health care.[2]

Perception is a process through which an individual becomes conscious about and interpret information regarding the situation, but the course of perception is essentially subjective in nature because it is not a precise reflection of the situation. Hence, a situation

Corresponding Author : Dr. Aruna D.S, Department of Public Health Dentistry, I.T.S Dental College, Delhi-Meerut Road, Muradnagar, Ghaziabad – 201 206, Uttar Pradesh, India. **Email:** arunads_samay @yahoo.com **(M)** 09897481173

1. Senior Lecturer, Department of Public Health Dentistry, I.T.S Dental College, Muradnagar Ghaziabad.
2. Post Graduate Students, Department of Public Health Dentistry I.T.S Dental College, Muradnagar Ghaziabad.
3. Professor, Department of Public Health Dentistry, I.T.S Dental College, Muradnagar Ghaziabad.
4. Reader, Department of Public Health Dentistry, D.J Dental College, Modinagar Ghaziabad.

may be the same for two individuals but the interpretation of that situation by both of them may be immensely different.[3] Perceptions on need for dental care play a key role as to whether people in general will seek dental care and that lack of need perceptions constitutes an important barrier for utilization of health care services.[4,5] An individual's perception of oral health measures the value attached to oral health and the likelihood of seeking oral care to achieve optimal oral health status.[6]

In a country like India, most of the people are unaware of the existence of dental profession and those who are fortunately aware of the fact do not have information about various specialties in dentistry rendering different modalities of the treatment. The lack of awareness among public towards oral health besides lack of knowledge regarding what our profession can offer and the benefits they can reap out of it are the major hurdles and a lacuna for the success of primary prevention of oral diseases.

Villages, which constitute a large part of India should be given due attention for dental health education and awareness programmes to combat rural-urban disparities in oral health perception and dental care.[7] The deeply ingrained public perception that oral health is in some way less important and separate from general health needs to be evaluated timely as they hinder utilization of dental care by the patients despite delivery of dental care by oral health professionals through organized outreach dental programmes.

Interventions to overcome these false perceptions and beliefs can start at the grassroots level, which can then lead to a coordinated national movement aimed to increase oral health literacy of public to obtain, process, and understand basic oral health information and services which are needed to make appropriate health decisions. There was dearth of reported studies on public perception towards oral health and oral hygiene practices in the catchment area of our Dental College in Muradnagar. Hence forward, this community based survey was conducted to assess the perception towards oral health and oral hygiene practices of patients attending dental outreach programmes in rural areas of Muradnagar, Ghaziabad.

Materials & Method

A community based Cross sectional survey was conducted in different villages of Muradnagar during outreach dental programmes carried out by the Department of Public Health Dentistry, I.T.S – Dental College, Muradnagar Ghaziabad. A total of 46 outreach dental programs were conducted from April to June 2013. Out of which 28 outreach dental programs were conducted for providing oral health care to the people residing in rural areas. Pilot survey was conducted in the month of February 2013 on randomly selected patients attending outreach programs to check for the feasibility of present study.

On approval of the study protocol by the Institution authority for internal evaluation, this study was scheduled for implementation during the month of April-June 2013. The study group were recruited by employing convenience sampling method comprised of 543 patients aged 18 years and above a representative sample of rural populace who attended outreach dental programs for dental check-up / treatment conducted in rural areas of Muradnagar. The purpose of study was explained to study participants and those with

expressed consent to participate voluntarily were included.

A pretested, validated, structured, close ended questionnaire was prepared and data was recorded through structured interview by three calibrated interviewers. The questionnaire was designed in Hindi language based on the predominant perceptions of the local rural population elicited during pilot study and from previous reported studies. The questionnaire included socio demographic details of the participants like age, gender, education level and socioeconomic status including questions comprising on variables based on their perceptions towards oral health and their oral hygiene practices. The socioeconomic status determination of the study group was based on Modified Kuppuswamy Scale.[8]

The mean Kappa co-efficient values for inter-examiner reliability was found to be 0.88. Study participants were interviewed for 8-10 minutes by calibrated interviewer using the predesigned structured questionnaire and were instructed to respond only one relevant answer verbally for each question asked. The survey forms were rechecked to assess for any missing information.

Statistical Analysis

The statistical analysis was carried out in 2 steps. The data obtained was compiled systematically, transformed from a pre-coded proforma to Microsoft excel and a master table was prepared. Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous variables are presented as Mean ±SD (Min-Max) and categorical variables are presented in Numbers (%). Chi square test was employed to determine any association between the socio-demographic variables and the perceptions towards oral health and oral hygiene practices. The level of significance was fixed (p-value < 0.05 at 95% confidence level). The statistical software SPSS 18.0 was used for analysis of the data.

Results

Response of 543 patients recorded in the questionnaire were analysed. The mean age of the study participants was 30.26 years (SD = 11.91 years). Among 543 participants majority were in the age group of 26 – 44 years 198 (37%) as shown in (Figure 1). A female preponderance of 55% (298) was observed among the participants (Figure 2). Education level varied among the participants, majority of them were illiterate 34% and only 13% had high level of education. (Figure 3). Majority of the participants belonged to lower socioeconomic status 73% with only 27% in the upper socioeconomic status (Figure 4).

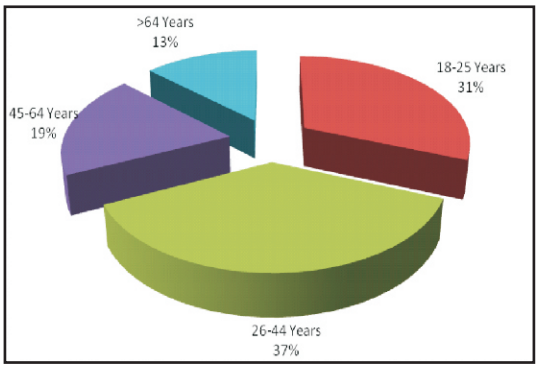

Figure-1: Agewise Distribution of the Participants

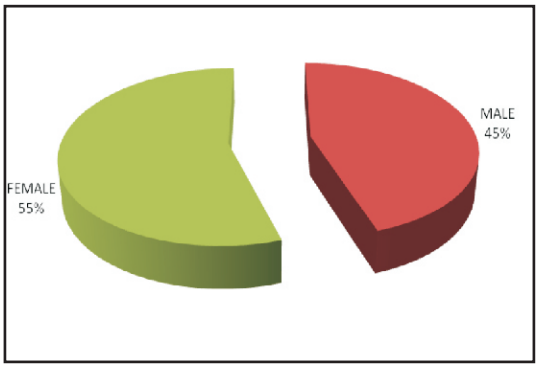

Figure -2: Gender-wise Distribution of the Participants

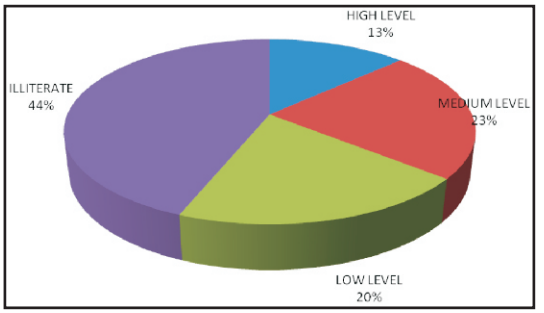

Figure-3: Educational Status of the participants

High level - Professional, Honours, Graduate or Post Graduate
Medium level - Intermediate or High School certificate
Low level - Middle or Primary School Certificate Illiterate

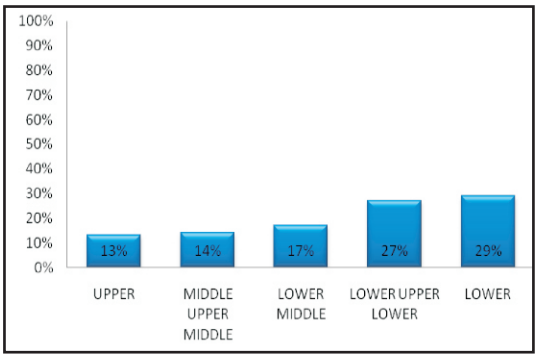

Figure 4: Distribution of participants according to Socioeconomic Status (Kuppuswamy 2011[8])

The perceptions of patients regarding oral health are shown in (Table 1) perception of extraction of teeth as only remedy for painful teeth was predominant (68%) followed by (65%) having perception of extraction of teeth as cause for weakening of eye sight, (55%) with tooth loss as a result of ageing, (65%) preferred dental surgeon over quack. On being questioned about perceptions regarding oral hygiene (51%)considered oral hygiene to be necessary, (61%) had perception of tooth brushing as sufficient to maintain oral hygiene and (65%) felt bleeding of gums as normal while tooth brushing as depicted in (Table 1)

Regarding the oral hygiene aids used to clean teeth, only (43%) used tooth brush and paste, (27%) used finger for cleaning teeth and later (24%) used Datun or Neem stick to clean their teeth. (Table 2). A highly significant association was found to be existing between the perceptions towards oral health ($p<0.001$) and oral hygiene practices ($p< 0.01$) with the age of the participants which was higher among the older age groups (Table 3)

Similarly, level of education was also found to be statistically associated with both the perception regarding oral health($p< 0.000$) and towards oral hygiene practice ($p<0.01$) The results showed that as the level of education increased false perceptions towards oral health and oral hygiene significantly decreased and was found to be lowest at High level of education. (Table 4)

Discussion

The public Perception towards oral health and oral hygiene practices reflect traditional beliefs and socioeconomic development of a country. India is a country with variant distribution of population 70% in rural and only 30% in urban area, this disparity drives to focus on the rural health care of the country which demands the clear picture of existing oral health situation.[9] The oral health and behaviour of population in rural area of India may present a different picture than from an urban one due to variation in their socio-demography and lifestyle that implies even for global comparison of Indian scenario with other countries. The present study revealed significant false perceptions existing in the community towards oral health and oral hygiene practices.

Age of the participants played a significant role in their perception towards oral health and oral hygiene practices. The false perceptions were found to be higher in older age groups as this group of population had probably inherited a cultural and traditional belief with long term effect on their health behaviour. The

false perceptions among them would also have an impact on the younger population in transmitting the same beliefs and traditions to the future generation. These findings are in accordance with the similar study in India by Singh SV et al, reporting higher false perceptions towards oral health in older age groups.[10]

Table: 1 Perceptions regarding oral health and oral hygiene practices among participants.

Questions on Perceptions regarding Oral Health	Response of the participants		
	Yes	No	Don't Know
1. Is oral health important for you ?	23%	68%	9%
2. Does general health depend on oral health?	41%	47%	12%
3. Can dental diseases be cured solely by medicines?	40%	58%	2%
4. Are dental procedures always painful?	40%	57%	3%
5. Do you think tooth loss due to ageing is normal?	55%	38%	7%
6. Extraction of teeth causes weakening of eye sight?	65%	30%	5%
7. Tobacco consumption prevents tooth decay or gum diseases?	58%	26%	16%
8. Does cleaning of teeth by dentist cause loosening of teeth?	46%	39%	15%
9. Is tooth extraction the only remedy /solution for the painful teeth?	68%	18%	14%
10. Do you prefer dental surgeons over quack?	65%	32%	3%
11. Does retention of baby teeth important in early life?	38%	42%	20%
Questions on Perceptions about oral hygiene practices	**Response of the participants**		
	Yes	**No**	**Don't know**
1. Do you feel oral hygiene is necessary for day to day life?	51%	47%	2%
2. Is tooth brushing sufficient to maintain oral hygiene?	61%	30%	3%
3. Do you feel bleeding of gums is normal while tooth brushing?	65%	20%	15%
4. Do you feel use of tooth brush is better than finger for cleaning teeth?	39%	52%	9%

Table 2: Distribution of oral hygiene aid used among the participants

Which oral hygiene aid you use to clean your Teeth?	Usage of different oral hygiene aid (%)
Toothbrush and toothpaste	43%
Use of finger for tooth cleaning	27%
Datun/ Neem Stick	24%
Any Other aid(Brick powder,Salt)	6%

Table 3: Age wise Comparison of perception regarding oral health and oral hygiene among the participants.

Age Group (Years)	False Perception About Oral Health						False Perception About Oral Hygiene Practices					
	Present		Absent		Total		Present		Absent		Total	
	n	%	n	%	N	%	n	%	n	%	N	%
18-25	87	50.58	85	49.42	172	100	79	45.93	93	54.07	172	100
26-44	105	53.03	93	46.97	198	100	102	51.51	96	48.48	198	100
45-64	63	61.76	39	38.24	102	100	61	59.22	41	40.78	102	100
>64	48	67.60	23	32.40	71	100	49	69.01	22	30.99	71	100

(X^2= 17.76; p< 0.001) **(X^2= 6.54; p<0.01)**

Table 4: Comparison of participant's perception regarding oral health and oral hygiene practices at different educational levels

Educational level of participants	False Perception About Oral Health						False Perception About Oral Hygiene Practices					
	Present		Absent		Total		Present		Absent		Total	
	n	%	n	%	N	%	n	%	n	%	N	%
High	78	45.34	94	54.66	172	100	73	42.44	99	57.56	172	100
Medium	98	49.49	100	50.51	198	100	101	51.01	97	48.99	198	100
Low	69	67.64	33	32.36	102	100	67	65.68	35	34.32	102	100
Illiterate	52	73.23	19	26.67	71	100	50	70.42	21	29.58	71	100
	(X^2 = 89.45; p<0.000)						**(X^2 = 67.43; p< 0.01)**					

Another important finding showed that population in rural Muradnagar with low level of socioeconomic status, low level of education and high rate of unemployment had higher negative perception towards oral health. Age played a considerable role, as higher percentage of older individuals in the study had false belief and perception towards oral health. A study conducted in India reported that high percentage of illiterates, mainly the male population, had belief in one or more dental myths.[10]

Other important findings related to false perceptions regarding their oral health such as preference of dental surgeons over quacks, extraction of teeth as the ultimate remedy for painful teeth, lack of knowledge regarding the importance of baby teeth are significant findings and are consistent with the findings of Khan SA et al.[11] This was found to be associated with their age and educational level. The study also showed that the use of indigenous aid like Datun or Neem twig chewing in (24%) of study participants in rural India as an oral hygiene measure, which is inferior to tooth brushing (43%). the massaging action of datun make it a more satisfactory option than finger, brushing or mouth rinsing which is in accordance to study findings done by Saumyendra V Singh et al.[12] Previous studies have shown that simply brushing teeth with non-medicated tooth paste led to 69% reduction of caries occurrence when compared to not brushing at all.[13] Although brushing was the commonly followed method of tooth cleaning , this study showed only 43% of participants who have adopted tooth brush for cleaning their teeth, which was lesser than the study reported among 49% of the participants conducted by Saumyendra V Singh et al.[12] No association between perceptions and income was found in the present study. It is possible that this was due to small income variations in that area and

to the fact that vast majority of them had very low income. Association of this nature have been found in other studies[14] which were conducted in Brazil and United States with greater population heterogeneity regarding income distribution.

Limitations of the Study

However, our study results have few limitations for its explicity as study sample were recruited by convenience sampling and was limited to patients attending out-reach dental programs with some perceived need for dental care. The response of patients who had not attended the out- reach dental programs supposedly having relatively higher false perception were not included and the existence of other perception besides those included in the study cannot be denied.

Conclusion and Recommendations

This survey provides baseline data on persistent numerous false perceptions towards oral health and oral hygiene practices of the study participants from rural areas of Muradnagar, more marked in the older age groups, illiterate and low socioeconomic class. These deep seated perceptions in patients regarding oral health and oral hygiene practices cannot be ignored by oral health professionals while planning for dental care of individual patient and for the community envisioned to reduce the effort and effect gap as well as empowering them to make decisions contusive for oral health. The results depict gloomy picture of wider gap between health care provider and receiver which are in contrast to reduction in dentist to population ratio with more than 290 dental colleges in India. This study implicates nationwide further qualitative research regarding perceptions on oral health and oral hygiene practices of the entire Indian population which may facilitate testing of various interventions for improving their oral health knowledge, attitude and practice besides exploring additional perceptions in different population affecting their oral health behavior.

This survey stimulates strengthening of social responsibility among dentists in spreading oral health awareness and extending themselves beyond their clinic for the benefit of public to promote oral health. Participation of Dentist with other stakeholders through mass media campaign such as Print/Press Media, Audio/Radio/Television, Internet, Organization of Social activities and more innovative methods could alleviate false perception of public towards oral health and enhance their oral health literacy with culturally sensitive health messages.

Conflict of Interest: Authors declared that they have no conflict of interest.

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Evaluation of The Anteroposterior Relationship of Maxillary Central Incisors to The Forehead In Profile

Singh V[1], Sharma P[2], Kumar P[3], Chandra P[4], Sharma R[2], Verma R[5]

Abstract

Objective : Evaluate the anterior-posterior relationship of maxillary central incisors to the forehead in young adults.

Materials and Method: The sample consisted of 146 lateral profile photographs of young adults with good facial harmony (control group) and 135 lateral profile photographs of young adult patients seeking orthodontic treatment (study group). The photographs were taken under standard conditions with the subjects in posed smile and the maxillary incisors clearly visible. The images were resized and the measurements were made using Image Tool version 3. The A-P position of the maxillary central incisors relative to the forehead was measured and the data subjected to statistical analysis.

Results : 90.4% of young adults in the control group had maxillary central incisors positioned ahead of FFA point of forehead and only 9.6% had maxillary central incisors positioned behind the FFA point whereas in the study group, 71.3% of young adults had maxillary central incisors positioned ahead of FFA point and 28.7% had maxillary central incisors positioned behind FFA point of forehead.

Conclusion: The FFA point of the forehead is a useful landmark in assessing the position of the maxillary central incisors in young adult patients seeking improved facial harmony.

Key Words : Profile Analysis, FFA, Maxillary Incisors

Introduction

Facial esthetics is one of the main goals of orthodontic treatment and increased emphasis has been placed on it in recent years by both the patients and the orthodontists. Evaluating the face in profile is an integral part of a complete orthodontic diagnosis. Studies of facial esthetics in orthodontic literature have concentrated on the profile aspect of the face, especially on the profile outline as traced from photographs or cephalometric radiographs.

With the advent of improved orthodontic and surgical techniques, emphasis has shifted more towards envisioning an ideal position of upper incisors as the starting point in treatment planning. Treatment mechanics can then be planned to position the incisors ideally and subsequently to fit all the other teeth around this ideal position.[1]

The maxillary incisors, when displayed, should be considered a part of the face both from the frontal and lateral perspectives.

Corresponding Author : Dr. Vishal Singh, Department of Orthodontics and Dentofacial Orthopedics, I.T.S. Centre for Dental Studies and Research, Delhi-Meerut Road, Murad Nagar, Ghaziabad-201206 Tel No. 01232-225380,81,82

1. Senior Lecturer, Department of Orthodontics and Dentofacial Orthopedics, I.T.S.Dental College, Muradnagar
2. Professors, Department of Orthodontics and Dentofacial Orthopedics, I.T.S.Dental College, Muradnagar
3. Associate Professor, Department of Orthodontics and Dentofacial Orthopedics, I.T.S.Dental College, Muradnagar
4. Professor and Head, Department of Orthodontics and Dentofacial Orthopedics, I.T.S.Dental College, Muradnagar
5. Reader, Department of Orthodontics and Dentofacial Orthopedics, I.T.S.Dental College Greater Noida

Contemporary orthodontic diagnosis includes assessing the display of the maxillary incisor teeth from the frontal perspective. In profile however, the maxillary incisors are not routinely assessed with regard to how they directly relate to the face. Instead, the soft tissue drape is relied on to reflect indirectly their positions, despite the potential unreliability of that method.

Andrews[2] has advocated the use of the forehead as a landmark for assessing the anteroposterior position of the maxillary central incisors in profile. Andrews defined forehead landmarks and observed a relation between the forehead's prominence and inclination and the position of the maxillary central incisors in individuals with a good facial profile. Schlosser et al[3] found that Andrew's method of profile assessment was a useful method to evaluate attractiveness relative to the maxillary incisor position.

Andrews [4] compared the anteroposterior relationship of the maxillary central incisors to the forehead in adult white females and found that their position was strongly correlated with forehead inclination. He concluded that treatment goals should include a harmonious anteroposterior relationship between the maxillary central incisors and the forehead.

The purpose of this study was to evaluate the anteroposterior position of the maxillary incisors in relation to the forehead in profile photographs of young adults and determine its usefulness as landmark for assessing the position of maxillary incisors.

Materials and Method

The study sample was derived from two different sources. The control group was selected from the students of I.T.S college campus (Muradnagar) and the study group was selected from the patients reporting for orthodontic treatment to the dental institution of the same campus. A written consent was obtained from the subjects after explaining the purpose of the study. Only those subjects willing to participate in the study were included. The subjects selected had all maxillary incisors present with no history of previous orthodontic treatment and no history of trauma or restorations in the maxillary anterior teeth. All the selected subjects were within the age group of 18-25 years.

A total of 415 subjects with class 1 occlusion and good facial esthetics were randomly selected for the study. Profile photographs of all the subjects were taken in the natural head position under standardized conditions with a Sony DSC-H50 Camera (9.1 Megapixel). All the subjects were photographed with a posed smile next to an inverted- L scale.

The control sample for the study was selected by a panel comprising of an orthodontist, an oral and maxillofacial surgeon, a plastic surgeon, a cosmetologist, a jury member of a local beauty pageant and two members from the peer population (a boy and a girl of a nearby engineering college were selected randomly).

The photographs were given to the members of the panel for the final sample selection. The panel was asked to choose photographs of patients with good facial harmony and a generally pleasing appearance of the maxillary incisors. Only those subjects were selected for the study who received a unanimous decision from all the members of the panel.

1. Control group – Out of the 415 photographs given to the panel 146 (65 males and 81 females) subjects were found to have a good facial harmony and a generally pleasing

appearance of the maxillary incisors by all the members of the panel. These 146 subjects were used as control group for the study.

2. Study group – 135 young adults seeking orthodontic treatment (59 males and 76 females) were used as the study group. Profile photographs of the study subjects were taken in the same manner as described for the control group.

All photographs were digitalized in life size with the help of the software Image Tool Version 3, according to the calibration scale so that measurements could be made.

The following landmarks and vertical reference lines (Figure 1) were constructed using Adobe photoshop CS4 version 9, parallel to the vertical scale:

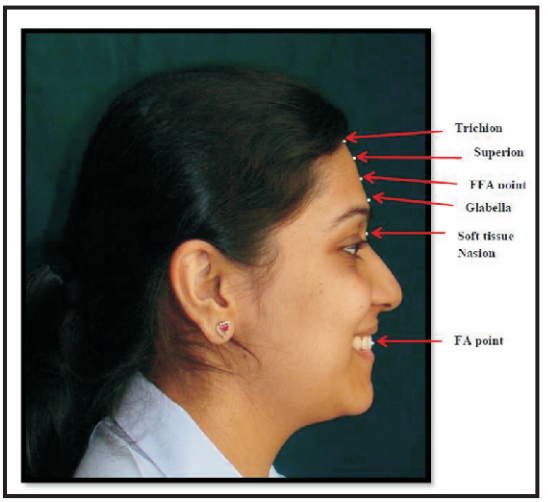

Figure1. Landmarks

a) Line 1 - through the FFA point. The FFA point is defined as the midpoint between trichion and glabella for foreheads with flat contour or the midpoint between superion and glabella for foreheads with rounded or angular contour.

b) Line 2 - through glabella.

c) Line 3- through the FA point of most prominent maxillary central incisor.

d) Line 4- (for assessing forehead inclination) was constructed by connecting glabella to the uppermost point of the clinical forehead (superion point or trichion) as described by Andrews.[4]

The following measurements were recorded using **Image Tool Version 3**:

1) Anteroposterior relation of the maxillary incisors to the forehead (FA – FFA) -measured as the distance between line 1 and line 3. A positive value was assigned when the maxillary incisors (line 3) were anterior to the forehead's FFA point (line 1) and negative when posterior.

2) Forehead inclination- measured as the angle between line 4 and line 1.

Results

The statistical analysis for the control group and study group was done using SPSS (Statistical Package for Social Sciences) Version 15.0 statistical Analysis Software. The means, standard deviations, and ranges were calculated and compared using a paired two-tailed t-test. This was followed by qualitative analysis to check for the percentage of values falling in a particular range. For this the mean value ± 1 S.D. for control group for males and females was set as a benchmark and the percentage of sample falling in this range was checked for both the study group and the control group. The percentages obtained were again evaluated statistically to check for significance.

All measurements were repeated at an interval of 1 month by the same examiner on a random sample of 50 subjects (25 from the study sample and 25 from the control sample). The systematic error between the first and second measurements was calculated using a paired t-test, for $P < 0.05$. No statistically significant difference was seen between the two sets of measurements for any of the groups, showing good reproducibility of the measurements.

Table 1 shows the mean values for forehead inclination in the control and study groups. For the overall sample, the mean value for forehead inclination was 17.97°±6.05° in the control group and 17.01°±6.46° in the study group. On comparing the data statistically, no significant difference was observed between the two groups (p>0.05). Among males, the forehead inclination had a mean value of 21.91°±5.50° in the control and 20.98°±6.25° in the study group. On comparing the data statistically, no significant difference was observed between the two groups (p>0.05).Among females, the forehead inclination had a mean value of 15.44°±4.95° in the control and 14.46°±5.21° in the study group. On comparing the data statistically, no significant difference was observed between the two groups (p>0.05).

Thus comparison of forehead inclination showed no significant difference in the control and study groups, both in males and females.

Table 1 also shows comparison of forehead inclination in males and females. Females had a significantly lower mean value in both the control and study groups (p<0.001) as compared to males.

Table 1: Assessment of Forehead inclination (angle between line 1 and line 4)

S.N		Control Group			Study Group			Statistical analysis	
		n	Mean (in degrees)	S.D.	n	Mean (in degrees)	S.D.	"t"	"p"
1.	Overall	146	17.97	6.05	135	17.01	6.46	1.164	0.246
2.	Males	65	21.91	5.50	59	20.98	6.25	0.747	0.457
3.	Females	81	15.44	4.95	76	14.46	5.21	1.143	0.255
Statistics			t =6.550 p < 0.001			t =6.059 p < 0.001			

* p <0.05Significant, p <0.01Highly significant, p <0.001Very highly significant, NS-not significant

Table 2 shows the values for the anteroposterior (AP) position of the maxillary incisors relative to the forehead (FA-FFA). For the overall sample, the AP position of the maxillary incisors relative to the forehead showed a mean value of 2.74 ± 2.01 mm for the control group and 1.95±3.0 mm for the study group. There was a statistically significant difference between the two groups (p <0.05) with the incisors positioned more forward relative to the forehead in the control group as compared to the study group. In the males, the AP position of the maxillary incisors relative to the forehead showed a mean value of 3.69 ±1.96 mm for the control group and 2.80 ±3.27 mm for the study group. There was no statistically significant difference between the two groups (p>0.05).

In the females, the AP position of the maxillary incisors relative to the forehead showed a mean value of 2.13 ±1.80 mm for the control group and 1.4 ±2.7 mm for the study group. There was no statistically significant difference between the two groups (p>0.05).

Table 2 also shows the comparison of anteroposterior position of the maxillary incisors relative to the forehead in males and females. There was a statistically significant difference between males and females in both the control and study groups, with the males showing higher mean values indicating a more forward position of the maxillary incisors as compared to females, (p <0.001 for control and p <0.05for study group).

Table 2: Antero-posterior Position of the Maxillary incisors relative to the forehead (FA - FFA)

S.N		Control Group			Study Group			Statistical analysis	
		n	Mean (in mm)	S.D.	n	Mean (in mm)	S.D.	"t"	"p"
1.	Overall	146	2.74	2.01	135	1.95	3.00	2.365	0.019
2.	Males	65	3.69	1.96	59	2.80	3.27	1.565	0.121
3.	Females	81	2.13	1.80	76	1.40	2.70	1.899	0.060
Statistics			t =4.367 p< 0.001			t =2.506 p= 0.014			

* p <0.05Significant, p <0.01Highly significant, p <0.001Very highly significant, NS-not significant

Table 3 (a,b,c) shows the qualitative assessment of the location of the maxillary central incisors relative to forehead in the control and study groups. In the overall sample, a significantly higher proportion of subjects had location of maxillary incisors ahead of glabella in the control group (64.4%) as compared to the study group (43.6%). This difference was statistically significant (p <0.01). The same difference was seen in the females (p<0.01) as well as males (p<0.05) with a higher proportion of subjects showing maxillary incisors ahead of glabella in the control group(63% in females, 66.2% in males) compared to the study group(40.8% in females, 45.8% in males). In the study group, a significantly higher percentage of subjects had maxillary incisors located behind FFA point of forehead in the overall sample (28.2%), as well as in males (25.4%) and females (30.3%) as compared to the control group (9.6% in the overall sample, 4.6% in the male and 12.3% in the female sample). The difference was statistically significant (p<0.001 for overall, p<0.01for males and females).

Table 3: Qualitative assessment of location of maxillary incisors relative to the forehead
a) Overall sample-

S.N	Location of maxillary incisors	Control Group (n=146)		Study Group (n=135)		Statistical Analysis	
		No.	%	No.	%	X^2	p
1.	Ahead of glabella	94	64.4	59	43.6	10.92	0.001
2.	Between glabella and FFA	38	26.0	38	28.2	0.197	0.657
3.	Behind FFA	14	9.6	38	28.2	13.60	<0.001

*p <0.05 Significant, ** p <0.01 very significant, *** p <0.001 most significant, NS-not significant

b) Males-

S.N	Location of maxillary incisors	Control Group (n=65)		Study Group (n=59)		Statistical Analysis	
		No.	%	No.	%	X^2	p
1.	Ahead of glabella	43	66.2	27	45.8	3.665	0.046
2.	Between glabella and FFA	19	29.2	17	28.8	0	1
3.	Behind FFA	3	4.6	15	25.4	7.283	0.007

*p <0.05 Significant, ** p <0.01 very significant, *** p <0.001 most significant, NS-not significant

c) Females-

S.N	Location of maxillary incisors	Control Group (n=81)		Study Group (n=76)		Statistical Analysis	
		No.	%	No.	%	X^2	p
1.	Ahead of glabella	51	63.0	31	40.8	7.320	0.002
2.	Between glabella and FFA	20	24.7	22	28.9	0.331	0.565
3.	Behind FFA	10	12.3	23	30.3	7.002	0.008

*p <0.05 Significant, ** p <0.01 very significant, *** p <0.001 most significant, NS-not significant

On comparing the location of maxillary central incisors relative to the forehead in males and females (Table 4), no statistically significant difference was observed between the two genders for any of the three locations in either control or study groups (p>0.05).

Table 4: Comparison of qualitative assessment of location of maxillary incisors relative to forehead in males and females

S.N	Location of maxillary incisors	Control Group Male vs Female		Inference	Study Group (n=59)		Inference
		X^2	p		X^2	p	
1.	Ahead of glabella	0.173	0.677	NS	0.498	0.480	NS
2.	Between glabella and FFA	0.301	0.583	NS	0.001	0.971	NS
3.	Behind FFA	2.241	0.134	NS	0.653	0.419	NS

*p <0.05 Significant, ** p <0.01 very significant, *** p <0.001 most significant, NS-not significant

Discussion

Contemporary orthodontic diagnosis includes assessing the display of the maxillary incisor teeth from the frontal perspective. There is enough literature and consensus regarding the vertical position of the upper incisor in relation to the upper lip both at rest and during smile. Also there are several guidelines regarding the saggittal position of the upper incisor related to various skeletal landmarks. The use of skeletal landmarks and intra-cranial reference lines however, can be unreliable because of errors in identification, angulation and variability in their positions between

individuals. In addition, good facial harmony can exist within a wide range of cephalometric values and positioning the upper incisors according to skeletal guidelines may not necessarily result in a pleasing soft tissue profile.[4-7]

Soft tissue landmarks such as the nose, lips and chin may not accurately reflect the position of the maxillary incisors. Using the forehead as a primary landmark for anteroposterior (AP) incisor positioning avoids the potential pitfalls of relying on hard and soft tissue cephalometric analyses. The rationale for using the forehead to determine the goal for the maxillary incisors includes the concept that, in persons with facial harmony, there is a correlation between the prominence and the inclination of the forehead and the AP positions of the teeth and jaws. Andrews also favored the forehead as a stable landmark because, unlike internal radiographic landmarks, it is a part of the face, and its relationship to the incisors is predictable and repeatable.

The results of this study show that the forehead inclination was not different in control and study groups. This finding agrees with Andrews[4] study of adult white females. Males had a more posteriorly inclined forehead than females, which agrees with the study by Hwang et al[8] who found that Korean and European- American men had a larger slope of forehead than women.

The maxillary incisors were positioned anteriorly in relation to the forehead's FFA point, more often in the control than in the study group, whereas a greater number of study subjects had maxillary incisors positioned behind FFA as compared to controls. This finding agrees with that of Andrews[4], who also found that the maxillary incisors were anterior to the forehead's FFA point in adult white females with harmonious profiles and behind this point in females seeking orthodontic treatment.

The position of maxillary incisors in relation to the forehead's FFA point was more anterior in males as compared to females in this study. Conversely, other analyses such as Burstone[9] and Arnett[10] in which the maxillary incisor position has been related to landmarks other than the forehead show that the incisors are positioned more forward in females than in males. This may have been due to a difference in the study samples.

In this study, 64.4% subjects in the control and 43.6% subjects in the study group had maxillary incisors positioned ahead of glabella as compared to only 3% in the control and 15% in the study group of Andrews study in adult white females. This finding indicates that the maxillary incisors were generally positioned more anteriorly in our sample compared to Andrew's sample, which reflects racial differences. This agrees with the study of Kalha et al[11], who also found that that the incisors were more proclined in the Indian population as compared to a white population.

The maxillary incisor position related strongly with forehead inclination in the control group but moderately in the study group, for the overall sample as well as males and females. This is in contrast to Andrews[4] study, in which the incisor positions were strongly related to the forehead inclination in adult white females with good facial harmony but a poor correlation was seen in the study sample.

Conclusion

The results of the study led to the following conclusions:

1. Females showed a more upright forehead than males while the maxillary central

incisors were found to be more anterior relative to the forehead in males.

2. Most of the subjects (90%) having good facial harmony and a pleasing appearance of the maxillary incisors in profile had maxillary central incisors positioned ahead of the FFA point of the forehead.
3. The forehead's FFA point is useful in assessing the position of the maxillary central incisors in young adult patients seeking improved facial harmony.

The limitations of our study were a small sample size and some subjectivity involved in classifying aesthetic and harmonious profiles. Further studies with a much larger sample size classified by age, sex and race are needed in order to arrive at numerical normative data.

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Assessment of Dental Anxiety In Children And Their Caregivers Using Norman Corah's Dental Anxiety Scale

Nanda J[1], Sharma D[1], Vashista K[1], Sandhu M[2]

Abstract

Background: Dental anxiety in children still remains a major reason for avoidance of dental treatment. It is challenging for a pediatric dentist to manage such anxious children. Therefore, assessment of anxiety in children would help the professional to modify the child's behaviour and deliver the treatment effectively and efficiently**. Aim:** This study was aimed at assessing the correlation between the dental anxiety level in children and their caregivers and to evaluate the dental procedure which elicits the maximum anxiety in both children and their caregivers. **Materials and Method :** The study comprised of 120 children aged 8-14yrs and 120 adults *i.e* their caregivers. The Norman Corah's Dental anxiety scale (DAS) was used to measure dental anxiety and Dental Concern Assessment scale was used to evaluate the maximum anxiety-eliciting procedure amongst children as well as their caregivers. **Statistical Analysis:** Frequency distribution method and Pearson coefficient test were used to assess the correlation and association, respectively, between dental anxiety level in children and their caregivers. Pearson Chi Square test was also used to test the association between the dental procedures eliciting maximum anxiety in children and their caregivers. **Results and Conclusion:** There was not a significant correlation between anxiety level in children and caregivers using Norman Corah DAS. But a significant correlation was found between the procedure eliciting maximum anxiety in both children and their caregivers ($r = 0.384$, $p = 0.00$), as both were most anxious about injections, followed by tooth extractions in case of children and sound and vibration of the drill in case of caregivers.

Key words: Dental anxiety, Norman Corah's scale, Caregiver, Children

Introduction

Fear is an individual's response to a life threatening event or dangerous situation to protect himself or herself. Dental anxiety, dental fear and dental phobia are three different terminologies used in dental literature to describe apprehension. Dental fear is considered to be aroused by a real, immediately present, specific stimulus (needles, drilling noise), whereas in dental anxiety the source of threat is unclear, ambiguous and not immediately present. However in both situations individual's emotional reactions are same[1].

Amongst these, dental anxiety is one of the most commonly reported[2]. Approximately 6-15% of the population suffer from high dental fear worldwide[3]. Prevalence of childhood dental fear varies from 3%-43% in different populations[4].

Corresponding Author : Dr. Jasmine Nanda, PG Student, Department of Pedodontics and Preventive Dentistry, ITS Centre for Dental Studies and Research, Murad Nagar, Ghaziabad. **(M)** : 08744881800 **Email- id :** dr.jasminenanda@gmail.com.

1. PG Students, Department of Pedodontics and Preventive Dentistry, I.T.S Centre for Dental Studies and Research,Ghaziabad.
2. Professor, Dept of Pedodontics and Preventive Dentistry, C-4, Staff residence, ITS Center for Dental Studies and Research, Ghaziabad.

Dental anxiety is a state of unpleasantness with an associated fear of danger from within or is a learned process of one's own environment[3]. Factors related to dental anxiety includes age, gender, parental anxiety, etc[4]. Painful or negative dental experience is the most common causes of dental anxiety[5].

The onset of anxiety is thought to originate in childhood, and the effect of this fear persists into adulthood[6]. As a result, anxious individuals postpone dental treatment, are quite uncooperative during dental visits and develop lower pain threshold.

Therefore, careful assessment of child's anxiety is an important step for proper patient management and delivery of good quality of dental care. Also, assessment of the caregiver's anxiety might be very helpful to form an understanding of the basis of the child's anxiety.

The aim of this study was to assess correlation between the dental anxiety level in children and their caregivers and to evaluate the dental procedure which elicits the maximum anxiety in both children and their caregivers.

Materials and Methods

The present cross-sectional study was conducted in the Department of Pedodontics and Preventive Dentistry, ITS Centre for Dental Studies & Research, Muradnagar, Ghaziabad, UP. Study population consisted of 240 subjects. It comprised of 120 children aged 8-14yrs and 120 adults i.e parents.

Sample Selection

The sample size consisted of 120 healthy children and their caregivers who were willing to participate in the study. Children and their parents were informed about the study design & written consent was obtained after explaining the contents of the questionnairs. Each questionaire was translated into hindi language as well. Children and their caregivers suffering from any systemic disease, or handicapping conditions were excluded from the study.

Corah's Dental Anxiety Scale (DAS) and Dental concern assessment scale were used to assess dental anxiety and procedural anxiety, respectively, in children and their caregivers. Corah's DAS is a well known psychometric scale that was developed in 1969[2]. It is simple, easy to use, has high reliability and predictive validity[5]. Dental concern assessment scale was developed by J. H. Clarke and S. Rustvold in 1993.

Measuring Dental Anxiety

The questionnaire was translated and given to each child and caregiver pair. It comprised of four multiple choice questions, each having 5 options, which were scored as A = 1, B = 2, C = 3, D = 4, E = 5; with (A) being a level of no anxiety and (E) representing the maximum level of anxiety felt towards a specific dental situation or procedure. The total score for the Norman Corah scale ranges from 4 to 20 and anxiety ratings are classified as: 4 to 8 = no anxiety, 9 to 12 = moderate anxiety, 13 to 14 = high anxiety, 15 to 20 = severe anxiety.

Measuring procedural anxiety:

Apart from Norman Corah's questionnaire, Dental Concerns Assessment scale, developed by J. H. Clarke and S. Rustvold in 1993, was also used. This questionnaire included a set of 26 situations and procedures encountered at the dental office during the treatment. Both children and caregivers were asked about these procedures, like extraction, injection, rubber dam, cost of treatment, sound of drill, root canal treatment, gagging, fear of being injured, etc., that elicit maximum anxiety in them.

Statistical Analysis

The data was analyzed using SPSS software 16.0. Frequency distribution method and

Pearson coefficient test were used to assess the correlation and association, respectively, between dental anxiety level in children and their caregivers. Pearson Chi Square test was also used to test the association between the dental procedures eliciting maximum anxiety in children and their caregivers. The level of significance was set at < 0.05.

Results:

A total of 120 child-caregiver pairs participated in the study. The results (table 1) show that the majority of participating children (55%) suffered from moderate anxiety and the percentage of caregivers suffering from moderate anxiety was 30%. The Pearson coefficient between child and caregiver anxiety is 0.266, and p value was 0.734

Table 1: Percentages of anxious children and caregivers.

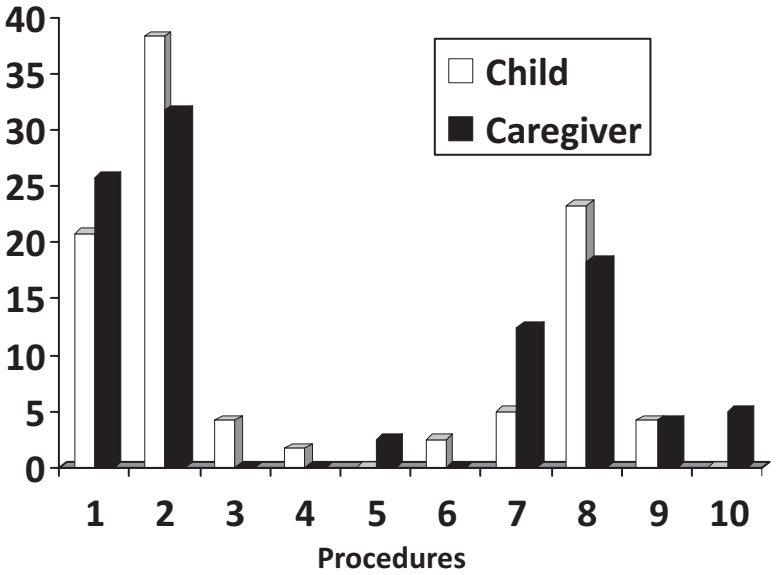
Level of anxiety	Children (%)	Caregivers (%)	P value	Pearson coefficient
No anxiety	18.3	58.3	0.734	0.266
Moderate anxiety	55.0	30		
High anxiety	16.7	11.7		
Severe anxiety	10.0	0		
Total	100.0	100.0		

In the second questionnaire about the dental procedure which elicited the most anxiety, results (table 2 and graph 1) showed that children as well as their caregivers were most anxious about injections (38.3% in children and 31.7% in caregivers), followed by tooth extractions in case of children (23.3 %) and sound and vibration of the drill in case of caregivers (25.8%). With respect to the dental procedure eliciting maximum dental anxiety, the Pearson chi square coefficient is 0.384, which is highly significant as p< 0.005 (p = 0.00).

Table 2: Cross-tabulation between procedural anxious children and caregivers

		Number of anxious caregivers							
	Procedures	Sound of drill	Injection	Rubber dam	RCT	Extraction	Fear of being injured	No. of appointments	Total
Number of anxious children	Sound of drill	12	4	1	5	0	3	0	25
	Injection	8	29	1	4	1	1	2	46
	Sound of scaler	3	1	0	1	0	0	0	5
	Gagging	2	0	0	0	0	0	0	2
	Cold air hurts teeth	1	0	0	2	0	0	0	3
	RCT	1	2	1	0	1	0	1	6
	Extraction	2	1	0	3	20	1	1	28
	Fear of being injured	2	1	0	0	0	0	2	5
Total		31	38	3	15	22	5	6	120
Pearson chi square coefficient = 0.384; p value = 0.00.									

Graph 1: Various dental procedures eliciting anxiety in children and caregivers.



1	Sound of drill
2	Injection
3	Sound of scaler
4	Gagging
5	Rubber dam
6	Cold air hurts
7	RCT
8	Extraction
9	Fear of injury
10	No. of appointments

Discussion

Despite the technological advances in dentistry, dental anxiety and the fear of pain remains globally widespread and is considered a major barrier to dental treatment[2].The various problems arising due to this are: dental avoidance, which worsens oral health and quality of life, and dental phobia, which may affect dentist – patient relationship further leading to a compromised dental treatment. Moreover, anxiety causes sympathetic responses which might lead to vasovagal syncope, hypertension, tachycardia and cardiovascular problems[7].

Managing children suffering from dental anxiety is challenging for the dental professionals. Therefore, the purpose of our study was to evaluate the anxiety level in children and their caregivers, and also to find out the procedure eliciting maximum dental anxiety in children as well as caregivers using a dental anxiety scale.

Results of this study shows that 10% children suffered from severe anxiety, 16.7% from high anxiety and 55% suffered from moderate anxiety. 11.7% of caregivers showed high anxiety and 30% had moderate anxiety. There is no significant correlation between child and parental anxiety. But, it was observed that when caregiver's anxiety increases, child's anxiety tends to increase (r = 0.630).

Similar findings have been reported by Katayoun Salem et al. in 2012[8] in which no relationship was found between child's dental fear and parental dental or general fear using Child Fear Survey Schedule- Dental Subscale (CFSS-DS). However, in a study done by Alaki et al., 2012[9] and other authors[10,11], the results showed that there is a statistically significant correlation between parental and child's anxiety.

Results of our study also showed that 38.3% of the children suffered from highest anxiety when injections were to be given during the dental treatment. Similar findings were reported by Humphris et al., 2000[5] and other authors[12]. It was followed by tooth extraction (23.3%), sound of drill (20.8%), root canal treatment (5%), sound of scaler (4.2%), fear of being injured (4.2%), cold air (2.5%) and

gagging (1.7%). However, Alaki et al., 2012[8] showed that extraction was the most anxiety provoking procedure in children.

Similarly 31.7% of caregivers also showed maximum anxiety when injections were to be admistered. But in contrast, sound of drill was the second most common anxiety provoking factor, followed by extraction(18.3%), root canal treatment (1.5%), number of appointments (5%),fear of being injured(4.2%), and rubber dam (2.5%).

Few authors have also suggested that dental fear and anxiety is an important predictor of dental caries and may become a potential risk factor for children (Kruger et al., 1998)[13]. Significant correlation was found between dental fear and DMFT scores by Aylin et al., 2009[4]. Possible reason for this is that because of anxiety, children and their parents avoid dental treatment, which further worsens their oral health.

Dental anxiety is a serious problem which negatively affects the oral health, general health and psychological development of children. Thus, early detection of the causes of fear is very important to reduce anxiety levels in pediatric patients. Child and parental counseling, routine dental health examination and most importantly dental health education programs would be highly useful methods in reducing dental anxiety in children in a sequential manner. Also, attention needs to be paid to the use of caries assessment tools such as caries activity tests and early intervention by preventive treatment methods such as pit and fissure sealants[4].

The information obtained from this study can be quite helpful for the pediatric dentists to accordingly modify the behavior management techniques and the manner in which the dental procedure would be effectively delivered to instill a positive attitude in children, which would help in making them better and healthy individuals for the future.

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Evaluation of Pulse Rate and Arterial Oxygen Saturation ($Sa0_2$) Levels in Children During Routine Dental Procedures

Singla D[1], Anand A[1], Dhama P[1], Sharma A[2]

Abstract

Aim: The aim of this study was to evaluate changes in pulse rate and arterial oxygen saturation in unsedated paediatric dental patients undergoing routine dental procedures using pulse oximeter. **Materials & Method** : A sample of one hundred and fifty patients in the age group of 4-7 years were selected based on the inclusion and exclusion criteria. Pulse rate and arterial oxygen saturation values were recorded before the start of either of the procedure (oral prophylaxis, restorative (cavity preparation and restoration) or extraction), during and after the completion of the procedure using pulse oximeter. **Statistical Analysis :** The data was analysed using one-way ANOVA and Least significance multiple range test. **Results** : During all routine dental procedures, the pulse rate values increased intraoperatively from the preoperative baseline values and then decreased in the postoperative phase.The arterial oxygen saturation (SaO_2) values remained unaltered during all routine dental procedures. **Conclusion:** Dental anxiety and fear may have an effect on the normal physiologic parameters during routine dental procedures.

Keywords: Arterial Oxygen Saturation, Dental Anxiety, Pulse Rate, Pulse Oximeter

Introduction

Dental fear is one of the most common problems seen in the general population. Children are known to have unfounded fear and anxiety thus managing dental anxiety and fear is considered to be a challenge for successful component of dental treatment.

Management of disruptive and uncooperative children receiving dental treatment continues to represent a special challenge to dentists. A behavior analysis suggests that "anxiety" is a complex of behaviours and that the disruptive behaviours exhibited by children of any age are a function of specific antecedent or consequent stimuli.[1] There is a strong relationship between a child's dental anxiety and successful dental treatment and also between anxiety and pain.

Painful conditions cause fear, whereas fear and anxiety increases the amount of perceived pain.[2] Pain sensations may be experienced during dental treatment by the conditioned stimulus such as prick of the needle during local anaesthesia injection, sound and vibrations of the handpiece, vibration from the ultrasonic scaler and tightness of the rubber dam clamp. These are some of the stressful situations which have the ability to alter physiologic functions like blood pressure, pulse rate and respiratory rate. Constant

Corresponding Author : Dr. Divya Singla, PG Student, Department of Pedodontics and Preventive Dentistry, ITS Centre for Dental Studies and Research, Murad Nagar, Ghaziabad. **(M) :** 09999718619 **Email ID:** divyasingla.2110@gmail.com

1. PG Students, Department of Pedodontics and Preventive Dentistry, I.T.S Centre for Dental Studies and Research, Ghaziabad.
2. Professor, Department of Pedodontics and Preventive Dentistry, I.T.S Centre for Dental Studies and Research, Ghaziabad.

monitoring of these functions are essential in order to detect and treat any emergency situation.

Monitoring is continuous observation of data from specific organ systems to evaluate the status of physiologic function with the purpose to permit prompt recognition of any deviation from normal, so that corrective therapy can be instituted before morbidity ensues.[3]

Health care has undergone a vast revolution in vital sign-monitoring technology over the last decade with the advent of pulse oximeter. One of the major functions of pulse oximeter is to monitor the patient's per cent oxygen saturation of haemoglobin (oxyhemoglobin) as an estimate of arterial oxygen saturation (SaO2).[4] Pulse oximeter provides an accurate, continous and a non-invasive monitoring of variations in pulse rate and arterial oxygen saturation in both sedated and unsedated patients without interfering with the dental procedures.

The purpose of this study was to evaluate changes in pulse rate and arterial oxygen saturation in unsedated pediatric dental patients undergoing routine dental procedures.

Materials & Method

The study was conducted in the Department of Pedodontics and Preventive Dentistry,ITS – Center for Dental Studies and Research, Muradnagar, Ghaziabad.. The study consisted of one hundred and fifty patients, randomly selected ranging in age from 4 to 7 years. There was no discrimination with respect to their age and socio-economic status. Previous dental experience of the patient was not considered during patient selection.

The inclusion criteria for the selection of subjects was: (1) Healthy child with no physical or mental disability (2) Presence of parents. (3) Child indicated for either of the routine dental procedures that is either oral prophylaxis, restorative procedures (cavity preparation and restoration) or extraction.

Patients with any systemic diseases, history of any medication or traumatic dental history were excluded from the study.

The parents/guardians were informed about the aims of the study and to choose at will, whether to take part in the study without affecting the dental care provided to the child. Written informed consent was obtained from all the parents. Vital signs which included pulse rate and arterial oxygen saturation (SaO_2) were recorded during different phases of the treatment using fingertip pulse oximeter.

The children were divided into three groups of 50 each and one of the either routine dental procedures like oral prophylaxis, restorative (cavity preparation and restoration) or extraction was carried out.

Prior to the operative procedure, each child was seated in the dental chair and allowed sometime to adjust to the dental environment. Pulse oximeter was applied to right forefinger. The pulse rate and arterial oxygen saturation (SaO_2) values were recorded at three moments –before commencing the procedure (pre-operative baseline value), during the procedure (intra-operative value) and after the completion of the procedure (post-operative value).

The statistical analysis of data was done by using Software SPSS version 18. The values obtained were tabulated and one-way ANOVA used to compare the significant difference of the means of pulse rate and

arterial oxygen saturation (SaO_2) between these procedures. For multiple comparison. LSD method was used. The confidence interval was at 95% and for significant results $p<0.05$ that was level of significance is 5%.

Results

The results are summarized in Tables 1 to 6.

Table 1: Mean scores and standard deviation of SaO_2 pre-operatively, intra-operatively and post-operatively

		N	Minimum	Maximum	Mean ±Std. Deviation	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Pre-operative PR	Restorations	50	90	99	95.88±2.918	95.05	96.71
	Extraction	50	90	99	96.12±2.655	95.37	96.87
	Scaling	50	90	99	96.04±3.213	95.13	96.95
	Total	150	90	99	96.01±.919	95.54	96.48
Intra-operative PR	Restorations	50	88	99	95.82±3.550	94.81	96.83
	Extraction	50	89	99	96.80±2.688	96.04	97.56
	Scaling	50	89	99	96.92±2.968	96.08	97.76
	Total	150	88	99	96.51±3.108	96.01	97.01
Post-operative PR	Restorations	50	87	99	96.04±3.276	95.11	96.97
	Extraction	50	88	99	96.26±2.933	95.43	97.09
	Scaling	50	88	99	95.86±3.785	94.78	96.94
	Total	150	87	99	96.05±3.331	95.52	96.59

Table 2: Mean scores and standard deviation of pulse rate pre-operatively, intra-operativel and post-operatively

		N	Minimum	Maximum	Mean ±Std. Deviation	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Pre-operative PR	Restorations	50	68	99	89.70±9.072	87.12	92.28
	Extraction	50	76	100	89.68±9.108	87.09	92.27
	Scaling	50	76	98	91.08±9.422	88.40	93.76
	Total	150	68	100	90.15±9.163	88.67	91.63
Intra-operative PR	Restorations	50	82	118	108.06±9.360	105.40	110.72
	Extraction	50	119	139	128.36±5.228	126.87	129.85
	Scaling	50	81	105	96.08±9.625	93.34	98.82
	Total	150	81	139	110.83±15.715	108.30	113.37
Post-operative PR	Restorations	50	77	99	92.18±6.977	90.20	94.16
	Extraction	50	80	102	91.66±7.615	89.50	93.82
	Scaling	50	79	99	92.68±8.622	90.23	95.13
	Total	150	77	102	92.17±7.727	90.93	93.42

Table 3: One –way ANOVA for SaO_2 (pre-operatively, intra-operatively and post-operatively)

ANOVA						
		Sum of Squares	df (degree of freedom)	Mean Square	F	p value
Pre-operative SaO2	Between Groups	1.493	2	.747	.087	.917
	Within Groups	1268.480	147	8.629		
	Total	1269.973	149			
Intra-operative SaO2	Between Groups	36.413	2	18.207	1.908	.152
	Within Groups	1403.060	147	9.545		
	Total	1439.473	149			
Post-operative SaO2	Between Groups	4.013	2	2.007	.179	.836
	Within Groups	1649.560	147	11.221		
	Total	1653.573	149			

Table 4:One –way ANOVA for pulse rate (pre-operatively, intra-operatively and post-operatively)

ANOVA						
		Sum of Squares	df (degree of freedom)	Mean Square	F	p value
Pre-operative PR	Between Groups	64.413	2	32.207	.380	.684
	Within Groups	12447.060	147	84.674		
	Total	12511.473	149			
Intra-operative PR	Between Groups	26626.813	2	13313.407	192.397	.000
	Within Groups	10172.020	147	69.197		
	Total	36798.833	149			
Post-operative PR	Between Groups	26.013	2	13.007	.216	.806
	Within Groups	8869.480	147	60.337		
	Total	8895.493	149			

Table 5: Least significance multiple range test comparison (SaO_2)

Multiple Comparisons							
LSD							
Dependent Variable	Procedure(I)	Procedure(II)	Mean Difference (I-II)	Std. Error	p value	95% Confidence Interval	
						Lower bound	Upper bound
Pre-operative SaO_2	Extraction	Restorations	.240	.588	.683	-.92	1.40
	Extraction	Scaling	.080	.588	.892	-1.08	1.24
	Scaling	Restorations	.160	.588	.786	-1.00	1.32
Intra-operative SaO_2	Extraction	Restorations	.980	.618	.115	-.24	2.20
	Scaling	Restorations	1.100	.618	.077	-.12	2.32
	Scaling	Extraction	.120	.618	.846	-1.10	1.34
Post-operative SaO_2	Restoration	Extraction	-.220	.670	.743	-1.54	1.10
	Restoration	Scaling	.180	.670	.789	-1.14	1.50
	Extraction	Scaling	.400	.670	.551	-.92	1.72
*. The mean difference is significant at the 0.05 level.							

Table 6: Least significance multiple range test comparison (Pulse rate)

Multiple Comparisons							
LSD							
Dependent Variable	Procedure(I)	Procedure(II)	Mean Difference (I-II)	Std. Error	p value	95% Confidence Interval	
						Lower bound	Upper bound
Pre-operative PR	Restorations	Extraction	.020	1.840	.991	-3.62	3.66
	Extraction	Scaling	-1.400	1.840	.448	-5.04	2.24
	Scaling	Restorations	1.380	1.840	.455	-2.26	5.02
Intra-operative PR	Restoration	Scaling	11.980*	1.664	.000	8.69	15.27
	Extraction	Restoration	20.300*	1.664	.000	17.01	23.59
	Extraction	Scaling	32.280*	1.664	.000	28.99	35.57
Post-operative PR	Restoration	Extraction	.520	1.554	.738	-2.55	3.59
	Scaling	Restorations	.500	1.554	.748	-2.57	3.57
	Scaling	Extraction	1.020	1.554	.512	-2.05	4.09
*. The mean difference is significant at the 0.05 level.							

Discussion

Anxiety and fear is the most common emotional disturbance seen in children during dental treatment. Anxiety may be defined as either a cognitive, emotional and physical reaction to a dangerous situation or the anticipation of threat that induces a physiologic stress response that manifests in corticoid release, blood pressure changes and hemodynamic and cardiovascular changes.[5]

Pulse oximeter is one of the most acceptable and widely used electronic devices for measuring variations in pulse rate and arterial oxygen saturation. It is based on the concept that pulsatile changes in light transmission through living tissues are due to alteration in the arterial blood volume. It functions by placing a pulsating vascular bed between a 2-wavelength light source and a silicon photodetector diode. The light source consists of two different light emitting diodes (LEDs), one emitting red (=660nm) and the other infrared (=940nm) light. Light absorption varies with arterial pulsation, the wavelength of light used, and the oxyhemoglobin saturation.[5,6] Absorbance characteristics of haemoglobin varies in red and infrared region. In the red region, oxyhaemoglobin absorbs less light than deoxyhaemoglobin and vice versa in the infrared region.[7] Using spectrophotometric analysis, the pulse oximeter determines the ratio of oxygenated (red) haemoglobin to deoxygenated (blue) hemoglobin and displays oxyhemoglobin saturation (SaO2).[6] In dental practice, it is currently being used to measure variations in pulse rate and arterial oxygen saturation in sedated and unsedated pediatric dental patients due to its atraumatic nature.

Pulse Oximeter is easy to use as it requires no calibration, warm-up time or tissue preparation and multiple probes are available for use at different sites like ear, finger, toe and nose.[3] In this study, fingertip pulse oximeter was used.

In the present study, it was observed that there was an increase in pulse rate during all the routine dental procedures (i.e. extraction, restoration and oral prophylaxis) from the pre-operative baseline values. Thereafter it decreased gradually in the post-operative phase.

The largest increase in pulse rate was seen during extraction followed by restorations and oral prophylaxis. Simpson[9] and Myers[10] also reported an increase in pulse rate in a group of children and they attributed this increase to anxiety, fear and excitement. Baldwin et al[11] also showed peak of anxiety during stressful event of extraction. Similar findings were also reported which showed peak of anxiety during extraction. Sanadhya et al[5] also reported that with the delivery of local anaesthetic, the pulse rate increased significantly, showing the association of emotional stress and fear with the enhanced sympathetic activity to be the cause of this increase.

Prabhakar[12] in his study also observed increased anxiety in children during cavity preparation and restoration and he attributed that the reason for this increase is the sound and sight of the handpiece. Kleinknecht[13] also observed similar findings in his study.

Rayen[14] also concluded in his study that the most anxiety promoting situation in the dental operatory was the period of extraction followed by the initial waiting in the reception area.

The study also shows that there is a statistically significant difference in pulse rate (intra-operatively) between different procedures like extraction and restoration, extraction and oral

prophylaxis and restoration and oral prophylaxis. This is in accordance with the study done by Prabhakar et al[12] which showed a statistically significant difference between oral prophylaxis and extraction in the control group where no non-aversive behaviour management therapy was instituted.

In the present study, the arterial oxygen saturation (SaO_2) levels remained unaltered during routine dental procedures. Observations of this study show that there is no significant change in the arterial oxygen saturation in the pre-operative, intra-operative and post-operative phases of dental treatment. In a study done by Bello[7], he also observed an insignificant change in arterial oxygen saturation(SaO_2) throughout the operative procedure. Rayen[14] also observed that arterial oxygen saturation(SaO_2) remained unaltered during various dental procedures. Sanadhya[5] also observed insignificant change in arterial oxygen saturation (SaO_2) at the time of anaesthetic agent delivery in her study. Prabhakar[12] observed that there was a decrease in arterial oxygen saturation (SaO_2) levels in children during dental procedures.

From the present study, it may be concluded that stress produces anxiety which further initiates a chain of physiological reactions which in turn produce variations in the physiologic parameters. Pulse rate is more sensitive to these changes. There was an increase in pulse rate during all the routine dental procedures and maximum increase was seen during extraction. There was no significant change observed in the values of arterial oxygen saturation (SaO_2) during all the procedures.

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Influence of a Dual-Cure Composite and Resin-Modified Glass Ionomer Cement used as a Dentin Substitute on the Microleakage of Class II Open-Sandwich Restorations.

Phogat N[1], Kumar M [2], Taneja S[3]

Abstract

Aim: To evaluate the influence of a dual cured composite and resin modified glass ionomer used as a dentin substitute on the microleakage of Class II open-sandwich restorations

Materials & Method: Standardized Class II cavities were prepared on 50 extracted human third molars. The teeth were randomly assigned to two groups (n=20) to compare a dual cure composite (Core X. flow) with resin-modified glass-ionomer cement (Vitremer) in open sandwich restorations covered with light cure composite (Ceram.X duo+). The teeth were then subjected to thermocycling (5 to 55 degrees, 500 cycles) with a dwell time of 15 seconds in electronically maintained water baths. The specimens were sealed with sticky wax at the root apices. Teeth were coated with two layers of nail varnish, leaving 1.0 mm around the margins of the cavity. Samples were immersed in 2% methylene blue solution for 24 hrs. The teeth were sectioned longitudinally and dye penetration was directly measured using stereomicroscope. Kruskal-Wallis and Mann-Whitney U test was applied to see the significance of mean of dye leakage.

Results: The degree of leakage increased significantly with Core X. flow compared to Vitremer. The resin-modified glass-ionomer cement remained the best intermediate materials when open-sandwich restorations are indicated.

Keywords: Core X. flow, Vitremer, Open-Sandwich technique, Dye leakage.

Introduction

With advances in dentine adhesives and the evolution of esthetic dentistry, resin composite materials are progressively being used as alternatives to amalgam in class II cavities in posterior teeth.[1,2] While class II composite restorations can be placed at an acceptable standard if the gingival margin is in sound enamel, there has been much debate regarding the marginal integrity of composite restorations that extend apical to the cementoenamel junction (CEJ).[3] Several in vitro studies have shown that there is poor marginal adaptation and considerable leakage when the cervical margin is located at or below CEJ.[2] This is due to the fact that dentin and cementum have higher organic content than enamel and are thus less favourable substrate for bonding.[4]In order to overcome the inherent disadvantages of composites, such as polymerization shrinkage and weaker adhesion at the composite-dentin interface several strategies were proposed. The step by step incremental technique, transparent

Corresponding Author : Dr Mohit Kumar, Associate Professor, Department of Conservative Dentistry and Endodontics I.T.S Centre for Dental Studies and Research Murad Nagar, Ghaziabad,U.P **(M) :** 9910113023, **E-mail address:** mohit_cusp@yahoo.co.in

1. PG student, Department of Conservative Dentistry and Endodontics I.T.S Centre for Dental Studies and Research Delhi-Merrut Road, Ghaziabad, U.P
2. Associate Professor, Department of Conservative Dentistry and Endodontics I.T.S Centre for Dental Studies and Research Delhi-Merrut Road, Ghaziabad, U.P
3. Professor & Head, Department of Conservative Dentistry and Endodontics I.T.S Centre for Dental Studies and Research Delhi-Merrut Road, Ghaziabad, U.P

matrices, light reflecting wedges and improved adhesive systems solved these problems only partially. Thus, a slightly different approach - an open sandwich technique was proposed. An open sandwich technique consists of a cervical layer of another class of material prior to composite insertion in class II cavities.

Glass ionomer cements have been proposed to be used as dentin substitute in case of open sandwich restorations due to its properties such as fluoride release and bonding to tooth structure.But, conventional GICs failed in open-sandwich restorations due to partial or total dissolution. This resulted in the use of RMGIC as base material. Vitremer, a tri-cure glass ionomer system overcomes the disadvantages of light cured glass ionomers while maintaining all their advantages. Studies investigating Vitremer in sandwich-technique have reported significantly better marginal adaptation on cervical dentin compared to base or total bond composite restorations.[5]

Another recent approach in sandwich technique is the use of dual-cured composite beneath composite restorations. Dual-curing composites may present a good alternative to RMGIC in open sandwich restorations and act as a dentin substitute. Core.X Flow, a recently introduced dual-cure composite have an advantage over light curing composites that, it can be placed in bulk like RMGIC, circumventing all the clinical problems related to light-curing. Moreover, it was reported that flowable materials, such as dual-cure composites, may improve the marginal and internal adaptation of composite restorations.[6,7,8,9] Very few studies have evaluated the effect of dual cure composites as dentin substitute in class II open sandwich technique.

Therefore, the purpose of this study is to evaluate the influence of a dual-cure composite (Core.X Flow; Dentsply De Tray, Konstanz, Germany) and a resin-modified glass ionomer cement (Vitremer; 3M ESPE, St. Paul, MN, USA) used as a dentin substitute on the microleakage of Class II open-sandwich restorations.

Methods & Material

Fifty non-carious, impacted human third molars were obtained and any residual soft tissue was carefully removed with the help of ultrasonic scaler and teeth were carefully examined under light microscope to rule out any pre-existing cracks. The teeth were then stored in 1% chloramine T at 4°C until use.

Specimen Preparation

A standardized mesio-occlusal class II cavity was prepared on each tooth using a straight fissure bur in a high speed handpiece. A new bur was used after every five preparations. All the internal line angles were rounded. The overall dimensions and depth were standardized as follows: occlusal floor - width 4 mm, length 5 mm; axial wall - width 4 mm, height 3 mm; gingival floor - width 4 mm, depth 2 mm. The proximal boxes ended in dentin 1 mm below the cemento-enamel junction (CEJ). The teeth were then stored in saline.

Forty teeth were assigned to the experimental group, and ten to the control group. Teeth in the experimental group were divided into Group I and Group II of twenty teeth each (n=20). Group III (n=5) -negative control. Group IV (n=5) -positive control.

Cavity Restoration

Group I: Core. X Flow

This group consisted of 20 samples. The

cavity was etched for 15 seconds and then rinsed with water from 3-way syringe and gently dried using a moist cotton pellet. The intensity of QTH was set at 500mW/cm² and was verified with the built-in radiometer. Dentin bonding agent, XP Bond with Self-Cure Activator, was applied with a fresh applicator tip to all the surfaces of two-third (2 mm) of cavity. Solvent was evaporated by thoroughly blowing with air from an air syringe for at least 5 seconds. Then it was light-cured for 10 seconds. A universal Toffelmire metal matrix band/retainer was placed around each prepared tooth and was supported externally by low-fusing compound to maintain adaptation of the band to the cavity margins. Dual cure composite (Core.X flow) was then used in bulk to fill the cervical two-thirds of the cavity. The material was visible light-cured for 20 seconds at an intensity of 550 mW/cm²and then allowed to be self-cured for 2-3 minutes. Excess material beyond 2 mm of the cavity was removed with the diamond bur. Etching and bonding was done for rest of the cavity as described above. The last coronal third was filled with a light-cured composite (Ceram.X duo+) using an incremental technique and cured for 40 seconds at an intensity of 500mW/cm².

Group II: Vitremer

This group comprised of 20 samples. Vitremer Primer was applied to the two-third of cavity for 30 seconds, the primer was dried using an air syringe for about 15 seconds and then it was light-cured for 20 seconds. A universal Toffelmire metal matrix band/retainer was placed around each prepared tooth and was supported externally by low-fusing compound to maintain adaptation of the band to the cavity margins. Vitremer was then used in bulk to fill the cervical two-third of the cavity. It was light-cured for 40 seconds and then allowed to self-cure for 4 minutes. Excess material beyond 2 mm of the cavity was removed with the diamond bur. Etching was done and bonding agent was applied on rest of the cavity as done for group 1. The last coronal third was filled with a light-cured composite (Ceram.X duo+) using an incremental technique and cured for 40 seconds at an intensity of 500mW/cm².

Ten additional teeth were restored, similar to those of group I, and were used as control.

Group III: Negative control

This group consisted of 5 samples, the teeth were restored same as group I.

Group IV: Positive control

This group also consisted of 5 samples, the teeth were restored same as group I but did not receive any dentin-bonding agent between the dentin walls and Core.X flow.

All the specimens (Group I, II, III and IV) were then stored in distilled water in an incubator at 37°C for 24 hours. The teeth were then subjected to thermocycling (5 to 55 degrees, 500 cycles) with a dwell time of 15 seconds in electronically maintained water baths.

Methylene Blue Penetration Test

The specimens were then sealed with sticky wax at the root apices. Teeth of experimental groups and positive control group were coated with two layers of nail varnish, leaving 1.0 mm around the margins of the cavity. Teeth of negative control group were entirely covered with nail varnish, not leaving 1.0 mm around the margins of the cavity. The teeth were then immersed in 2% methylene blue dye solution for 24 hours at 37 °C. After removal of the specimens from the dye, they were thoroughly rinsed in tap water. The teeth were then sectioned longitudinally along the mesio-

distal plane cutting through the center of the mesial cavities using a low speed diamond disc. Scoring Criteria 0= no dye penetration,1= dye penetration up to one-third cavity depth,2= dye penetration one-third to two-third cavity depth,3= dye penetration in excess of two-third depth,4= extensive dye penetration involving the axial wall. The dye penetration at the tooth-restoration interface was observed under a stereomicroscope at a magnification of 20X (Olympus, Spectro Analytical Laboratory, Delhi). The results were tabulated and statistically analyzed. The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 15.0 statistical Analysis Software. The mean, standard deviation, minimum and maximum values were calculated for all groups in terms of dye leakage. Descriptive statistics have been calculated for all the variables. Kruskal-Wallis and Mann-Whitney U test was applied to see the significance of mean of dye leakage. p-value of ‹ 0.05 has been considered as statistically significant level.

Results

Table 1 show the mean and standard deviation of dye penetration in all the groups.Dye penetration was significantly higher (p= 0.009) in group I, which was restored with Core.X flow, compared with group II, which was restored with Vitremer. The negative controls did not show any dye penetration and high penetration was observed in the positive controls.

Table 1: Mean ± SD and statistical comparison of dye leakage score

Groups	Dye Leakge Scores		Statistically significant difference between the groups			
	N	Mean±SD	I	II	III	IV
I	20	2.05±1.00	-	0.009	<0.001	0.001
II	20	1.10±1.02	-	-	0.024	<0.001
III	5	0±0	-	-	-	<0.001
IV	5	4±0	-	-	-	-

p-value <0.05-significant

Discussion

The greatest limitation in the use of composite restoration as a posterior restorative material seems to be shrinkage during polymerization, which leads to poor marginal seal and microleakage.[10] This problem is more conspicuous when the gingival margins of the tooth preparation lie below the cemento-enamel junction. Microbial microleakage, an important sequel of polymerization shrinkage has been identified as a major factor in the pulpal reaction to composite resin

restorations.[11]

Several techniques have been developed in an attempt to reduce polymerization shrinkage stress, and to improve marginal adaptation. These include incremental composite placement, stepped or ramped light curing and open-sandwich technique. The open-sandwich technique for placement of class II posterior composite restoration has all layers of restorative material exposed to an oral cavity at the proximal margins, which are areas of primary concern for long-term clinical success.[12,13,14,15]

In the "open sandwich" technique, glass ionomer cement (GIC) is used as a dentin replacement in a laminated GIC/composite resin (CR) restoration. GIC adheres chemically to dentin and has a similar expansion coefficient to that of tooth structure.[16] But, the traditional open-sandwich technique with a conventional GIC showed clinical failure rates between 13% and 35% after 2 yrs and 75% after 6yrs (Welbury, 1990; Knibbs, 1992; van Dijken, 1994). The main reasons for failure were partial or total dissolution of the GIC part or fracture of the restoration.

Resin-modified glass-ionomer cements (RMGIC), introduced in the early nineties, showed improved mechanical and physical properties compared to the conventional cements and higher resistance to early moisture contact and desiccation.[17] One of the popularly used RMGIC is Vitremer. It has several advantages as compared to light-cure glass-ionomer restorative like bulk placement and adhesion to dentin in the absence of light. Several in vitro studies have reported less microleakage in Vitremer as compared to all other materials tested.[18,19]

Dual-curing composites may present a good alternative to RMGIC in open-sandwich restorations and act as a dentin substitute. Core.X flow, a recently introduced dual-cure composite is used in the present study.[8,20]

The results of this in vitro study showed that Core.X flow (group I) showed significantly more dye penetration as compared to Vitremer (group II).

The better dye penetration score of Vitremer might be due to its ability to absorb some of the polymerization stresses of the composite resin setting, reducing the stress accumulation in the dentin-restoration interface and water sorption which relieves setting shrinkage as compared to composites.[21]

The intrinsic porosity of this material, introduced by hand mixing, can increase the "within-material" free surface area, which also contributes to stress relief.[19,22]

The present findings are in accordance with the results of Koubi et al (2010)[21,23] who reported that Fuji II LC (RMGIC) demonstrated less dye leakage as compared with Multicore Flow (dual-cure composite) in a Class II open-sandwich restoration.

However, findings contrary to the present study was reported by Kamath et al (2012)[24] who found that delayed light polymerization of the dual-cured composite base reduced the microleakage in class II open-sandwich restorations.

The present study focuses on one of the major factors responsible for the clinical failure of Class II composite restorations, that is, microleakage. Further clinical studies are required to assess the clinical efficacy of dual-cure composites as dentin substitute in Class II open-sandwich restorations.

Conclusion

Within the limitations of the present study, it

was concluded that

- Vitremer (RMGIC) when used as dentin substitute provides better marginal seal than Core.X Flow (dual-cure composite) in Class II open-sandwich restorations.

Further clinical studies are required to corroborate the findings of the present study.

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A Comparative Evaluation of the Efficacy of Glycine Air Polishing following Scaling and Root Planing & Scaling and Root Planing Alone in the Treatment of Chronic Periodontitis : A Clinical Study

Arora K[1], Dodwad V[2], Kukreja B J[3], Nagpal S[1]

Abstract:

The purpose of this study is to evaluate the short term clinical effect of air polishing device, as well as safety and patient acceptance in subjects with pocket depth of 3-5mm. This was a randomized, spilt mouth clinical trial. In this study subgingival application of amino acid glycine powder at limited pressure was compared to scaling and root planing (SRP) in 10 subjects with pocket depth 3-5mm. After supra-gingival scaling, the spray was applied for 4-5 seconds in all sites in the test quadrant, whereas SRP was done in control quadrant. Sub-gingival air polishing was safe (no adverse events were noted), perceived to be more acceptable by the patients and was more time-efficient than SRP.

Keywords : Airpolishing Device, Aminoacid Glycine Powder, Plaque Index, Chronic Periodontitis

Introduction

Periodontitis isdefined as "an inflammatory disease of the supporting tissues of the teeth caused by specific microorganisms or groups of specific microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone with pocket formation, recession, or both."[1]Accumulation of bacteria on tooth surfaces is the primary cause of gingivitis and periodontitis. Thus, regular mechanical removal of bacterial plaque from all non-shedding oral surfaces is considered the primary means to prevent and stop the progression of periodontal disease.[2]

It has been seen that in periodontal patients, frequently performed sub-gingival debridement in pockets >3mm has shown to be necessary to maintain periodontal health.[3]Hand instruments or oscillating scalers may be used to reduce sub-gingival microflora; however their use is time-consuming and technically demanding, and may lead to clinically relevant root substance loss over time.[4] Hard tissue loss isone ofthe major causes of increased sensitivity in the treated teeth to evaporative, tactile, thermal or osmotic stimuli.[5]

The air-abrasive technology uses an abrasive powder introduced into a stream of compressed air to clean or polish the surface by removing deposits attached to it or smoothing its texture.[2]Plaque removal can be accomplished effectively using air-polishing devices. However, air-polishing using a slurry of water, sodium bicarbonate ($NaHCO_3$) and pressurized air is highly abrasive to root

Corresponding Author : Dr. Kapil Arora, P.G Student, Department of Periodontology & Oral Implantology I.T.S-CDSR, Murad Nagar, Ghaziabad. **(M)** 8954789441 **Email- Id -** dr.kapilarora@yahoo.in

1. P.G Students, Department of Periodontology & Oral Implantology I.T.S-CDSR ,Murad Nagar, Ghaziabad.
2. Professor & Head, Department of Periodontology & Oral Implantology, I.T.S-CDSR ,Murad Nagar, Ghaziabad.
3. Senior Lecturer, Department of Periodontology & Oral Implantology, I.T.S-CDSR ,Murad Nagar, Ghaziabad.

cementum or dentin.[6] To reduce the abrasiveness and render this approach potentially suitable for removal of biofilm on root surfaces, it was suggested to replace sodium bicarbonate with a powder of amino acid glycine.[7]

Using pressurized air in dental procedures carries the risk of provoking emphysema. Cases of emphysema were noted after the use of high-speed dental hand pieces and air-water syringes.[8] However no cases of emphysema has been reported after the glycine air polishing, suggesting that this protocol allows gentle cleaning of the sulcular area with no major disruption of the gingival tissues.[9]

Thus, the aim of this study is to evaluate the short term clinical effect of air polishing device, safety and patient acceptance in subjects with pocket depth of 3-5mm.

Materials & Method

This was a 7 day single-centre, randomized, split-mouth clinical trial.Ten systemically healthy patients were recruited from the department of periodontics, I.T.S – C.D.S.R. Subjects who were of age 18-60 years with presence of at least one periodontal pocket of PD 3-5mm in two separate quadrants between distal aspect of central incisors and mesial of second molar with no obvious sign of persisting massive sub-gingival calculus deposits were included in the study.

Patients suffering from chronic bronchitis, asthma, major systemic illness (cardiovascular diseases), HIV, cancerand patients on anti-biotics, anti-inflammatory drugs or any medications taken within a monthwere also excluded as they may affect the outcome of the study.Written informed consent was obtained from each patient.

A powder of amino acid glycine, a non-toxic soluble material with a mean grain size of 20µm was used. Air polishing device Prophy Mate® was used to allow acess of the amino acid glycine powder in the sub gingival area. Prophy Mate® delivery system uses a customized handpiece to deliver amino acid glycine powder sub-gingivally under pressurized air. The abrasive particles have an access to sub-gingival tooth surfaces and have shown to be effective in removal of plaque and soft deposits.

The test procedure consisted of sub gingival treatment by inserting the tip into the pocket and applying the spray for 5 seconds. The control procedure consisted of deep scaling and root planing with Gracey curettes, without local anesthesia, for no longer than 5 minutes per site. The patients were randomly assigned to receive test treatment in one quadrant and control treatment in the other quadrant according to the availability of at least one periodontal pocket with PD 3-5mm in the area between distal aspect of central incisor and mesial aspect of second molar.

At baseline the following clinical parameters were recorded: plaque index (PI), gingival index (GI) and pocket depth (PD). This examination also included a visual examination for changes in colour and texture, signs of abrasion and visual analog scale (VAS) scoring was also done to evaluate the pain and discomfort level of the patient.

On the day of sub gingival treatment, supra gingival hard and soft deposits were removed in entire dentition. Test quadrant was treated with air polishing device (Fig. 2) and in control quadrant SRP was done (Fig. 1). Time spent in sub gingival treatment in both the quadrants was noted. Subjects were recalled after 7 days and PI,GI, PD and all adverse events were noted.

Fig. 1 (CONTROL SITE)

Fig. 2 (TEST SITE)

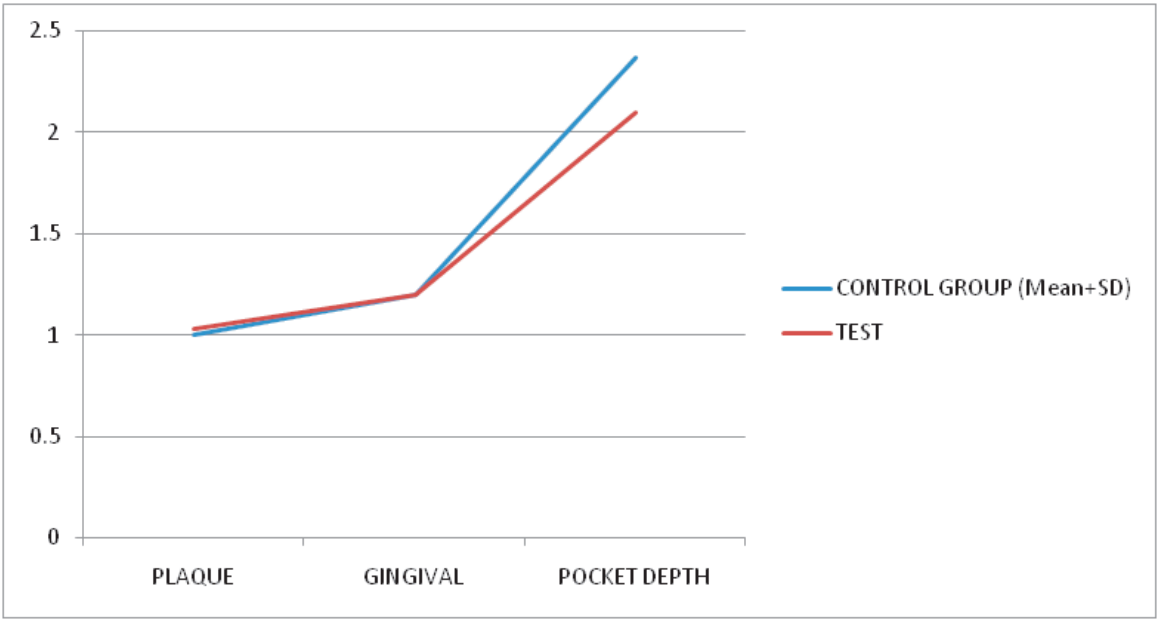

Fig. 3 Graphical representation of clinical parameters at 1 week.

Table 1: clinical parameters (PI, GI, & PD) recorded at baseline for both the groups. No significant difference in test or control group was seen for any of the clinical variables

PARAMETERS	CONTROL GROUP (Mean±SD)	TEST GROUP (Mean±SD)	*p* VALUE
PI	1.8 ± 0.48	1.8 ± 0.54	NS
GI	1.9 ± 0.27	1.9 ± 0.27	NS
PD	3.8 ± 0.47	3.8 ± 0.47	NS

Table 2: clinical parameters (PI, GI & PD) recorded after 1 week for both groups. Both the treatment procedures significantly reduced PI, GI & PD, but when compared between the groups there was no significant reduction

PARAMETERS	CONTROL GROUP (Mean+SD)	TEST GROUP (Mean+SD)	*p* VALUE
PI	1 ± 0.1	1.03 ± 0.1	NS (0.667)
GI	1.2 ± 0.35	1.2 ± 0.38	NS (0.67)
PD	2.37 ± 0.25	2.1 ± 0.1	NS (0.772)

Results

The primary outcome measures of the study were oral tissue safety and pain/discomfort, rated by the patient on a VAS from 0 to 10. Secondary outcomes included differences between the groups for changes in pocket depth (PD), plaque index (PI) and gingival index (GI).

All 10 patients finished the study and no adverse events were noted by any subject during the study. The evaluation of pain or discomfort on a VAS from 0 to 10 immediately upon completion of treatment revealed that the patients perceived the treatment with air polishing to be significantly more comfortable than the instrumentation with curettes. As expected, the mean time needed by the operator to treat one site was significantly shorter with the air-polishing device than with the curettes.

Discussion

The primary purpose of this trial was to evaluate the safety of a new method for subgingival air polishing in deep pockets. Prophy Mate® allowed access sub-gingivally. In addition, sodium bicarbonate was replaced by the amino acid glycine, a non-toxic, soluble material with a mean grain size of 20 mm.In the past, emphysema with the use of sodium bicarbonate powder for air polishing was noted.

Previous studies indicated potential risk of soft tissue damage, sodium bicarbonate causing erosive changes in the keratin and epithelial layer.Petersilka et al,[10] evaluated the safety and efficacy of air polishing with glycine powder at the histologic level.

With regard to patient acceptance, the treatment with air polishing was perceived to be significantly more comfortable than SRP with curette. Treatment with the new subgingival air-polishing device was three times faster than conventional SRP[11](Petersilka et al). Also in a study by Rapheal et al they used a specially designed nozzel for sub-gingival air polishing with amino acid glycine powder.[2]Our results are in agreement with a previous study[11], in which the patients rated the mean comfort of subgingival air polishing in shallow pockets at 8.7.

Conclusion

Subgingival air polishing with a new device was safe, because no adverse events were

noted in any of the patients, and it was perceived as being more acceptable and more time effiecient than SRP.

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Evaluation of the Clinical Efficacy of a new Desensitizing Tooth Paste Containing Nano-crystalline Hydorxyapatite in Dentine Hypersensitivity Patients : A Double Blind Randomized Controlled Clinical Trial

Verma P[1], Gupta U[2], Dodwad V[3], Kukreja BJ[4], Arora K[1]

Abstract

Aim: Several dentifrices have been shown to be effective in reducing dentine hypersensitivity (DH). The aim of the present study was to evaluate the desensitizing efficacy of Aclaim® toothpaste.

Materials and Method: A double blind randomized controlled clinical trial was performed on 40 subjects in which 20 were asked to use Aclaim® toothpaste (test group) and 20 were asked to use fluoridated foaming dentifrice available in market . All subjects were examined at baseline and after 3 weeks and 6 weeks; at each visit only the teeth identified as hypersensitive at baseline were re-evaluated. The hypersensitive teeth were assessed using the commonly used and validated stimuli tests: tactile tests, air blast test and ice stick test and subjective tests.

Results: The results showed that both dentifrices were largely effective; the mean score reduction from baseline to 6 weeks was significant in all the parameters (air blast, tactile, ice stick and subjective test) in both the groups. But, the test group showed a statistically significant mean score reduction in all the parameters recorded.

Conclusion: The results of the present study suggested that there is a significant reduction in dentinal hypersensitivity in subjects advised to use nano-crystalline hydroxyapatite containing dentifrice as compared to subjects using commercially available fluoride based desensitizing toothpaste.

Keywords: Dentinal Hypersensitivity, Remineralizing Agent, Occlusion of Dentinal Tubules.

Introduction

Dentine hypersensitivity (DH) is characterized by a short, sharp pain arising from the exposed dentine in response to thermal, evaporative, tactile, osmotic or chemical stimuli, which cannot be ascribed to any other dental defect or pathology.[1,2] The condition can arise as a result of enamel loss caused by attrition, abrasion or erosion and can be often associated with exposed root surfaces of canines and premolars.[3] Dentine hypersensitivity is a common problem with prevalence varying widely, with various studies showing that it affects 3% to 57% of adult population.[4,5] Current evidence explaining dentinal hypersensitivity favors the hydrodynamic theory originally postulated in the 19th century and later developed by Brannstrom in 1963.[6]

A number of treatment regimens have been recommended over the years, and particular attention has been focused on "home use" dentifrices containing various "active" compounds, either blocking the

Corresponding Author : Dr. Paras Verma, P.G Student, Department of Periodontology & Oral Implantology I.T.S-CDSR, Murad Nagar, Ghaziabad. **(M)** 09555514495 **Email- Id -** dr_parasverma@yahoo.com

1. P.G Students, Department of Periodontology & Oral Implantology I.T.S-CDSR ,Murad Nagar, Ghaziabad.
2. Professor, Department of Periodontology & Oral Implantology, I.T.S-CDSR ,Murad Nagar, Ghaziabad.
3. Professor & Head, Department of Periodontology & Oral Implantology, I.T.S-CDSR ,Murad Nagar, Ghaziabad.
4. Senior Lecturer, Department of Periodontology & Oral Implantology, I.T.S-CDSR ,Murad Nagar, Ghaziabad.

hydrodynamic mechanism or the neural response.[7] According to Lee et al, the variations in DH symptoms occur according to the extent of opened dentinal tubules.[8] Therefore, an effective method to occlude patent dentinal tubules may prove to be beneficial in treating DH. At one time, strontium salts were the most common desensitizing agents.[9] Subsequently, potassium salts became the most popular active ingredients of dentifrices advocated for use in DH treatment.[10,11,12] Most of the products and devices used to treat DH, behave by reducing stimuli conduction and apatite dissolution rather than aiming to promote mineralization through apatite crystallization or the replacement of the lost mineral.[13,14]

Recently, Aclaim® toothpaste has been advocated for treatment of DH which offers nanocrystals of hydroxyapatite. These nanocrystals mimic natural hydroxyapatite in composition, structure, nano-dimensions as well as functionality. Acting as a filler, nano particles easily penetrate into the exposed dentinal tubules and strongly adsorb to dentine apatite, thus sealing exposed dentinal tubules. The tooth paste releases calcium and phosphate ions, which precipitate and recrystallize to form a biomimetic apatite layer over exposed dentinal tubules. This biomimetic apatite layer has been shown to be impermeable and resistant to acid attack. It also remineralizes microsized pores of demineralized enamel, micro cracks, sub-surface lesions and smoothens the enamel surface. This smooth enamel surface reduces the accumulation of plaque and stains.

Thus, the aim of the present study was to compare the clinical efficacy of a dentifrice containing nanocrystalline hydroxyapatite (Aclaim®) to a commercially available fluoridated desensitizing tooth paste as a positive control in the management of dentinal hypersensitivity over a period of 6 weeks.

Materials And Method

Study Population

The study was conducted in the outpatient Department of Periodontology and Oral Implantology, I.T.S-CDSR, Ghaziabad. For this randomised controlled trial, 40 patients were selected. Following inclusion criteria was used 1) Patients aged 18 to 60 years, 2) Hypersensitive area on facial surfaces with at least two teeth scoring one or more on the air blast sensitivity test, 3) Periodontally healthy patients, 4) Systemically healthy patients 5) Patients with gingival recession and 6) No other condition that might explain their apparent DH. The exclusion criteria were 1) Deep dental caries or large restorations showing pulpal response, 2) Defective restorations, 3) Deep periodontal pockets, 4) Orthodontic appliances, 5) Patients with dentures or bridge work that would interfere with the evaluation of hypersensitivity, 6) Patients who had undergone periodontal surgery within the previous 6 months, 7) Patients who were undergoing treatment with antibiotics or anti-inflammatory drugs and treatment for tooth hypersensitivity, 8) Heavy smokers, alcohol or drug abusers and 9) Patients with any systemic disease. The subjects were randomly categorized into two groups, i.e. the test group and the control group. The test group included 20 subjects, who were advised to use Aclaim® toothpaste and the control group received a fluoride containing desensitizing toothpaste, Sensodent KF® The randomization process was made externally by the statistical unit using a computer generated random table. The investigator was neither involved during the

randomization process nor were they aware of which group the subject belongs to in the evaluation phase. Informed written consent was taken from all the patients prior to the study.

Initial Therapy

The patients initially completed a plaque control program, including oral hygiene instruction, scaling and root planing. The patients were instructed to perform non traumatic brushing technique twice a day for 2 min and not to use any other desensitizing agent or dentifrice. Only those patients maintaining optimum oral hygiene as well as showing compliance towards the correct brushing technique were included in the study.

Clinical Parameters

All subjects were examined at baseline, 3 weeks and 6 weeks. At each visit only the teeth identified as hypersensitive at baseline were re-evaluated. During the visits minimum of two and up to four hypersensitive teeth were assessed using stimuli tests: tactile tests, air blast test and ice stick test.[15] the teeth were isolated with cotton rolls and stimuli were applied on each tooth.

Air Blast Test

A blast of air was directed onto the affected area of the tooth for 1 sec from a distance of 10mm, while the adjacent teeth were isolated using cotton rolls, using standard dental unit air syringe. Sensitivity was recorded using the air sensitivity scale.

0 = tooth/ subject does not respond to air stimulus.

1 = tooth/ subject responds to air stimulus but subject does not request discontinuation of the stimulus.

2 = tooth/ subject responds to air stimulus and requests discontinuation or moves from the stimulus

3 = tooth/ subject responds to air stimulus, considers stimulus to be painful, and requests discontinuation of the stimulus

Tactile Test

The test was carried out using a sharp dental explorer. The explorer was passed across the facial surfaces of the tooth perpendicular to its long axis, at an approximated constant force. The test was repeated three times before a score was recorded. The subjects were asked to rate the perception of sensitivity as a score '0-10' where '0' meant no pain and '10' meant excruciating pain, based on a visual analog scale (VAS). This was the "probe intensity score.[16]"

Ice Stick Test

Ice sticks were kept at the facial surface of the tooth after proper isolation for a 5 sec. Sensitivity was measured using a 10 cm VAS score.

0 = no pain

10 = excruciating pain or discomfort

The above stimuli tests were applied in the above order with a minimum of 5 min gap between the applications of different stimuli.[17]

Subjective Tests

In addition to stimuli tests, the subject's subjective perception was investigated using an overall sensitivity score. Subjects were asked to rate their perception to hot/ cold food and drink, air, tooth brushing and too sweet and sour food by providing a score of 0-10.[18]

All assessments were made by two investigators, after receiving a 5 hours specific training programme and were unaware of the subjects group. Each subject was evaluated by the same investigator throughout the trial. During each visit, the occurrences of potential adverse effects were

assessed by investigators through both clinical survey and participants enquiry.

Statistical Analysis

The data was subjected to statistical analysis. Paired't' test was used to evaluate intra group scores. Unpaired t' test was used for assessing inter group results. A two-tailed p-value of 0.05 was considered significant for all analyses.

Results

Table 1 shows the mean value for all the parameters recorded, i.e., air blast, tactile, ice stick and subjective test for both the groups. The mean value for tactile test in control group at baseline, 3 weeks and 6 weeks was 5.26 ± 0.76, 4.1 ± 0.72 and 3.46 ± 0.80 while at test site was 4.84 ± 1.12, 1.28 ± 0.92, and 0.50 ± 0.52. The mean value for air blast test in control group at baseline, 3 weeks and 6 weeks was 1.84 ± 0.49, 1.51 ± 0.29 and 1.29 ± 0.22 while at test site was 1.98 ± 0.29, 1.29 ± 0.22 and 0.96 ± 0.12 respectively. Ice stick test showed mean value at baseline, 3 and 6 week were 7.08 ± 1.76, 4.44 ± 0.96 and 3.32 ± 0.98 at control site while at test site they were 7.44 ± 1.80, 3.14 ± 1.34 and 2.4 ± 1.16. Also, subjective test showed mean value at baseline, 3 and 6 weeks 7.2 ± 1.18, 3.94 ± 1.3 and 1.94 ± 1.04 at control site. At test site, the values were 6.92 ± 1.48, 1.6 ± 1.0, and 1.02 ± 0.96, respectively. In control group the mean reduction value was 1.8 in tactile test as compared to 4.34 in test site. This reduction was statistically significant on comparison. In control group the mean reduction value was 0.59 in air blast test as compared to 1.02 in test site. This reduction was found statistically significant on comparison. In control group the mean reduction value was 3.76 in ice stick test as compared to 4.3 in test site. This reduction was statistically significant on comparison. In control group the mean reduction value was 5.26 in subjective test as compared to 5.9 in test site. On comparison this reduction was statistically significant.

Bar diagram shows mean value reduction in all the parameters including air blast test, tactile test, ice stick test and subjective test at base line, from base line to 3 weeks and from baseline to 6 weeks respectively.

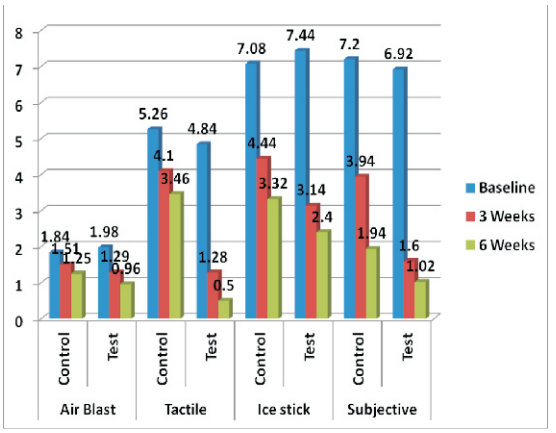
Discussion

Dentine hypersensitivity might be reduced physiologically by formation of intratubular crystals from the dentinal fluid and saliva minerals or by the application of therapeutic chemical agent to occlude the exposed dentinal tubules.[19] Clinically treatment of dentinal hypersensitivity with agents that promote the occlusion of dentinal tubules aims to cause the precipitation of crystals which may subsequently reduce the movement of dentinal fluids. But there has been no gold standard for treatment of dentinal hypersensitivity. It may be achieved by home use of various desensitizing dentifrices which contains various ingredients i.e strontium chloride, sodium fluoride, pro argenine, potassium nitrate. A recent addition to this category is nano- hydroxy appetite crystals in the form of toothpaste which due to its nano sized particle occludes well inside the exposed dentinal tubules. To evaluate the threshold of response to pain elicited by various stimuli, it should be quantified and established. DH has been mainly evaluated on the basis of the patient's subjective response to the presenting stimulus, for example, in the form of verbal rating and VAS and questionnaires.[16] DH may be evaluated either in terms of the stimulus intensity required to evoke pain (stimulus-based assessment), or as the subjective evaluation of the pain produced by a stimulus

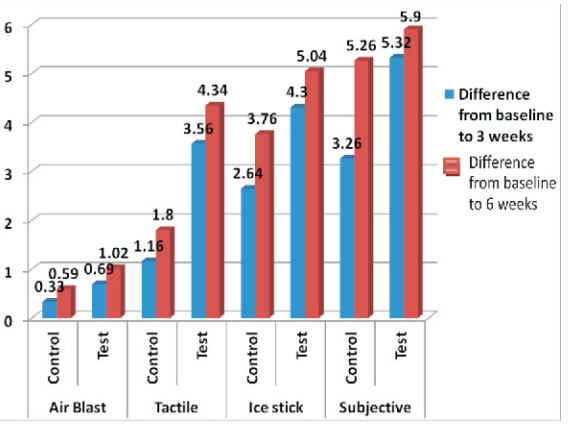
Table 1: Mean values of control and test group at baseline, three weeks and six weeks for tactile airblast, ice stick and subjective test.

Clinical Test	Groups	N	Baseline		3 Weeks		6 Weeks	
Air Blast	Control	20	1.84 ± 0.49	0.3	1.51 ± 0.29	0.009*	1.25 ± 0.28	0.000*
	Test	20	1.98 ± 0.29		1.29 ± 0.22		0.96 ± 0.12	
Tactile	Control	20	5.26 ± 0.76	0.4	4.1 ± 0.72	0.000*	3.46 ± 0.80	0.000*
	Test	20	4.84 ± 1.12		1.28 ± 0.92		0.50 ± 0.52	
Ice stick	Control	20	7.08 ± 1.76	0.5	4.44 ± 0.96	0.048*	3.32 ± 0.98	0.010*
	Test	20	7.44 ± 1.80		3.14 ± 1.34		2.4 ± 1.16	
Subjective	Control	20	7.2 ± 1.18	0.4	3.94 ± 1.3	0.000*	1.94 ± 1.04	0.007*
	Test	20	6.92 ± 1.48		1.6 ± 1		1.02 ± 0.96	

*p<0.05



Bar Diagram 1: mean values of control and test group at baseline, three weeks and six weeks for tactile, air blast, ice stick and subjective test.



Bar diagram 2:- Bar diagram show the mean value reduction after baseline to 3 weeks, baseline to 6 weeks for tactile test, airblast test, ice stick test and subjective test.

(response-based assessment).[2]

In the present study, assessment of stimuli for all patients was done by VAS without any bias. Compliance was enhanced by regular follow-up of patients. No side effects were observed in any patient during the conduction of the clinical trial. Orisini et al 2010[20] documented that the new dentrifrice containing zinc-CHA nanocrystals significantly reduced dentinal hypersensitivity after 4 and 8 weeks, supporting its utility in clinical practice. OHTA K et al, demostrated that nano-HAP could be an effective agent for occluding dental tubules and may be useful in treatment of hypersensitivity.[21] It is noteworthy that the benefits seen in the present study were obtained by simple home use of the products in the form of dentrifices, rather than by more complex in-office interventions.

Kim et al in 2006 evaluated the effect of nano-hydroxyapatite toothpaste, which was produced by nano- technology, on the remineralization of human enamel. The authors reported Vickers hardness number values between those obtained before and after the remineralization steps were significant. The results showed that the remineralization effect increased with increasing immersing time. However, there were no significant differences in VHN values between the two groups. SEM also demonstrated differences in the micro surface at each step. Hence they concluded that a toothpaste containing nano-hydroxyapatite has the potential to remineralize an incipient caries lesion. In addition, the addition of fluoride had no synergistic effect on remineralization.[22] Peter et al in 2011,[23] evaluated the effects of nano-hydroxyapatite (n-HAp) toothpastes on remineralization of bovine enamel and dentine subsurface lesions. In that study, the specimens were demineralized, randomly divided into five groups, and exposed to an aqueous remineralizing solution for two and five weeks (37 °C). Brushing procedures were performed with the respective toothpaste/storage solution slurry twice daily (2 × 5 s; total contact time of the slurries 2 × 120 s/d): storage in remineralizing solution only (0); additional brushing with B (20 wt% zinc carbonate nano-hydroxyapatite, $ZnCO_3$/n-HAp); BS (24 wt% $ZnCO_3$/n-HAp); E (0.14 wt% amine fluoride); or A (7 wt% pure n-HAp). Differences in mineral loss before and after storage/treatment were microradiographically evaluated. The author reported that the Dentine groups 0, B, BS, and A showed significantly higher values compared to E. Enamel values of group A were significantly higher compared to group E, whilst no significant differences of these groups could be observed compared to 0, B, and BS. They concluded that, toothpastes containing n-HAp revealed higher remineralizing effects compared to amine fluoride toothpastes with bovine dentine, and comparable trends were obtained for enamel.

In a study done by Lee et al[8], the effects of the short-term use of a dentifrice containing nano-sized carbonate apatite (n-CAP) on the occlusion of the dentinal tubules using a scanning electron microscope (SEM) and an image analyser in vitro was evaluated. One hundred human dentine specimens were wet ground with a silicone carbide papers and etched with 6% citric acid for 1 min to allow complete opening of the dentinal tubule. Specimens showing complete opening tubules were used as the baseline. The specimens were divided randomly into five groups: G1: 0% n-CAP, G2: 5% n-CAP, G3: 10% n-CAP, G4: 20% n-CAP and G5: 10% strontium chloride

($SrCl_2$). Five specimens from each group were brushed by applying 50, 100, 250 and 500 strokes, respectively. All the specimens were evaluated by a SEM (×3000), and the degree of occlusion of the dentinal tubules was quantified using an image analyser. The results were analysed by one-way anova and a Tukey's test using the spss 12·0 statistical package program. The dentifrice containing 20% n-CAP for 50 strokes, which indicated 2-day use, showed the highest tubular occlusion than the other groups ($P < 0{\cdot}05$). Moreover, this group showed 79·5% and 77·4% less open tubular area than the baseline and 0% n-CAP group, respectively. The groups containing various concentrations of n-CAP showed significant differences in the $SrCl_2$ group after tooth-brushing for 500 strokes, which indicated 17-day use. According to this examination of the short-term use of desensitizing dentifrices *in vitro*, the dentifrice containing 20% n-CAP was the most effective in occluding the dentinal tubules.

The results of the present study demonstrate that home use of desensitizing toothpastes can be effective in the management of dentinal hypersensitivity. Moreover, the use of these agents is safe and effective and can provide relief within a few days. Occlusion of the dentinal tubules is thus an effective way to tackle this common complaint of the patient. For this, the newly available toothpaste i.e. Aclaim® seems to be an effective method to achieve remineralization. As evident from the study, there was an improvement in both the objective and the subjective symptoms of dentinal hypersensitivity.

Conclusion

The results of the present study suggest that there is a significant reduction in dentinal hypersensitivity in subjects advised to use NHA crystals containing dentifrice as compared to subjects using commercially available fluoride-based desensitizing toothpaste. This may be due to the increased bioavailability of hydroxyapatite, promoting remineralization of exposed dentinal tubules, thereby reducing hypersensitivity. However, long-term clinical trials studies, along with SEM analysis are suggested to establish the exact mechanism of its effectiveness in the management of dentinal hypersensitivity.

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Customised Ocular Prosthesis: A Case Report

Gupta S[1], Bhargava A[2], Sehgal M[3], Gupta RK[4]

Abstract

It's a god given right of every human being to appear human. After enucleation, evisceration and exenteration of the eye, the goal is to replace the missing tissues with an artificial prosthesis and restore the facial symmetry and normal appearance of the anophthalmic patient. Therefore the combined efforts of the ophthalmologist, the plastic surgeon, and the maxillofacial Prosthodontist are essential in order to restore the patient's quality of life. Custom made prostheses provide more esthetic and precise result as compared to stock eye prosthesis. Simplification of the technique with the commonly available materials makes it easier. This case report describes the fabrication of eye prosthesis in a cost effective manner with a unique fabrication technique.

Keywords : Ocular Prosthesis, Anophthalmic Patient, Congenital Defect Iris Painting.

Introduction

A congenital defect, pathology or accidental trauma may necessitate surgical intervention, which can lead to removal of the eye ball[1]. Ocular disfigurement can cause significant physical and emotional disturbances[2]. The combined efforts of the ophthalmologist and the maxillofacial prosthodontist are required to provide a satisfactory ocular prosthesis, which can restore the patient's quality of life.

Various literature reports advocate the use of the stock eye for ocular replacement although it is well documented that customised prostheses offer excellent esthetics.[3,4] The custom-made ocular prosthesis has improved aesthetics only when the iris colour is perfectly matched with the fellow eye. A properly planned and customized ocular prosthesis maintains its orientation, when patient performs various movements. Exact color match of the iris and sclera with the adjacent eye can be achieved.[5,6] In the technique described in this article, a perforated acrylic resin tray reinforced with disposable syringe is used. The anatomy of the enucleated socket and overlying tissues is obtained with greater detail with proper tissue contours.Thus the prosthesis obtained will have closed adaptation to the tissues, simulating natural mobility of the eye ball.

The following clinical report demonstrates a custom-made ocular prosthesis with a special emphasis on iris painting to create aesthetically pleasing results.

Clinical Report

A 65-year-old male patient complaining of a missing left eye was referred to the Department of Maxillofacial Prosthodontics I.T.S-CDSR Muradnagar, Ghaziabad. The enucleation had been carried out 12 years ago

Corresponding Author : Dr. Sharad Gupta, Professor, Dept. of prosthodontics, I.T.S Centre for Dental Studies & Research, Delhi Meerut Road, Muradnagar-201206, Ghaziabad (Uttar Pradesh) **(M)** +91-9873435895 **E mail:** sharadssv@gmail.com

1. Professor, I.T.S Centre for Dental Studies & Research, Delhi Meerut Road, Muradnagar-201206, Ghaziabad (Uttar Pradesh)
2. Professor & Head, I.T.S Centre for Dental Studies & Research, Delhi Meerut Road, Muradnagar-201206, Ghaziabad (Uttar Pradesh)
3. P.G Student, I.T.S Centre for Dental Studies & Research, Delhi Meerut Road, Muradnagar-201206, Ghaziabad (Uttar Pradesh)
4. Sr. Lecturer, I.T.S Centre for Dental Studies & Research, Delhi Meerut Road, Muradnagar-201206, Ghaziabad (Uttar Pradesh)

following a thorn prick and subsequent infection. On examination of the defective eye socket it was found that patient had a defect with a shrunken orbit and intact tissue bed. (Figure 1)

Figure 1 : Preoperative

Treatment

An impression of the anophthalmic socket was made with irreversible hydrocolloid (Zelgan 2002, DENTSPLY) mixed in thin consistency, which was injected into the socket through the hollow stem of the plastic impression tray. The impression was then poured in sections using dental stone (Kalastone, Kalabhai Pvt. Ltd, Mumbai, India). After complete setting the two halves of the cast were separated and a special tray with clear acrylic having hollow passage was fabricated. The patient's eye socket was coated with a thin layer of Vaseline and an impression was made using light viscosity polyvinyl siloxane impression material (Aquasil LV, DENTSPLY) (Figure 2). Patient was asked to do various movements to record all anatomical details of the socket.

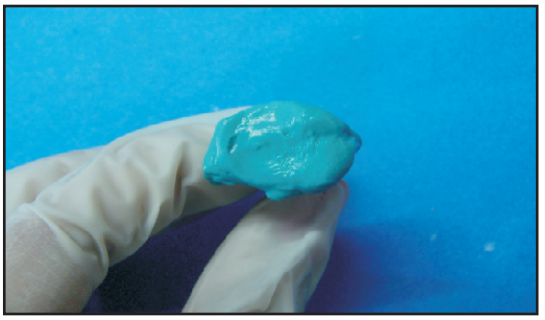

Figure 2 : Final impression of anopthalmic socket

Soft putty consistency polyvinyl siloxane (Aquasil soft putty/regular DENTSPLY) set was wrapped around the final impression to obtain a mould for wax pattern fabrication. Then putty was separated horizontally into two halves. The mould space was ready for wax pattern fabrication into which molten white wax (Surana dental wax Mangalore Dent Corp) was poured through the channel formed by tray handle (Figure 3).When the wax had set the putty mould was separated and the wax pattern was retrieved and carved.

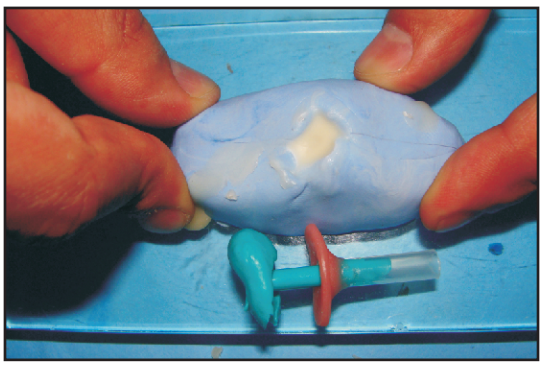

Figure 3 : Putty mould for wax pattern fabrication.

Wax pattern trial

Fullness of the defect was checked along with the extensions. This was confirmed by asking the patient to perform various movements and patient was inspected from the frontal view. The prefabricated black iris disc with handle was positioned maintaining the symmetry with the iris of the adjacent unaffected right natural eye of the patient.

Flasking

After trial wax pattern was sealed on the cast and the whole assembly was invested in special small aluminium flask (Figure 4). After dewaxing the mould was packed with tooth coloured heat cure polymethylmethacrylate acrylic (PMMA). Shade selection was done for sclera as per the contralateral natural eye. After acrylization

conformer was retrieved and invested mould was preserved for final processing. Later 1.5mm of the acrylic was trimmed from the outer surface to create space for iris and scleral painting followed by processing of the definitive prosthesis with clear acrylic.

Iris and Scleral Painting

Iris painting was carried out to match the colour of the natural iris, using acrylic-based pigments (Acrylin, Camlin Ltd, Mumbai, India), including white, blue, black and brown. To begin with a brown and black mix was painted as the base colours. The stroma was then painted with a lighter intensity colour. Thin radial strokes were given to form the striations with the very fine brush point. A small area around the pupil was left forming the collarette and was painted slightly brighter than the base colour. Finally, the limbus was painted with a mix of light blue and white to simulate the light bluish haziness that was presenton the inferior portion of the right iris. The black pupil was then painted. The painted iris disc was fixed with a special Monopoly Syrup solution which was formed with 10 parts of heat-cure acrylic monomer and 1 part of clear acrylic polymer[7]and checked for accuracy against the natural eye and found to be well-matched (Figure 5). Appropriate shade of sclera acrylic resin that matched well with natural eye sclera was selected. Further characterization was done by extrinsic staining and attaching veins by using the red-coloured silk threads.

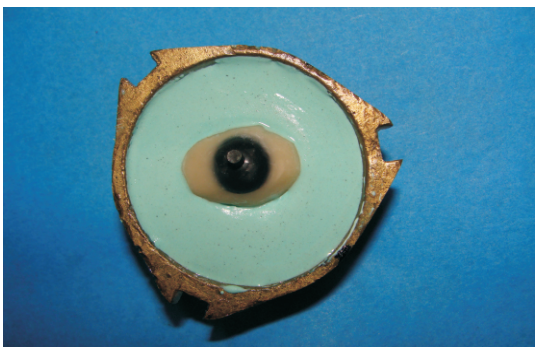

Figure -4 : Investment of wax trial

Figure -5 : Colour Match with Natural Eye

The prosthesis was finally cured with clear heat-polymerising acrylic (Ashwin Clear Heat Cure PMMA) resin. The prosthesis was finished, polished and placed in the eye socket. The colour match or the iris was excellent and the patient was satisfied with the outcome. Patient was taught insertion, removal and hygiene of the prosthesis. Follow-up evaluation was carried out once a week for the first month. At the time of the follow-up appointment, the prosthesis was working well and the patient had no problems (Figure 6).

Figure 6 : Postoperative- Prosthesis in Situ

Discussion

A customized ocular prosthesis maintains its orientation when patient performs various movements. With the development of newer materials the socket can be finely recorded on which custom made ocular acrylic prosthesis (Sykes, 1996)[8] can be fabricated with exact fit and esthetics although the prosthetic rehabilitation may be enhanced with the use of

implants.

Artopoulouet al.[9] has presented a technique of replicating the patient's iris using digital photography. The photographs are adjusted using graphics software and the final image is printed on 20 lb white paper with brightness 87 using a laser printer.The suggested technique is reliable but the digital photography equipment and settings, computer software as well as the patient co-operation for the photographs is required as it is technique sensitive. Conversely, if the iris anatomy and colour science are studied, custom iris synthesis can be accomplished just with the help of a paint brush and colours.

Although the literature[10,11] suggests modifying and characterising the sclera of stock eyes, it maynot be possible to change the iris colour. The colour of stock eyes may blend with younger patients but may not match older patients. These patients may have a smattering of brown throughout the sclera and more in the area of limbus and conjunctiva because of deposition of hepatic by-products.The case reported had the characteristic light bluish tinge on the iris of the natural eye. Hence, it was more difficult to achieve exact matching with a stock eye, so we decided to customize our prosthesis in the present case report.

Summary

The use of custom-made ocular prosthesis has been a boon to the patients who cannot afford for the implant replacements. Also, as discussed above, the esthetic and functional outcome of the prosthesis are better than the stock ocular prosthesis. A hand-painted technique in the presence of the patient seems to gain credence in the long-term.This procedure may be more time-consuming and entails a trial and error approach, but the aesthetic and functional results justify the extra effort. Hence, custom-painting of the iris should be encouraged.

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Palatal Reservoir Denture- Hope for Xerostomia Patient- A Case Report

Suganna M[1], Singh M[2], Khatri A[2], Kaur N[2], Thakur V[2]

Abstract

Xerostomia is the subjective sensation of oral dryness, usually, associated with hyposalivation. The difficulties encountered can be troublesome and at times may lead to complete failure of the prosthesis. Poor tolerance and retention of removable dental prostheses because of thin dry atrophic mucosa and lack of a salivary film are the major problems encountered in such cases. The present clinical report of xerostomic edentulous patient involves full mouth denture rehabilitation with incorporation of a salivary reservoir in the denture in which a salivary substitute is added.

Keywords : Xerostomia, Reservior Denture, Molloplast –B.

Introduction

Xerostomia is defined as the dry mouth resulting from reduced or absent salivary flow[1]. It is a common patient discomfort reported to the dentist in their day to day practice that could be manifestation of systemic conditions like Sjogren's Syndrome, salivary gland diseases, Diabetes mellitus, Parkinson's disease, dysfunction of immune system like HIV/ AIDS, head and neck irradiation, medication related side effects.[2,3]

Saliva functions to cleanse and moisten the oral cavity besides regulation of water balance, antimicrobial and buffering actions. Decreased salivation could lead to difficulty in mastication and deglutition of bolus in xerostomia patient. This subjective discomfort in conjunction with loss of taste acuity increase the risk of anorexia.[4] Xerostomia patients complain of dry mouth and difficulty in eating, speaking and swallowing. However, in denture wearers there is reduced amount in retention and extreme discomfort[5].

Salivary mucins possess rheological properties that include elasticity and adhesiveness to aid in retention of dentures and xerostomia, dentures invariably become loose. [6, 7] Prosthodontist pose a challenge to combat discomfort and poor retention of denture prosthesis among these patients.

This case report of xerostomia patient oral rehabilitation with reservoir denture fabrication elaborates both clinical and laboratory procedures.

Case Report

History and Examination

A 65 year old male patient reported to the Department of Prosthodontics ITS-CDSR, with the chief complaint of difficulty in chewing food and denture discomfort. Patient was relatively asymptomatic after complete denture rehabilitation seven years before. The

Corresponding Author : Dr. Mahesh Suganna, Associate Professor, Department of Prosthodontics, I.T.S Centre for Dental Studies and Research, Murad Nagar, Ghaziabad. **(M)** +91-8650077237 **Email:** maheshgolgeri@gmail.com

1. Associate Professor, Department of Prosthodontics, I.T.S Centre for Dental Studies and Research, Ghaziabad.
2. PG Students, Department of Prosthodontics, I.T.S Centre for Dental Studies and Research, Ghaziabad.

patient underwent surgery and radiotherapy for cancer of vocal cord four years back with subsequent difficulty in chewing food and discomfort in wearing dentures that progressed over time leading to avoidance of wearing denture till date. A palatal reservoir denture with artificial salivary substitutes was planned for the patient.

Procedure

01. Preliminary impressions of the maxillary and mandibular arches were made with impression compound and final impressions using light body elastomeric impression material.
02. Maxillomandibular relations were recorded and teeth arrangement completed by conventional method[8].
03. Trial dentures were evaluated in the patient's mouth.
04. Extra bulk of modelling wax was added to the palatal side of maxillary denture base approx. 2mm for providing space for the reservoir. Palatal contours were adjusted and evaluated for speech variables.
05. An index of the palatal surface was made (Type III dental stone, Kalabhai Karson Pvt Ltd, Mumbai, India) to serve as a guide for fabrication of the floor of the reservoir.
06. Excess modelling wax was then removed and denture was processed (Fig 1).

Figure 1 : Invested palatal index

07. A sheet of modelling wax was adapted on the surface of the stone index then invested and processed in clear heat-polymerized acrylic resin (Trevalon; DENTSPLY India Pvt Ltd, Gurgaon, India) to form the floor of the reservoir.
08. Adaptation of the floor of the reservoir with the denture base was evaluated (Fig 2).

Figure 2 : Floor of the reservior with the denture

09. A bulb shaped hole was made with roughened borders in the anterior part of the floor and relined with a permanent soft liner thus achieving functional in the oral cavity. (Molloplast-B, Buffalo Dental Manufacturing Co., Inc.) (Fig 3).

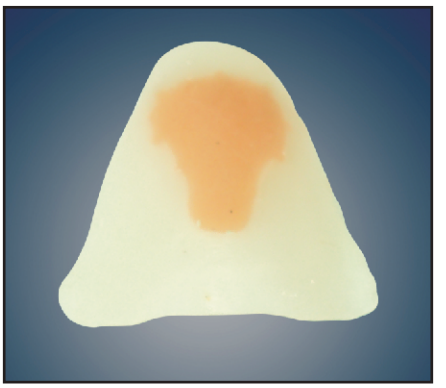

Figure 3 : Permanent soft liner to form the floor of reservoir

10. Two cuts were made of 1 mm in width in the central part of plate one in the anterior and other in the posterior part.

11. Floor of the reservoir was attached to the palatal surface of denture with autopolymerising acrylic resin (Trevalon, DENTSPLY India Pvt Ltd) (Fig 4).

Figure 4 : Reservoir denture in situ

12. Salivary substitute (Wet Mouth; ICPA Health Product) injected into the reservoir through the cuts by syringe. Patient is instructed to practice this procedure until they are able to inject the saliva substitute easily.
13. Treatment record card was given to the patient to note the time when the reservoir is filled, the quantity of substitute, and the time till the reservoir was empty. One week recall appointment was made.
14. After 1 week, the average duration of flow was evaluated and recorded. The duration of flow provided by artificial saliva reservoirs should range from 2 to 5 hours. Size of the cuts is adjusted to manipulate the flow rate.[6, 7]
15. *Post Denture instructions:*

a) Explained that this is an adjunct to the other therapy and has to continue his medicines.

b) To consume at least eight glasses of water per day.

c) Instructed about the filling of the reservoir with artificial saliva and the due care.

d) A post-insertion check-up was done in regular recall visits.

Discussion

The purpose of the technique is to fabricate a prosthesis that makes swallowing a control mechanism for the flow of saliva substitute. As the patient swallows, the tongue creates pressure on the anterior part of the hard palate, which, in turn, releases the substitute. On releasing pressure, the liner reverts to its position because of its resiliency and creates negative pressure inside the reservoir space that sucks air inside. The air collects at the top of the reservoir.

The thickness of the palate was increased primarily in the palatal vault area with minimum increase at the periphery of the palate. Increased palatal thickness in the regions of contact areas of the tongue while pronouncing /ch/ and /j/ (tongue contacts anteriorly), /s/ and /sh/ (tongue contacts laterally) and /k/ (tongue contacts posteriorly) affects speech significantly[9].

The volume of the reservoir was 5 ml and its working duration was 2 to 2.5 hours. As the mean number of swallowing cycles is approximately 600 cycles per day or approximately 25 cycles per hour, the amount of substitute released per functional cycle of the reservoir was approximately calculated to be about 0.25 ml[10].

Saliva substitutes containing thickening agents for longer relief and increased moistening and lubrication of the oral surfaces have been developed. These are available as solutions, sprays or gels and have multiple contents such as carboxymethylcellulose, electrolytes and flavouring agents. e.g. Wet

Mouth (ICPA Health Products Ltd). However, the main problem is to deliver this substitute constantly into patient's mouth without affecting his normal routine.

The permanent soft liner Molloplast-B is heat processed silicone material that stays soft permanently and features decades of documented success in denture reline cases. The material bonds firmly to new or existing acrylic dentures, and stays elastic and bacteria free for years.

This method utilizes routine clinical stages during fabrication of prosthesis. So, this is an easy and less time consuming procedure for xerostomia patients.

Summary

A palatal reservoir denture offers the clinician an alternative method of treating patients suffering from xerostomia. The advantage of this palatal reservoir denture technique over previous reservoir dentures mentioned in the literatures lies in the ready access to the reservoirs, both by the patient and for professional attention, it is easy to fabricate without tedious laboratory procedures.

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Adenomatoid Odontogenic Tumor of Mandible – An Unusual Case Report

Singh G[1], Ahuja P[2], Singh R A[3], Thanuja R[4]

Abstract

Adenomatoid Odontogenic Tumor (AOT) is a relatively uncommon odontogenic neoplasm. Initially this lesion was considered to be a variant of Ameloblastoma but its clinical features and biological behaviour indicate that it is completely a separate entity. It is a tumor arising from odontogenic epithelium with duct like structures and varying degrees of inductive changes in the stroma. It is a slow growing benign lesion commonly found in maxillary anterior region of young females and represents 3% of all odontogenic tumors. The aim of this paper is to present a rare case of intraosseous follicular variant of AOT in the mandibular anterior region.

Keywords: Adenomatoid Odontogenic Tumor, Intraosseous, Follicular.

Introduction

Adenomatoid Odontogenic Tumor (AOT) is a benign tumor originating from the odontogenic epithelium, corresponding to 2.2-7.1% of all odontogenic tumors.[1] The first case was reported by Steensland in 1905 as "Epithelioma Adamantinum". Various names have been used for this lesion like "Adeno- ameloblastoma" which was used for many years since the tumor was considered a histological variant of Ameloblastoma.[2] The tumor was also reported by Harbitz in 1915 under the name of "Cystic Adamantoma.[3]" Philipsen and Birn proposed the widely accepted and currently used name "Adenomatoid Odontogenic Tumor", a term that was adopted by the first edition of the World Health Organization classification of Odontogenic tumors in 1971. Adenomatoid Odontogenic Tumor is defined as a tumor composed of odontogenic epithelium in a variety of histoarchitectural patterns, embedded in a mature connective tissue stroma and characterized by slow but progressive growth. AOT is mostly seen in young patients, especially in the second decade of life and is not commonly found in patients older than 30 yrs of age. Females are affected more often than males. Maxilla is the predilection site of occurrence, almost twice as often as the mandible and the anterior part of the jaw is more frequently involved than the posterior part.[4]

Case Report

A 15yr old female patient reported to I.T.S Dental College, Hospital & Research Centre with a chief complaint of pain and swelling in lower front teeth region since 15-20 days. On intraoral examination, diffuse swelling was present in mandibular anterior teeth region in relation to 31, 41 and 43 with a smooth surface. Grade I mobility was present in

Corresponding Author : Dr. Garima Singh, Post Graduate Student, Department of Oral and Maxillofacial Pathology, I.T.S Dental College, Hospital & Research Centre, Greater Noida, U.P- 201308, India.

(M): 8860718661 **E-mail:** drgarima_singh1509@yahoo.com

1.Post Graduate Student, Department of Oral and Maxillofacial Pathology, I.T.S Dental College, Hospital & Research Centre, Greater Noida
2.Professor & Head, Department of Oral and Maxillofacial Pathology, I.T.S Dental College, Hospital & Research Centre, Greater Noida
3.Professor, Department of Oral and Maxillofacial Pathology, I.T.S Dental College, Hospital & Research Centre, Greater Noida
4.Reader, Department of Oral and Maxillofacial Pathology, I.T.S Dental College, Hospital & Research Centre, Greater Noida

relation to 31, 32, 41, 43 with missing 42 (Fig. 1). Orthopantomgram revealed a single unilocular, well defined radiolucency in the midline of the mandible with well defined borders, extending mediolaterally from apical region of 44 to 33 and extending from crest of alveolar bone till inferior border of mandible. The radiolucency completely enclosed the tooth including root of 42. Displacement of teeth was seen in relation to 31, 32, 41, 43 (Fig. 2). Occlusal radiograph showed buccal and lingual cortical plates expansion (Fig. 3). Hematological and urine analysis were done and were normal. Enucleation of the lesion was done and sent for histopathological examination.

Histopathological examination revealed odontogenic epithelial cells forming nests, nodules, whorls and duct like structures in a fibrous connective tissue stroma with hemorrhagic areas (Fig. 4). The nodular areas exhibits 2-3 layers of odontogenic epithelium with duct like structures having a single layer of odontogenic epithelium and the whorls and rosettes pattern having 2-3 layers of epithelium (Fig. 5). Areas of calcification, areas of amorphous eosinophilic material along with pleomorphic epithelial cells arranged in sheets and strands are noted. Areas of odontogenic epithelial rests are present. Histopathological examination confirmed the diagnosis of Adenomatoid Odontogenic Tumor.

Figure 1: Pre-operative view showing swelling in mandibular anterior jaw region

Figure 2: Pre-operative Panoromic view showing single, unilocular, well defined radiolucency on the midline of the mandible extending mediolaterally from apical region of 44 to 33

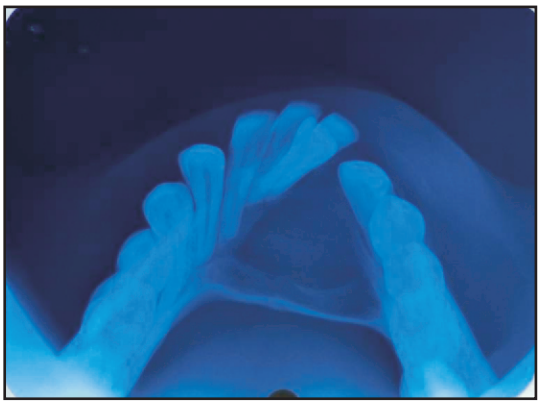

Figure 3: Occlusal radiograph shows buccal and lingual cortical plate expansion.

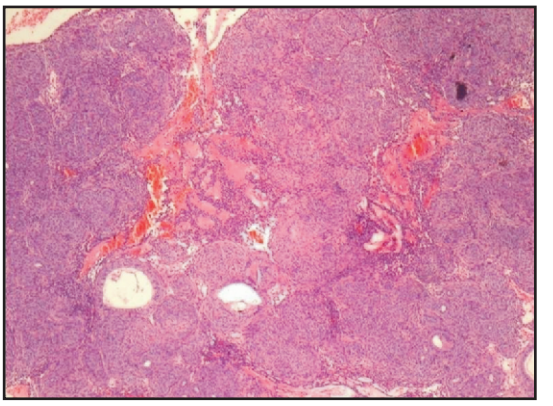

Figure 4: Photomicrograph is showing odontogenic epithelial cells forming nests, nodules, whorls and duct like structures in a fibrous connective tissue stroma with hemorrhagic areas (H & E, x40)

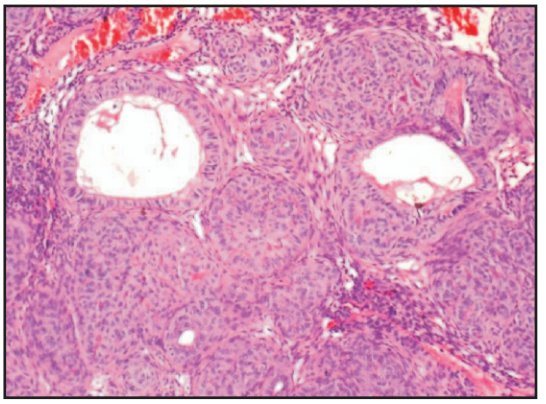

Figure 5: Photomicrograph is showing nodular areas exhibits 2-3 layers of odontogenic epithelium with duct like structures having a single layer of odontogenic epithelium and the whorls and rosettes pattern are having 2-3 layers of epithelium (H & E, x100)

Discussion

AOT is defined as a tumour of odontogenic epithelium with duct like structures and varying inductive changes in the connective tissue.[5] The tumour is largely found in the second and third decades of life with a male: female ratio of 1:1.9; 64.3% of all AOT variants occur in the Maxilla of which 62.3% are intraosseous. The canine was found to be the commonest permanent tooth to be involved.[6] In a study done by Swasdison in Thai patients showed that out of 67 reported cases of AOT, none of the lesions was present in the mandibular region[6].

There are 3 clinicopathologic variants of AOT – namely intraosseous follicular, intraosseous extrafollicular and peripheral variants. The follicular type is a central intraosseous lesion associated with an impacted tooth. Intraosseous extrafollicular variant of AOT has no relation with an unerupted tooth. It is commonly located above or superimposed upon roots of adjacent erupted teeth. These 2 variants accounts for 96% of all cases of AOT. Peripheral variant appears as gingival growth on labial surface[6]. The case which is presented here is an intraosseous follicular variant in mandibular anterior jaw region. Radiographically, the intraosseous follicular AOT is seen as a well defined unilocular radiolucency associated with crown or root of an unerupted tooth.[7] The most common differential diagnosis for this variant is Dentigerous Cyst which also occurs as a pericoronal radiolucency in the jaws. Dentigerous Cyst encloses the coronal portion of an unerupted tooth in most of the cases whereas AOT encloses both coronal and radicular portion of an unerupted tooth.[8] In approximately two thirds of intrabony variants, the radiolucency shows discrete foci having a flocculent pattern of scattered radiopacities. In this case, the radiolucency was well defined and unilocular associated with an unerupted or impacted mandibular anterior tooth.

AOT is usually surrounded by a well developed connective tissue capsule. It may present as a solid mass, a single large cystic space or as numerous small cystic spaces. The characteristic duct like structures are lined by a single row of columnar epithelial cells, the nuclei of which are polarized away from the central lumen. The lumen may be empty or contain amorphous eosinophilic material[5]. Dystrophic calcification is encountered in varying amounts and in different forms. It is also seen scattered among epithelial masses or in the stroma, in most AOT structures.[5]

Immunohistochemical and ultrastructural findings have shown that eosinophilic deposits probably represent some form of enamel matrix. Recent studies indicate that AOT is derived from a complex system of dental lamina and its remnants.[6] As the growth of AOT is slow growing and its nature is benign, the treatment of choice is enucleation

and curettage.

In the present case; the age, sex and histopathology is in accordance with the literature but the involved site and tooth is a rare occurrence. AOT is more common in maxilla but in this case it was present in mandibular anterior region. It is commonly associated with an impacted canine but in this case it is associated with an impacted Lateral Incisor.

Conclusion

Adenomatoid Odontogenic Tumors are rare odontogenic tumors which are common in young patients. So as dentists, it is important to know about the various variants of tumor with all its features so that early diagnosis can be made properly and the treatment can be done as soon as possible.

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Gingival Depigmentation: A Case Series

Mahajan V[1], Dodwad V[2], Nagpal S[1]

Abstract

Esthetics has become a significant aspect of dentistry and clinicians are faced with achieving acceptable gingival esthetics as well as addressing biologic and functional problems. The color of the gingiva plays an important role in overall esthetics but the principles and the techniques of the management of the problems associated with gingival melanin pigmentation are still not fully established. This case report presents simple techniques of de-epithelization which has been successfully used to treat gingival hyperpigmentation caused by excessive melanin deposition and highlights the relevance of an esthetically pleasing smile specially in smile conscious individuals.

Key Words: Depigmentation, Gingiva, Scalpel Surgery, Physiologic Pigmentation, Melanin.

Introduction

A smile expresses a feeling of joy, success, sensuality, affection and reveals self-confidence and kindness. A smile is more than a method of communication and is a means of socialization and attraction. The harmony of the smile is determined not only by the shape, the position and the color of the teeth but also by the gingival tissues.[1] The gingiva is most commonly affected intraoral tissue responsible for an unpleasant appearance. Melanin pigmentation often occurs in the gingiva as a result of an abnormal deposition of melanin. This pigmentation may be seen across all the races and at any age and it is without gender predilection[2]. It is generally agreed that pigmented areas are present only when melanin granules synthesized by melanocytes are transferred to the keratinocytes. This close relationship between melanocytes and keratinocytes was labeled by Fitzpatrick and Breathnach in 1963 as the epidermal-melanin unit.[3]

Gingival depigmentation is a periodontal plastic surgical procedure whereby the gingival hyper-pigmentation is removed or reduced by various techniques. The foremost indication for depigmentation therapy is the demand by a person for improved esthetics. Demand for cosmetic therapy of gingival hyper-pigmentation is common. Various methods as gingivectomy (Bergamaschi et al,1993)[3], gingivectomy with free gingival autografting (Tamizi & Taheri, 1996)[4], acellular dermal martrix allografts (Pontes et al, 2006)[5], electrosurgery (Gnanaesekhar & Al-Duwairi, 1998)[6], cryosurgery (Yeh, 1998)[7], abrasion with diamond bur (Bishop,1994)[8], and various types of lasers (Stabholz et al , 2003)[9] have been used for cosmetic therapy of gingival melanin depigmentation.

Corresponding Author : Dr. Vikram Mahajan, P.G Student, Department of Periodontology & Oral Implantology, I.T.S-CDSR, Murad Nagar, Ghaziabad. **(M)** 8449636423 **Email- id -** vikrammahajan18@gmail.com

1. P.G Students, Department of Periodontology & Oral Implantology, I.T.S-CDSR , Murad Nagar, Ghaziabad.
2. Professor & Head, Department of Periodontology & Oral Implantology, I.T.S-CDSR , Murad Nagar, Ghaziabad.

The present case series describes four simple and effective surgical depigmentation techniques – scalpel surgery, electrosurgery and laser for gingival depigmentation, which are simple, effective and have produced good results with patient satisfaction.

CASE-1 (Scalpel Surgery)

A 27 - year old female patient visited the department of Periodontics, I.T.S-CDSR, Murad Nagar with the chief complaint of "black" colored gums (Fig.1). Her oral examination revealed that she had deeply pigmented maxillary gingiva from right first premolar to left first premolar. The patient requested for any kind of esthetic treatment which could make her "black" colored gums look better. A scalpel surgery was planned to perform the depigmentation. The entire procedure was explained to the patient and written consent was obtained. A complete medical, family history and blood investigations were carried out torule out any contraindication for surgery. Local anesthesia was infiltrated in the maxillary anterior region from premolar to premolar. A Bard Parker handle with a No.15 blade was used to remove the pigmented layer (Fig. 2). Pressure was applied with sterile gauze soaked in local anesthetic agent to control hemorrhage during the procedure. After removing the entire pigmented epithelium along with a thin layer of connective tissue with the scalpel, the surgical area was covered with a periodontal dressing. Post-surgical antibiotics (Amoxicillin 500mg, thrice daily for five days) and Analgesics (ibuprofen with paracetemol, thrice daily for three days) were prescribed. The patient was advised to use chlorhexidine mouthwash 12 hourly for one week, The patient was reviewed at the end of one week. The healing process was proceeding normally and patient did not report any discomfort. The patient was asked to continue the chlorhexidine mouthwash for another week. At the end of one month, re-epithelization was complete and healing was found to be satisfactory. Patient had no complaints of postoperative pain or sensitivity and there was no repigmentation observed.

Fig 1(Scalpel surgery)Pre- operative

Fig 2 (Scalpel surgery) Post- operative

CASE-2 (Abrasion with bur)

A 24 - year old female patient visited the department of Periodontics, I.T.S-CDSR, Murad Nagar with the chief complaint of "black" colored gums (Fig.3). Her oral examination revealed that she had deeply pigmented gingiva from right first premolar to left first premolar. The patient requested for

any kind of esthetic treatment which could make her "black" colored gums look better. An abrasion with diamond bur was planned to perform the depigmentation.

Fig 3 (Abrasion with bur)Pre- operative

Fig 4 (Abrasion with bur)Post- operative

The entire procedure was explained to the patient and written consent was obtained. A complete medical, family history and blood investigations were carried out to rule out any contraindication for surgery. Local anesthesia was infiltrated in the maxillary anterior region from premolar to premolar. A diamond bur was used to remove the pigmented layer (Fig. 4). Pressure was applied with sterile gauze soaked in local anesthetic agent to control hemorrhage during the procedure. After removing the entire pigmented epithelium along with a thin layer of connective tissue with the diamond bur, the surgical area was covered with a periodontal dressing. Post-surgical antibiotics (Amoxicillin 500mg, thrice daily for five days) and Analgesics (ibuprofen with paracetemol, thrice daily for three days) were prescribed. The patient was advised to use chlorhexidine mouthwash 12 hourly for one week. The patient was reviewed at the end of one week. The healing process was proceeding normally and patient did not report any discomfort. The patient was asked to continue the chlorhexidine mouthwash for another week. At the end of one month, re-epithelization was complete and healing was found to be satisfactory. Patient had no complaints of postoperative pain or sensitivity and there was no repigmentation observed.

CASE -3 (LASER)

A 22 year old male patient visited the department of Periodontics, I.T.S-CDSR, Murad Nagar with the chief complaint of blackish gum which looked unpleasant while smiling.(fig.5) The medical history was non-contributory.Intra-oral examination revealed generalized blackish pigmentation of the gingiva, however it was healthy and completely free of any inflammation. Considering the patient's concern, a laser depigmentation procedure was planned. Diode Laser (Photon plus)with wavelength of 980nm was selected for the procedure. No topical or local anesthesia was given to the patient. Melanin pigmented gingiva was ablated by diode laser with a flexible, fibre-optic delivery system in contact mode at a power settings of 1.2 watt under standard protective measures. The procedure was performed on all pigmented areas. Remnants of the ablated tissue were removed using sterile gauze damped with saline. This procedure was repeated until the desired depth of tissue removal was achieved. Vitamin E capsules were applied topically on the ablated

tissues. The patient was told to apply the same for next 5 days. No post-operative pain, haemorrhage, infection or scarring was observed in first and subsequent visits. (fig.6). Healing was uneventful. Patient's acceptance of the procedure was good and results were excellent as perceived by the patient.

Fig 5. (LASER) Pre- operative

Fig 6. (LASER) Post- operative

CASE-4 (Electro surgery)

A young male patient aged 21 years visited the Department of Periodontics, I.T.S –CDSR Murad Nagar with the chief complaint of "blackish gums" which esthetically interfered with his smile. (fig7) The patient requested for any cosmetic therapy which would eventually enhance the esthetics on smiling. The patient's history revealed that the blackish discoloration of gingiva was present since birth suggestive of physiologic melanin pigmentation. His medical history was non-contributory. On intraoral examination, generalized diffused blackish pigmentation of gingiva was observed.

Fig 7. (Electro surgery) Pre- operative

Fig 8. (Electro surgery) Post- operative

A gingival depigmentation procedure with electro surgery was planned. Following the administration of local anesthetic solution, the pigmented tissues was removed with elecro-cautery hand piece in coagulation mode. The area was clean and dry with no bleeding observed. Surgical area was covered with a periodontal pack and post-operative instructions were given. Analgesic was prescribed for the management of pain. After one week, the pack was removed and the surgical area was examined. The healing was uneventful without any post surgical complications. The gingiva appeared pink, healthy and firm giving a normal appearance (fig.8). The patient was very impressed with such a pleasing aesthetic outcome.

Discussion

There are wide variations in gingival color in normal healthy persons. Degree of vascularization, the thickness of the keratinized layer and the amount of the pigment containing cells will determine the

color of the gingiva.[10]The techniques that have been tried in the past to treat gingival pigmentation include chemical cauterization gingivectomy, scalpel scraping procedure and abrasion of gingiva. The recent techniques of gingival depigmentation in practice are cryotherapy free gingival autograft and laser therapy, all these techniques have achieved satisfactory results. Though the initial result of the depigmentation surgery is highly encouraging, repigmentation is a common problem. The exact mechanism of repigmentation is not known. Different studies show variation in the timing for repigmentation. To return to the full clinical baseline repigmentation it takes about 1.5 to 3 years.[11]This variation may be due to the different techniques performed or due to the patient's ethnicity. Thus, gingival depigmentation procedure, if performed primarily for cosmetic reason, will not be of permanent value, because pigmentation tends to return to baseline value.[11]However even if gingival repigmentation occurs in the patient, the same procedure can be repeated in the same region. Scalpel surgical technique technique is highly recommended inconsideration of the equipment constraints.[12] Electro-surgery provides bloodless field whereas Laser eliminates the need of infiltrating local anesthesia and provides a painless and bloodless surgery with esthetically pleasing results.[13]This case report hereby described four simple and effective surgical procedure for the treatment of gingival melanin hyper pigmentation resulting in improved esthetics and cosmetic appearance.

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Lipoma – Case Report of a Rare Intraoral Tumor

Mittal S[1], Suma GN[2], Dua S[1], Agarwal S[3]

Abstract

Lipomas are well-circumscribed benign tumors and represent the most common mesenchymal neoplasms. However, it is very rare in oral cavity with only 1% to 4.4% occurring in this region. The literature is scanty on lipomas occurring in intra-oral soft tissues. The purpose of this report is to highlight the existence of this rare but not uncommon disease and to emphasize that a high index of suspicion is needed in making a diagnosis.

Keywords : Lipomas, Buccal Mucosa, Benign Tumor, Mesenchymal Neoplasm.

Introduction

Lipomas are benign mesenchymal soft tissue neoplasm of mature adipose tissue.[1] They are relatively rare in the oral cavity, accounting for 1%–4.4% of all benign tumors.[1] Their aetiology and pathogenesis remain unclear, Although mechanical, endocrine and inflammatory influences have been reported. It may originate from embryonic rests of lipoblasts and proliferating embryonic mesoderm, fatty degeneration of other cells or metaplasia of muscle cells.[2]

It was reported that buccal mucosa (32%) is the most common site involved for intra-oral lipomas followed by tongue (20%), floor of the mouth (15%), buccal sulcus and vestibule (12%), and other locations (21%).[3]

The exact nature of this tumor is uncertain but it is widely accepted that lipoma represents a true benign tumor. Lipomas may occur sporadically or as one of several inherited disorders including familial multiple lipomatosis and benign symmetric lipomatosis.[3] Intraoral lipomas generally arise submucosally, presenting as soft, well-defined mobile masses with yellowish appearance. There appearance resembles other benign soft tissue lesions. They are asymptomatic in majority of cases but may cause discomfort during speech and mastication in larger cases.[4]

Here, we present a case of lipoma on buccal mucosa which was clinically diagnosed as a mucus extravasation cyst based on history and clinical examination. A confirmed diagnosis was made only after histopathological examination.

Case report

A 53 year old male patient reported to the Department of Oral Medicine and Radiology with the chief complaint of intra-oral swelling on left cheek region. Swelling appeared on left buccal mucosa one year ago after an incident of cheek biting, showing continuous gradual enlargement and causing discomfort on occluding the teeth. Patient reported an

Corresponding Author : Dr. Samta Mittal, Senior Lecturer, Dept. of Oral Medicine & Radiology, I.T.S. Dental College, Hospital & Research Centre, GREATER NOIDA (U.P.) **(M)** 9711161091 **E-mail :** samta.goel@gmail.com

1. Senior Lecturers, Department of Oral Medicine & Radiology, I.T.S. Dental College, Hospital & Research Centre, Greater Noida.
2. Professor & Head, Department of Oral Medicine & Radiology, I.T.S. Center for Dental Studies and Research, Muradnagar, Ghaziabad.
3. Post Graduate Student, Department of Oral Medicine & Radiology, I.T.S. Dental College, Hospital & Research Centre, Greater Noida.

episode of clear fluid discharge at the site of swelling few days after its appearance. There was no associated pain Nothing relevant was reported in the past medical and dental history.

On inspection, a solitary dome shaped swelling was observed on left buccal mucosa, opposite to second premolar. Swelling measured 10 x 10 mm in size, pink in color with orange hue, having a smooth surface with well defined regular margins. Overlying mucosa was normal. Underlying capillaries were clearly demarcated on the surface of the lesion. The lesion on palpation was found to be non-tender, fluctuant, soft in consistency and mobile in nature. [Figure 1]

Figure 1: Intra-oral swelling on left buccal mucosa

Based on the history and clinical examination, a provisional diagnosis of mucus extravastion cyst was made. Differential diagnosis considered were fibrous hyperplasia/fibroma, lipoma, peripheral nerve tumors [neurofibroma, schwannoma, traumatic neuroma] and minor salivary gland tumor.

All routine blood investigations were within the normal limits.

The patient was called for phase I therapy and on the following visit, the swelling was excised surgically and sent for histopathological examination. Post-op instructions were given and patient was kept on antibiotic and analgesic coverage. Patient was recalled after a week and healing was found to be satisfactory. Follow up of the patient for 6 months did not show any sign of recurrence.

Histopathological report

Submitted H and E section showed cluster of mature adipocytes separated by fibrous connective tissue septa showing lobular appearance. Thin zone of connective tissue separated the lesional tissue from overlying parakeratinized stratified squamous epithelium. Histopathological picture was suggestive of lipoma. [Figure 2]

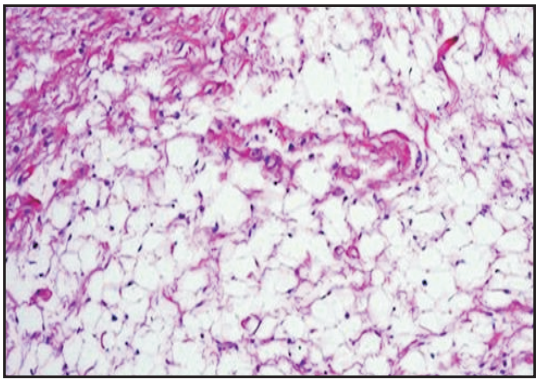

Figure 2: Histological picture showing cluster of mature adipocytes separated by fibrous connective tissue septa

Discussion

Benign lipomas are the most common mesenchymal tumors of soft tissues, but only 1-4% affects the oral cavity. Roux in 1848 described the first oral lipoma and he referred to it as "yellow epulis".[5] Most lipomas are developmental ones occurring in maxillofacial regions, usually arise late in life and are presumed to be neoplasms;

occasionally associated with trauma. Oral lipomas are evenly distributed between sexes and most of these patients are aged over 40 years.[6] Few lipomas show re-arrangement of 12q, 13p, 6p chromosomes.[7] Howard and Helwing proposed that embryonic sequestration of multipotential cells become activated at puberty by hormones and differentiate into simple lipomas.[8] The pathogenesis of lipoma is uncertain, but they appear to be more common in obese people. However, the metabolism of lipoma is completely independent of the normal body fat. If the caloric intake is reduced, lipomas do not decrease in size, although normal body fat may be lost.[9]

The lipoma lesion can occur almost anywhere in the body; oral lipomas predominantly affect the buccal mucosa, lips, tongue, palate and floor of mouth.[2] Clinically, oral lipomas generally present as mobile, painless submucosal nodules, with yellowish tinge. In some cases, oral soft tissue lipomas can present as a fluctuant nodule. All these findings were in accordance with our case however, onset of the lesion following trauma and an episode of fluid discharge led us to a provisional diagnosis of mucus extravasation cyst. Other lesions, such as oral dermoid and epidermoid cysts and oral lymphoepithelial cysts must be considered in the differential diagnosis of oral lipomas. Unlike oral lipomas, lymphoepithelial cysts are found in the floor of the mouth, soft palate and mucosa of the pharyngeal tonsil.[10] Although oral dermoid and epidermoid cysts can occur in other sites of the oral mucosa, they typically occur on the midline of the floor of the mouth.

Because an oral lipoma can occasionally present as a deep nodule with normal surface colour, salivary gland tumors and other benign mesenchymal neoplasms should also be included in the differential diagnosis. Lipomas have a less dense and more uniform appearance than the surrounding fibro-vascular tissue when transilluminated. Magnetic resonance imaging scans are very useful in diagnosis while CT Scans and ultrasonography are less reliable.[9]

Definitive diagnosis depends on correlation between clinical and histopathological features; however, histopathology remains the gold standard in the diagnosis of lipoma. Classic lipomas are composed of mature adipose tissue with true lipoblasts showing no cellular atypia. Several variants described include angio-lipoma, chondroid lipoma, myo-lipoma, spindle cell lipoma, pleomorphic lipoma, fibrolipoma, osteolipoma/chondrolipoma.[11] Lipomas of the oral and pharyngeal region are not difficult to differentiate from other lesions, although spindle cell and pleomorphic types of lipoma must be distinguished from liposarcoma.[11]

On occasions, lipomas of the buccal mucosa cannot be distinguished from a herniated buccal fat pad, except by the lack of a history of sudden onset after trauma. A clinician sending a surgical specimen to the pathologist for microscopic analysis must provide accurate clinical and surgical information in order to make a definitive diagnosis.[12]

The treatment of lipomas is surgical excision with rare recurrence. The asymptomatic course will allow the lesion to grow in most cases; it is the cosmetics, functional impairment that prompt the patient to seek dental assistance. Few complications like (a) obstruction of upper airway leading to asphyxial death in case of oesophageal fibrolipoma have been reported and (b) in long standing cases, liposarcoma can also

occur.[7] Multiple lipomas of head and neck have been observed in neurofibromatosis, gardner syndrome, encephalocraniocutaneous lipomatosis, multiple familial lipomatosis and proteus syndrome. Generalised lipomatosis have been reported to contribute to unilateral facial enlargement in hemifacial hypertrophy.[5] Lesions outside the oral cavity could show greater recurrence rates after surgical excision, but intraoral intramuscular lipomas, although not well-limited, rarely show recurrence if completely excised as seen in our case.

Conclusion

A dental surgeon should be able to diagnose lipomas in an early stage avoiding a massive growth of these lesions. It will be essential to prevent any aesthetic and functional disturbances in patients. An adequate treatment and postsurgical follow up in lipomas is fundamental for monitoring any possible chances of recurrence.

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Rehabilitation of a Completely Edentulous Patient using Cheek Plumper Prosthesis and Neutral Zone Technique. : A Case Report

Chaudhary A[1], Aggarwal A[1], Sharma A[2], Bansal A[3]

Abstract

Complete denture therapy is an age old form of dental treatment. Ridge atrophy poses a clinical challenge towards the fabrication of a successful prosthesis. Extreme resorption of the maxillary and mandibular denture bearing areas results in sunken appearance of cheeks, unstable and non retentive dentures. This article describes the step by step fabrication of a complete denture using neutral zone technique along with cheek plumpers attached to ensure a stable and aesthetic complete denture.

Keywords: Ridge Atrophy, Residual Ridge Resorption, Admix Impression, Neutral Zone, Cheek Plumper Prosthesis.

Introduction

Stability of lower complete dentures is well recognized as a potentially difficult treatment aim to achieve. Looseness and discomfort are the most frequent complaints reported by patients and they are quite often difficult to manage by dentists. Neuromuscular control is said to be the key determinant of stability of lower complete dentures as the area available for support is far less than maxillary support area. Size and position of prosthetic teeth and the contours of polished surface have a crucial role in lower complete dentures stability as they are subjected to destabilizing forces from the tongue, lips and cheeks if they are placed in hindrance with function of these structures.

Throughout time, many concepts and theories emerged to describe where teeth on complete dentures should be positioned.[1] Some of them adopted mechanical principles, others used biometric guides and a minority advocated mathematical formulas based on natural teeth position and dimensions.[2,3] These dogmatic or arbitrary approaches have been challenged and found insufficient, in fact not only by rigorous research, but also by failure to restore function, aesthetic and comfort in patients with severely atrophic mandibular ridges. To overcome such problem, the neutral zone technique was advocated.

Slumped or hollow cheeks can add years to a person's age and hence have a detrimental psychological effect on the patient. While replacing missing teeth, it is important that the prosthesis not only replace the missing teeth but also restore the facial contours. Proper extensions and contours of denture flange can help to achieve this. However in some cases like patients with hollow cheeks, extra support has to be provided. This can be done

Corresponding Author : Dr Aditya Chaudhary, Senior Lecturer, Dept of Prosthodontics, ITS Dental College, Hospital and Research Centre, Greater Noida. **(M)** 9868911499

1 Senior Lecturers, Department of Prosthodontics, ITS Dental College, Hospital and Research Centre, Greater Noida.
2 Professor & Head, Department of Prosthodontics, ITS Dental College, Hospital and Research Centre, Greater Noida.
3 Post Graduate Student, Department of Prosthodontics, ITS Dental College, Hospital and Research Centre, Greater Noida

using cheek plumper or cheek lifting appliances.[4-6]

This article describes a case report of a completely edentulous patient having atrophic mandibular ridge complimented with hollow or slumped cheeks.

Case report

A sixty five year old male patient reported to the Department Of Prosthodontics, ITS Dental college, Greater Noida, with the chief complaint of replacement of existing dentures. The patient gave a history of loss of teeth over a period of fifteen years. The patient had been wearing a complete denture prosthesis since then. The existing dentures were loose and ill-fitting causing discomfort to the patient. He was also not happy with the sunken appearance of his cheeks.

Clinical evaluation revealed resorbed maxillary ridge with sunken cheeks, atrophic mandibular ridge and increased interarch space. The existing dentures were unstable and non retentive. So it was decided to rehabilitate the patient with a complete denture using the neutral zone technique with attached cheek plumpers as the patient was not interested in any surgical intervention.

Procedure

1. The primary impressions were made using impression compound.
2. Maxillary custom tray was fabricated using a full spacer design with additional wax relief over the anterior ridge, incisive papilla, mid-palatine raphe and tuberosity areas. Mandibular custom tray was fabricated to provide a space of 4 mm using two wax spacers for admix impression material.
3. Maxillary secondary impression was made using zinc oxide eugenol impression paste. The mandibular secondary impression was made using an admix of impression compound and green stick compound.[7]
4. Mandibular neutral zone impression was recorded using the anthropoidal pouch technique. In this technique, the mandibular wax occlusal rim was removed and retentive wire loops were attached to the acrylic resin record base. Compound was kneaded and adapted to the mandibular denture base.
5. Maxillary record base was placed in the patient's mouth followed by placement of the mandibular record base with softened compound. The patient was asked to carry out different functional movements like sucking, swallowing, smiling, licking the lips, whistling, pronouncing vowels and counting. Excess compound was trimmed away and the material was resoftened and placed back into the mouth asking the patient to repeat the functional movements.
6. Plaster index of the impression was made and the mandibular teeth were arranged in the neutral zone following the index.(Fig 1)

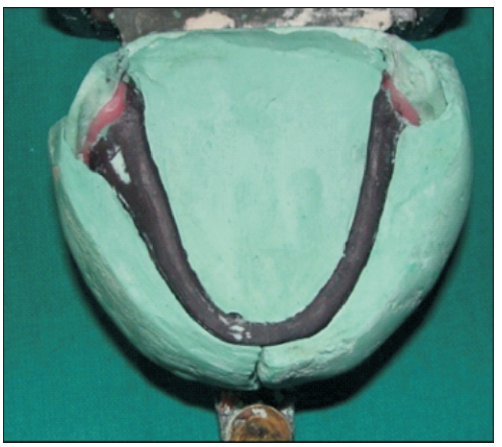

Figure 1: Plaster index of the impression.

7. Autopolymerising acrylic resin was used to form pattern for the attachment. Attachment consisted of a flat rectangular thin base connected by a neck to two balls of 3 mm diameter. The width of rectangular base was kept slightly short of the width of the plumper prosthesis. The attachments were casted using chrome cobalt alloy.(Fig 2)

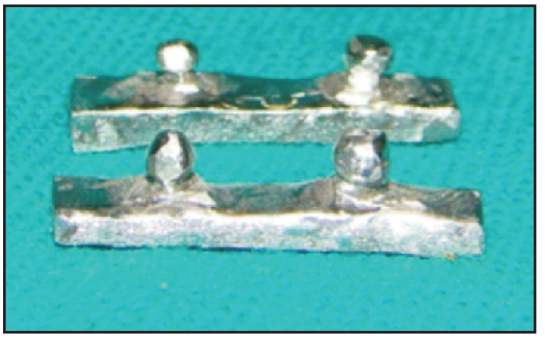

Figure 2: Casted attachments.

8. They were polished on all surfaces except the one which would be waxed in the denture as the surface irregularities aid in better retention of attachment to the trial denture base.
9. The waxed plumper prosthesis was repositioned over the attachment and required corrections were done during the trial phase taking in consideration the patient's cheek fullness.
10. Wax pattern of plumper was then invested and acrylised separately and the dentures were acrylised separately using the conventional approach.
11. Separators were placed over the metal attachments in the denture. These were then picked using autopolymerising acrylic resin in the plumper part. These separators allowed close approximation of the plumper with the denture and also facilitated removal from the denture. (Fig 3)
12. Patient was instructed on the use of plumpers and dentures were delivered after evaluating them for fit and aesthetics. Recall appointment were scheduled after 1 day, 1 month and every 6 months.(Fig 4)

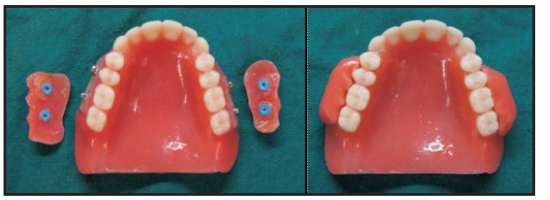

Figure 3: Acrylised maxillary denture and cheek plumpers with seperators placed.

Figure 4: Pre-treatment & Post-treatment Photograph

Discussion

Many approaches to set teeth have been advocated and used in complete denture treatment. However, there is substantial debate on which of these provide optimal position in the facio-lingual dimension and guarantee a favourable outcome in terms of stability, facial support, chewing efficiency, aesthetics and patient comfort.

Some authors adopted a mechanical concept and advocated setting teeth directly in the centre of denture support area where the least amount of leverage is present which in turn enhances the stability of lower complete denture.[8] All of these approaches were and are still being used and each of them proved to

have advantages and disadvantages when compared to others. Furthermore, these approaches seem to work best when used with patients who have; their oral and peri-oral musculature unaltered for any reason, adequate neuromuscular control and acceptable amount of residual ridge for support.

Neutral zone technique has been criticized based on claims that it is supported by empirical evidence. However, other authors maintain that this is inaccurate as neutral zone technique is based on significant clinical observations on the role of destabilizing forces the muscles apply to complete dentures during functional movements. Furthermore, the large number of case reports accumulated in a short period of time and clinical studies conducted by Stromberg & Hickey[9] and Fahmy & Kharat[10] undermine this criticism and add to the validity of neutral zone technique. Stromberg & Hickey found better patient adaptability to physiologically formed denture bases when compared to conventional ones.

The detachable plumper prosthesis was planned in this case to reduce weight of the final prosthesis and to allow ease in placement of the prosthesis. Detachable plumpers enabled the patient to remove the plumpers and use the denture if required. [11]

Conclusion

This article has described a simple, effective and non invasive treatment alternative to improve facial appearance in a patient with hollow cheeks. An effort was made to improve patient's appearance along with providing a better neuromuscular adaptation of the denture and thus better acceptability to the patient.

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Epiplating Systems for Retaining Facial Prostheses: A Case Report

Sethi T[1], Kheur S[2], Kheur M[3], Jambhekar S[4]

Abstract

Rehabilitation of patients using extraoral prosthesis with bone fixtures is gaining popularity. Its advantages over conventional adhesive retained prostheses make it a better option for the patient. Various factors need to be taken into account for ensuring the success of implants and therefore treatment planning is of utmost importance.

This case report demonstrates the procedure for rehabilitating a patient with epiplating system fixtures using magnets as attachments for the silicone prosthesis.

Keywords: Epiplating, Auricular Prosthesis, Maxillofacial Prosthesis

Introduction

Maxillofacial prosthetics deals with a wide range of rehabilitations ranging from simple adhesive retained body parts to those involving extensive reconstructive surgeries and implants. Loss of these body parts can be congenital or due to trauma, or as an outcome of surgery for carcinomas.[1]

Adhesive retained prostheses have disadvantages like inadequate retention and stability, wear of prosthesis due to constant removing and placing the prosthesis, skin reactions to the adhesive and general lack of acceptance amongst patients.[2,3,4]The use of implants to retain facial prostheses is on the increase.

There are various factors influencing the position of an implant for an auricular prosthesis:

a) Thickness of underlying bone: The thickness of underlying bone of the skull (mastoid region[5]) should be measured and must be at least 3-4mm to provide a stable implant.[6,7]

b) Position of anti helix of prosthesis: The anti helix is the bulkiest or thicker part of the ear prosthesis and the implants should be placed below it and approximately 20mm from the external ear canal. [6,7]For the right ear, they should be placed at 8 and 11 o`clock positions and for the left at 1 and 4 o`clock[1]. (Fig 1)

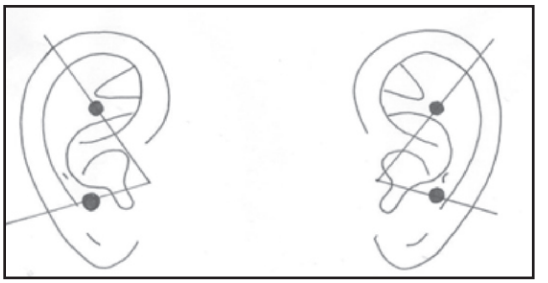

Figure1: Position of implants on the left and right ear

c) Position of the contra lateral ear: The protrusion, inclination, anterior- posterior position, superior -inferior position, shape and size of the contra lateral ear must be taken

Corresponding Author : Dr. Tania Sethi, 808, Sindh Colony, Aundh, Pune 411007.
Phone Number: +918793377303, +919823004331 Email address: drtaniasethi@gmail.com

1. Post Graduate Student, Dept. of Prosthodontics, M.A.Rangoonwala Dental College, Pune.
2. Professor, Dept. of Oral Pathology, D.Y.Patil Dental College, Pimpri.
3. Professor, Dept. of Prosthodontics, M.A.Rangoonwala Dental College, Pune.
4. Lecturer, Terna Dental College, Navi Mumbai.

into consideration[6,8-11](Fig 2).In a symmetric face, positions of the nasion, gnathion and sub-nasale can be considered to locate the superior and inferior border of the prosthetic ear.[6] The Frankfort's plane and upper and lower insertion points can also be used as a guidline.[6]

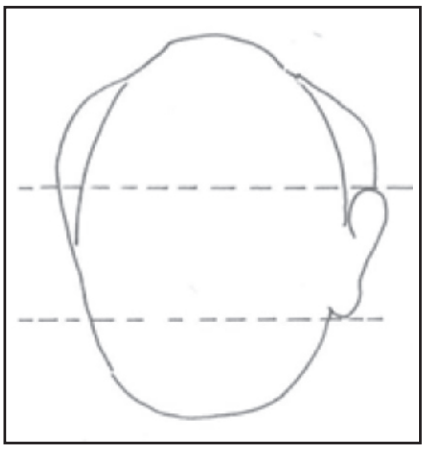

Figure 2: Position of contra lateral ear for planning the prosthesis

d) Presence of ear remnants and soft tissue cartilage: (Fig 3) These may be congenital as in case of microtia or present due to previous surgeries. [6-10,12,13] Some patients refuse to remove them and they need to be considered while making a prosthesis.

Figure 3: Presence of ear remnants

e) **Position of BAHA implant/hearing aids:** Boneanchoring hearing aids are placed with the support of implants in the mastoid region. An adequate distance has to be maintained between the BAHA and prosthesis for it to function effective[6](Fig 4).These can be camouflaged by positioning the prosthesis correctly and hearing aids can also be incorporated in the prostheses.[6,7]

Figure 4: Position of a BAHA in relation to a prosthetic ear

CT scan data can be used and manipulated to form 3D models and using interactive software, implant positioning can be planned[6,11]. Softwares such as Mimics (Materialise, Belgium) can be used to mirror the contra lateral ear positioning onto the defect side in a virtual environment. This can be used for further procedures like Rapid Prototyping to form 3D models and templates used for surgical procedures.

For auricular cases, implants with bar and magnetic attachments are a good option providing adequate retention and patient compliance. Bone attachments can be of 2 types primarily- Root form implants and epiplates.

The epiplate system involves the placement of a titanium framework subperiostally on the surface of the bone and is held in place with the help of bone fixation screws. Titanium being biocompatible is well accepted for these restorations. This case report provides an overview of treating an auricular case with an epiplate, magnetic attachments and its final

restoration in silicone elastomer.

Case report:

Figure 5 : Pre treatment presentation

A 28 year old male patient with a history of chemical injury presented to the hospital for replacement of his missing left external ear (Fig 5). Different options for replacement of the ear including reconstructive surgery, adhesive retained prosthesis, and implant retained prosthesis were discussed by the maxillofacial prosthetic rehabilitation team.

A fixed prosthesis was chosen by the patient. Using the epiplating system for bone support, a magnet retained prosthesis was planned.

1.Impressions

Impression of the defect site was made using irreversible hydrocolloid (Vignette, Dentsply, U.S.A). Care was taken to keep the tissue as relaxed as possible to improve accuracy of impression. Anatomical landmarks were marked out on the patient and transferred onto the cast through the impression.(Fig 6)

A cast of the same was obtained in dental stone (Kalabhai Karson Pvt. Ltd., India).

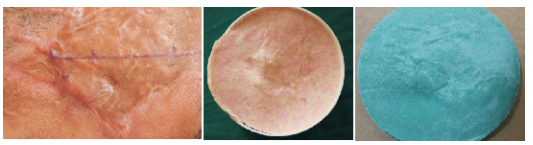

Figure 6: Impression and cast

2. Surgical Stent

The position of the implants were planned as per the prosthetic planning and marked out on the cast. A surgical stent was fabricated (Fig 7) by duplicating the wax trial ear, using clear self cure acrylic resin (Acryln `R`, Asian Acrylates, India).

Figure 7 : Fabrication of Stent and Trial

3. Surgical Phase

The stent was used to mark the implant sites onto the skin. These were transferred onto the underlying bone with the help of surgical ink. A full thickness flap was raised (Fig 8). The implant sites were marked again.

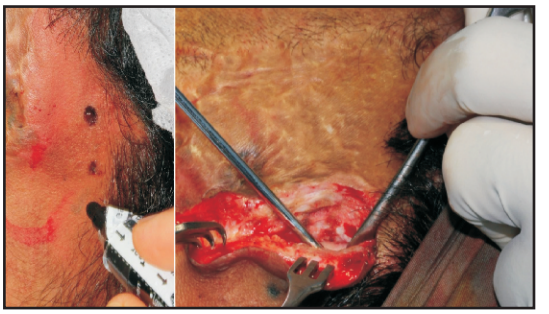

Figure 8: Marking of site and reflection of flap

The epiplate was bent to conform to the contours of the bone and adapted well before finally being fixed on. The epiplate was screwed on with the help of fixation screws (Fig 9).Magnetic abutments (Medicon instruments , Germany) were placed on it (Fig 10). The flap was closed and sutured, the skin was released above the magna-abutments to allow them to protrude above the surface of the skin.

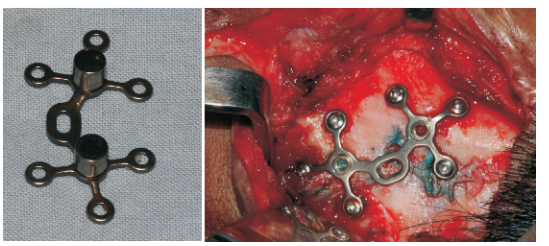

Figure 9 : Epiplate placed on the bone

Fig 10: Magnetic abutments placed on epiplate and closure of flap

4. Prosthetic Phase

After 3 months, pick up magnets were placed on the magnets present on the epiplate. These were splinted together using heavy body silicone elastomer (Aquasil, Dentsply de tray, U.S.A) to avoid mobility during impression making. The final impression was made using light body silicone (3M ESPE Express, U.S.A) surrounding the magnets and was picked up using alginate. A cast was obtained onto which the magnets (Technovent, Ltd, Wales, U.K)were attached.

Figure 11: Final impression and cast

An acrylic substructure (Acryln `R`, Asian Acrylates, India) incorporating the magnets was made. A wax up of the ear was made in modeling wax incorporating this substructure.

The wax up was tried onto the patient and adjustments were made. The contralateral ear was used as a reference for the general contouring of the ear.

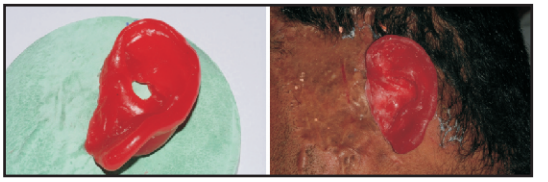

Figure 12: Wax trial

The wax ear was flasked as per conventional protocol using a three part mold. Silicone (Z 004, Technovent, U.K) in a 1:1 ratio was manipulated. Intrinsic pigments (Cosmesil, Technovent Pvt. Ltd., U.K) were added to it to match the shade of different areas of the prosthesis. Flocking Cosmesil, Technovent Pvt. Ltd, U.K)was added to give the prosthesis a life like appearance. The mold was (packed and cured for 1 hour at 80 degrees Celsius. Finishing with extrinsic staining (Cosmesil, Technovent Pvt. Ltd., U.K) giving the prosthesis its final touches was artistically carried out and a sealant was applied (Single component silicone, Technovent Pvt. Ltd., U.K).

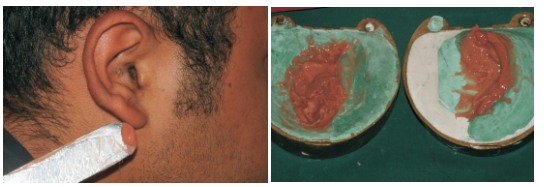

Figure 13: Shade matching

5) Final Prosthesis :

Figure 14: Final prosthesis

Discussion

Epliplating systems have numerous advantages over the use of root form implants

for facial prosthetics. One of the most important advantages is force distribution over a wider surface area. Multiple screws also share the load distribution. Failure of one screw may not lead to failure of the prosthesis in whole. This system is well accepted in cases especially where the bone quality is compromised and any added form of retention will aid in a better prognosis for the prosthesis.

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Dilated Odontome as a "Smiling" Mandibular Third Molar: A Case Report

Lakhanpal M[1], Suma GN[2], Srivastav S[3], Malik S[4]

Abstract

Dens Invaginatus (DI) is a developmental dental malformation presenting with different morphological variations, resulting in a deepening or invagination of the enamel organ into the dental papilla prior to calcification of the dental tissues. The most severe variety of dens invaginatus is called dilated odontome. Here we present an extremely rare case of a dilated odontome arising in the mandibular third molar of a 24 year old male patient and to give an insight of the clinical, histological and radiological features.

Key Words : Dens Invaginatus, Dilated Odontome, Mandibular third Molar

Introduction

Dens Invaginatus (DI) is a developmental dental malformation presenting different morphological variations, resulting in a deepening or invagination of the enamel organ into the dental papilla prior to calcification of the dental tissues.[1,5] DI in human tooth was described by a dentist named Socrates in 1856.[2,6] Dens invaginatus was first described by 'Ploquet' in 1794 in a Whale's tooth and then by Salter in 1855 as "a tooth within a tooth.[4]" This condition has been described with a plethora of terminologies; such as Busch in 1897 suggested the term "Dens in Dente" which is derived from the radiographic appearance of "tooth within a tooth." Hunter proposed the term "dilated composite odontome.[7,9]" The term "Dens Invaginatus" first suggested by Hallet, implies the infolding of the outer portion (enamel) into the inner portion (dentin) with the formation of a pocket and dead spaces, therefore appearing as the most appropriate terminology[2]. The different theories suggesting the aetiology of the malformation are growth pressure of dental arch resulting in buckling of enamel organ, focal failure of growth of internal enamel epithelium, rapid and aggressive proliferation of a part of internal enamel epithelium invading the dental papilla, infection, trauma and genetic factors[7,10-14].

The reported prevalence of DI is .25% to 10%. The teeth mostly affected are the maxillary lateral incisors followed by maxillary central incisors, premolars, canines and molars. The most severe variety of dens invaginatus is called a dilated odontome. Dilated odontome demonstrates an inverted hard tissue structure due to severe invagination, often accompanied with central soft tissue or hard tissue. A dilated odontome in the mandibular molar region is a rarity.[1,3,4,15,16]

A pubmed search with the key words dilated

Corresponding Author : Dr Siddharth Srivastav, Senior Lecturer, Department of Oral Medicine & Radiology, I.T.S. Dental College, Muradnagar, Ghaziabad. **(M)** 09990339478 **Email id:** sidharth_june@yahoo.co.in

1. Reader, Department of Oral Medicine & Radiology, I.T.S. Dental College, Muradnagar, Ghaziabad.
2. Professor & Head of Department of Oral Medicine & Radiology, I.T.S. Dental College, Muradnagar, Ghaziabad.
3. Senior Lecturer, Department of Oral Medicine & Radiology, I.T.S. Dental College, Muradnagar, Ghaziabad.
4. Senior Lecturer, Department of Oral Medicine & Radiology, Subharti Dental College and Hospital, Meerut.

odontome and mandibular third molar revealed only one case report till date. Here we present an extremely rare case of a dilated odontome arising in the mandibular third molar of a 24 year old male patient, to give an insight of the clinical, histological and radiological features.

Case Report

A 24-year-old male patient reported to the department of Oral Medicine and Radiology, for the extraction of lower right back tooth, quite often associated with recurrent previous episodes of pain and swelling over right side of face since last 1 year. The general and extra-oral examinations were non contributory. Intraorally, mandibular right permanent first molar was missing; mandibular right second molar was endodontically treated, while the mandibular right third molar was found partially erupted. Periapical radiograph of the mandibular right third molar region as well as a panoramic radiograph revealed a bulbous third molar with severely deformed roots (Fig.1, 2, 3).Varied densities were found within the tooth. Internally the tooth showed severe invagination of enamel extending upto the apical third, therefore enlarging the roots and giving it a “smiling frog” appearance. The radiolucent mouth of the frog marked the recess while the smile creases the pulpal chambers. Therefore, provisional diagnosis of a dilated odontome was made.

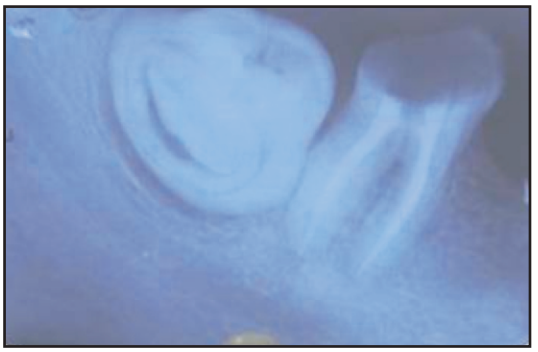

Fig.1. Intraoral Periapical Radiograph of mandibular right third molar

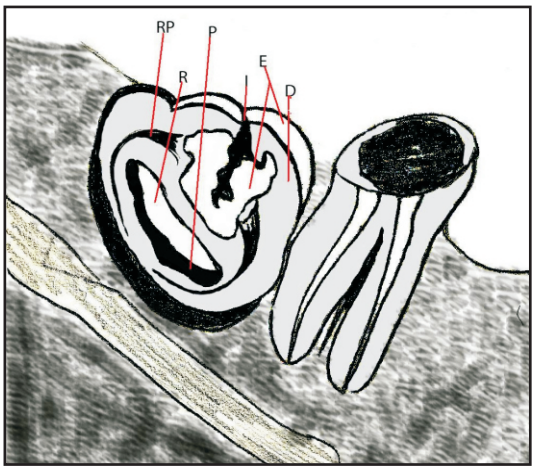

Fig.2.Diagramatic illustration of the radiographic presentation of the dilated odontome (E: Enamel; D: Dentine; P: Pulp; I: Invagination; R: Recess; RP: Radicular pulp)

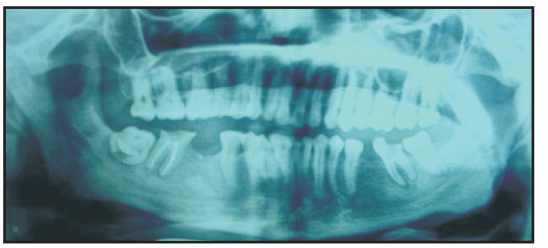

Fig.3. Panoramic Radiograph showing morphological variant of mandibular right third molar

The extraction of the mandibular right third molar was planned and the extracted tooth (Fig.4) underwent a histological examination. The ground section of tooth revealed a typical "tooth-within-a-tooth" appearance. Microscopically mineralized structure similar to dentine and cementum and non mineralized pulp in a haphazard or irregular manner could be appreciated. (Fig.5). Thereafter a diagnosis of a dilated odontome was made.

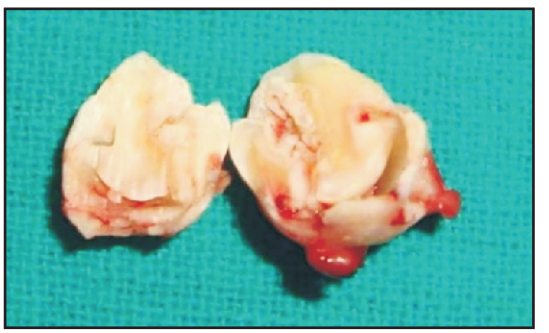

Fig.4. Typical “tooth-within-a-tooth appearance

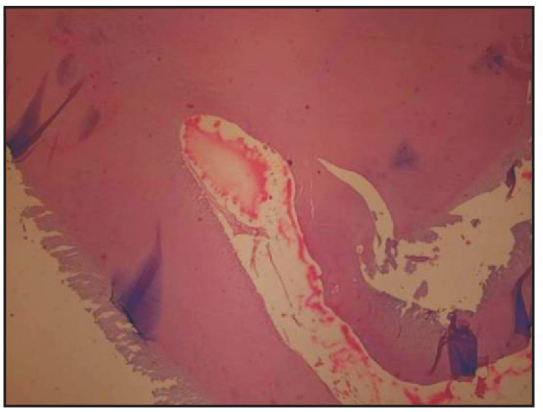

Fig.5. Microscopic histological findings.

Discussion

A dilated odontome has been described as a developmental dental anomaly in which the tooth has an oval or circular shape with a radiolucent interior having central soft tissue mass. Rushton coined the term "dilated composite odontome" and suggested that the main point of differentiation between dens invaginatus and DI is the time when the disturbance occurs. Dens invaginatus occurs later in odontogenesis and thus forms a recognizable tooth unlike Dilated odontome which originates during the morphodifferentiation stage of tooth development.[17] The precise etiopathogenesis is still unknown but the proposed theories include ingrowth of enamel organ into dental papilla, focal growth retardation, focal growth stimulation,localized external pressure in certain areas of the tooth bud, trauma, infection and genetic.[18,19]

Thomas conducted a radiological study and reported an incidence of 7.74%[20]. The dilated odontome reported in this case report was discovered while taking an intraoral periapical radiograph of a partially erupted third molar.

Dilated odontome in the third molar region is very rare but some cases have been reported as compound or complex odontoma[1]. Crincoli et al reported a case presenting with a pumpkin-like morphology with a C shaped pulpul cavity in the second molar region of the maxilla[5]. Joubert et al. reported a case of a dilated odontoma in the third molar of the mandible with a bizarre malformation in the crown and upper half of the root presenting characterestics of a complex odontoma whereas the lower half of the root was normally formed.[21] The radiographic appearance of the bulbous mandibular right third molar was that of a smiling frog in this case.

The differential diagnosis that was considered is a complex odontoma. Complex odontomas present as an amorphous conglomerations of enamel and dentine with a predilection for posterior mandible. It presents as a well-defined radiopacity surrounded by a radiolucent rim, often associated with an unerupted tooth. It is usually irregular in shape, only the dilated varieties are usually corticated and well defined with round or oval masses with radiolucent centers. The treatment modalities recommended for an invagination are:

- Prophylactic or preventive sealing of the invagination
- Root canal treatment
- Endodontic apical surgery
- Intentional replantation
- Extraction[7]

In this case, an extraction of dilated odontome was performed as it was impacted.

Conclusion

Dens invaginatus is not an uncommon condition but is easily overlooked as it does not present with any significant clinical signs. Invagination is considered to increase the risk of caries, pulpal involvement and periodontal

conditions therefore reiterating the need to acknowledge and treat the anamoly with appropriate modality.[22]

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Osteosarcoma: A Challenge in Diagnosis & Management

Rastogi P[1], Kumar K[2], Dhanpal R[1]

Abstract

Osteosarcomas are highly malignant neoplasms of bone that are challenging to diagnose. These neoplasms often show atypical behavior. In the initial phase they may present as nondescript bony swellings with an indolent growth rate, only to become overtly aggressive and malignant towards the later phase of the disease. Similarly, the histological growth pattern of this neoplasm can be quite diverse, presenting with areas that mimic benign myofibroblastic tumors, giant cell granulomatous conditions and also may show partial encapsulation. The final diagnosis of an osteosarcoma is often reached after thorough sampling and examination of multiple biopsy specimens. This article reports a case of an advanced osteosarcoma of the maxilla in a 41 year old woman who came for the evaluation of a swelling.

Key Words: Osteosarcoma, Fibroblastic, Bone Neoplasm, Maxilla.

Introduction

Osteosarcoma is a common malignant tumor of bone, characterized by production of tumor osteoid tissue, with a reported incidence of 1:100,000 per year.[1] Though osteosarcomas of head and neck is relatively rare tumor and accounts for only 10% of all osteosarcomas.[2] In the head and neck, jaw is the most common site. The mean age of occurrence is in the fourth decade. The incidence of tumors in the maxilla favours the alveolar ridge and sinus, whereas mandibular lesions are most common in the body of the mandible. Previous radiation therapy and Paget's disease of bone are known predisposing factors, especially in patients who are older than 40. Radiographic evaluation is important in diagnosis, because clinical symptoms. Such as pain, paresthesia, swelling and loose teeth, are not specifc. Diagnosis by conventional radiography is difficult. It has to be supplemented by computed tomography (CT) to know the extent of involvement. The most common histopathologic variant in the jaw is osteoblastic osteosarcoma. Osteosarcoma of the jaw (JOS) differs from osteosarcoma of the long bones in its biological behavior, though the histological features are identical. It presents a lower incidence of metastasis and a better prognosis. Osteosarcomas should always be considered in the differential diagnosis of expansile lesions of jaw. Early diagnosis and adequate surgical resection are the keys to high survival rates.[3,4]

Case report

A 41 year old female patient presented with a solitary swelling in the left middle-third of the face. The swelling was present for a month.

Corresponding Author : Dr. Priyanka Rastogi, Reader, Department of Oral and Maxillofacial Pathology and Microbiology I.T.S. Center for Dental Studies and Research Muradnagar, Ghaziabad (U.P) - 201206, India

1 Readers, Department of Oral and Maxillofacial Pathology and Microbiology I.T.S. Center for Dental Studies and Research Muradnagar, Ghaziabad (U.P) - 201206, India

2 Associate Professor, Department of Oral and Maxillofacial Pathology and Microbiology I.T.S. Center for Dental Studies and Research Muradnagar, Ghaziabad (U.P) - 201206, India

Extraorally, the swelling measured around 2x2cms . It was firm in consistency, tender on palpation and the overlying skin appeared stretched and shiny. There was associated lymphadenopathy. Intraorally, the swelling extended anterioposteriorly from distal aspect of 23 to distal aspect of 27 (Fig. 1). Lateral extension revealed the obliteration of the buccal vestibule, medially up to the midpalatal area. A root stump was present in relation to upper left first premolar.

Figure 1 : Showing swelling from 23-27 region.

Orthopantamograph revealed a root stump in relation to 24 and increase width of periodontal ligament membrane with loss of lamina dura in relation to 26 (Fig. 2). Considering the findings, a provisional diagnosis of infected periapical pathology in relation to 26 was given. Patient was advised extraction of the root stump and endodontic therapy for 26. Following treatment, patient reported back to the hospital within two weeks with significant increase in the size of the swelling from 2x2 cms at the first visit to 6x5 cms. On intraoral examination, a foul smelling, reddish black mass measuring 6x5x6 cms, pedunculated swelling was seen arising from the extracted socket of 24. Palpatory findings revealed the swelling to be firm in consistency, tender on palpation and slight bleeding on probing. These features suggested a provisional diagnosis of central giant cell granuloma.

Figure 2: Showing a pedunculated reddish black mass arising from the extracted socket of 24.

Additional investigations were done that included hematological investigation which revealed increase in blood glucose and ESR levels. Radiographic investigations of paranasal sinus showed haziness of the left maxillary sinus, with erosion of infra orbital, medial and lateral walls. Computed tomography revealed a large expansile lesion arising from the lateral wall of the superior alveolus of the maxilla of the left side, extending into the left maxillary sinus and eroding all the walls of the maxillary sinus (Fig. 3). CT morphology suggested the possibility of a giant cell tumor.

Figure 3: showing large expansile lesion arising from the lateral wall of the superior alveolus of the maxilla of the left side, extending into the left maxillary sinus and eroding all the walls of the maxillary sinus

An incisional biopsy was performed and histopathological findings showed a nonspecific inflammation suggesting an inaccurate biopsy site. A repeat biopsy was requested in relation to deeper areas. However, patient reported back within two days of incisional biopsy with a further increase in the size of the swelling with the lesion protruding out of the oral cavity causing inability to close the mouth.

Histopathology showed the lesion to be composed of proliferating fibroblasts along with bundles of collagen fibers. A markedly cellular lesion comprising of mature proliferating fibroblasts with infrequent mitosis and occasional atypia was seen (Fig. 4). Areas of tumor osteoid seen. There was a presence of abundant inflammatory cells along with few reactionary giant cells, interspersed with a myxoid background (Fig. 5). Storiform pattern of arrangement of fibroblasts was also seen, with the fibroblasts showing atypia in relation to size and shape. Invasion into the adjacent adipose tissue was also noted. Few areas suggested histiocytic type cells admixed with atypical fibroblasts and mitotic figures were also seen on the basis of clinical and histopathological features the final diagnosis of fibroblastic variant of osteosarcoma was made.

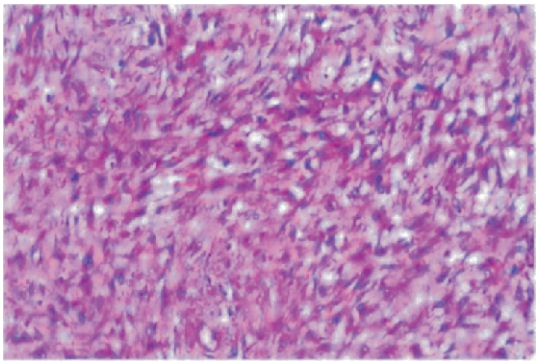

Figure 4: showing mature proliferating fibroblasts with infrequent mitosis and occasional atypia

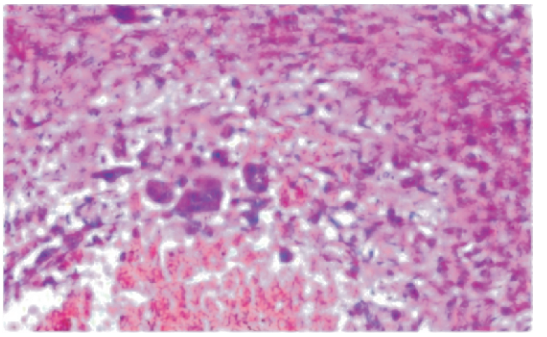

Figure 5: showing abundant inflammatory cells along with few reactionary giant cells, interspersed with a myxoid background.

Discussion

OS are primarily bone producing malignant tumours arising most frequently in the long bones. Jaw OS usually occur one to two decades later than that of OS of other regions. Patients with OS usually have nonspecific clinical symptoms, the most common of which is pain associated with the swelling presenting from weeks or months. It has a bimodal age distribution, with a major peak in the second decade and a somewhat smaller peak after the age of 50.[5] However, bimodal distribution of jaw lesions differ from those in the apppendicular skeleton, with the first peak occurring somewhat later, in the third decade. The present case, with a critical clinical appearance of pain and swelling, is in accordance with the literature related to jaw OS, where patient presents with clinical symptoms in 3rd and 4th decade of life.[6,7]

These neoplasms often show typical behavior in the initial phase presenting as a nondescript swelling, only to become overly aggressive in the later phase of the disease. Histologically, although OS of jaws are almost similar to that of long bones, they are always better differentiated than the latter.[8] It has been reported that production of osteoid by malignant cells, even in small amounts, is

diagnostic of OS. Depending on the relative amounts of osteoid, cartilage, or collagen fibres present in the extracellular matrix, OS are categorized histopathologically into osteoblastic, chondroblastic, or fibroblastic subtypes. In reality, most OS exhibit varying amounts of these three cell types and matrix. Therefore, division into any one of these types is arbitrary and is generally meant to signify greater than 50% prevalence of any of these histologic types. Recent studies have focused on new markers for early detection of OS.[9] Park et al. in their recent study showed by immunohistochemistry that high-grade OS of the jaws had a higher expression rate of proteins involved in regulation of growth and metastasis of cancer cells (ezrin and Metastatic tumour antigen) suggesting that their positivity can be used as additional prognostic markers in OS of the jaw [10,11].

Another study analyzed the clinicopathological features and immunohistochemical expression of p53, MDM2, CDK4, PCNA and Ki67 proteins in 25 head and neck OS and found 52% positivity for p53, 24% for MDM2, 84% for CDK4, 92% for PCNA and 88% for Ki-67 suggesting PCNA as one of most favourable prognostic marker.[9,12] Another study suggested the role of 12q13-15 genes in OS of the jaws with amplification and over expression of these genes might help in detecting high-grade tumours[13]. Response to chemotherapy (CT) is best seen in fibroblastic subtypes and poorest in chondroblastic subtype. Multimodality therapy using chemotherapy and radiation treatment (RT) has shown improvement in survival rates in the OS of the extremity, from 20% to 70%, which is better than the 40% survival rate reported for jaw OS.[14,15]

Conclusion

Osteosarcoma should always be considered in the differential diagnosis of expansile lesions of the jaws. Pain may not always be an associated feature. Pain associated can be misinterpreted as odontogenic in origin, resulting in delay in obtaining the final diagnosis. Movement of teeth in the area of a lesion suggests a neoplastic process. Radiographic findings are not always pathognomonic; the 'sunburst' pattern may not always be seen. All exophytic rapidly growing lesions should receive clinical and radiographic follow-up until remission. Sufficient sample of biopsy is a must for final diagnosis. For proper management, emphasis should be laid on the aggressiveness of this lesion which warrants an early identification and diagnosis followed by prompt treatment.

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Surgical And Orthodontic Treatment Of Skeletal Class III, Long Face Syndrome

Batra P[1], Sadhu P[2], Srivastava M[3]

Abstract

Class III malocclusion associated with skeletal anterior open bite pattern in adults can be a challenging orthodontic problem, especially if treated nonsurgically. Conventionally, several treatment alternatives are available such as tooth extraction, molar intrusion, and absolute anchorage system or orthognathic surgical correction. A correction with surgery may be the most effective and stable way. The article presents a case report of a 20 years old unilateral cleft lip and palate patient with skeletal Class III and long face syndrome(severe anterior open bite) treated by orthodontic compensation (lower first premolars extraction) followed by vertical reduction genioplasty. Post treatment the patient obtained satisfactory occlusion as well as functional results with correction of severe anterior open bite and reverse overjet.

Key words: Class III Malocclusion, Open Bite, Orthodontic Treatment, Genioplasty.

Introduction

Class III malocclusion is considered to be one of the most difficult and complex orthodontic problems to treat. Individuals with class III malocclusion frequently show combinations of skeletal and dent alveolar components. Skeletal class III malocclusion may either be associated with maxillary retrusions, mandibular protrusion, or a combination of the two[1, 2]. These complex cases require careful treatment planning, an integrated approach and patient cooperation[2]. A poor facial appearance is often the patient's chief complaint, but it may be accompanied by functional problems, temporomandibular disorders, or psychosocial handicaps[3].

Several distinct cephalometric features have been reported in class III patients, such as a short anterior cranial base length, acute cranial base angle, a short and retrusive maxilla, proclined maxillary incisors, retroclined mandibular incisors, an excessive lower anterior face height and obtuse gonial angle.

An important aspect of comprehensive orthodontic therapy is managing the vertical dimension of the patient's face. Many of the most difficult orthodontic cases involve long face syndrome. A "long face" is characterized by an excessively vertical face, also referred to as long face pattern,[4,5] "long face syndrome",[6] and hyper divergent facial type.[7] Characteristics include excessive eruption of posterior teeth, normal or excessive eruption of anterior teeth, short posterior facial height, and a steep mandibular plane angle[7]. Facial syndromes related to excessive vertical dimension, such as Class III malocclusion

Corresponding Author : Dr Mudita Srivastava, Senior Lecturer Department of Orthodontics and Dentofacial Orthopaedics IDST, Modinagar.U.P **(M)** 09910930544 **Email-**mudi2007@rediffmail.com

1. Prof & Head, Department of Orthodontics IDST, Modinagar,U.P
2. Director, Department of Plastic Surgery Global Hospital Mount Abu, Rajasthan, India.
3. Senior Lecturer, Department of Orthodontics and Dentofacial Orthopaedics IDST, Modinagar.U.P

with long-face syndrome, can be treated by means of surgical manipulation of the jaws, thereby improving the skeletal-dental relationship and resulting in a more aesthetic proportion . Extraction mechanics with orthodontic compensation is also frequently used for correction of anterior open bite with large vertical dimension.

The article presents and discusses the treatment of a case of unilateral cleft skeletal class III malocclusion with long face syndrome treated by combination of orthodontic compensation and reduction genioplasty.

Case Report

A 20 years old male UCLP (left side) patient reported with a chief complaint of poor facial aesthetics, with difficulty in closing lips, mastication and chewing. The lip was operated at six months of age and palate at 2 years of age. There was no previous history of orthodontic treatment. He denied ever having had any temporomandibular joint dysfunction signs or symptoms, and maximal opening and lateral and anterior movements were within normal limits. Also there were no deviations on opening and closure, and no joint sounds

On extraoral examination (Fig:1) face appeared symmetrical and elongated, unilateral scar noted on left side of upper lip. Patient had concave profile with prominent chin and retrusive middle third of face, upper lip was retrusive and protrusive lower lip with increase in lower anterior face height and high clinical FMA. There was excessive contraction of mentalis muscle during closing of lips at rest (lip sealing). On intraoral examination (Fig: 2) all compliment of teeth were erupted in mouth except for third molars. Upper lateral incisors were missing bilaterally. Presence of complete open bite of 6-7mm extending from second molar bilaterally. Patient presented with Class III molar and canine relation bilaterally with reverse overjet of 4 to 5mm. Maxillary arch was severely constricted “v” shaped while mandibular arch was wide and squarish. Scar tissue on upper lip and fistula in palatal area was also noticed. Moderate crowding present in upper and lower anteriors with mesially tipped lower canines. There was tongue thrusting habit which was secondary to complete open bite.

Figure 1 : Pre Treatment Extaoral

Figuure 2 : Pre Treatment Intraoral

Radio graphical examination using a lateral cephalogram and OPG was done. On doing the cephalometric analysis (Fig:3) it was found that the patient had skeletal Class III malocclusion because of retrognathic maxilla and prognathic mandible with prominent chin. Mandibular basal length was also increased with short ramal height. There is steep mandibular plane and gonial angle with severe increase in lower anterior facial height (LAFH). Sassouni's skeletal analysis revealed that the palatal, oclussal and mandibular plane are divergent. There was increase in posterior

maxillary height in vertical plane along with supra eruption of maxillary and mandibular second molars resulting in downward and backward rotation of mandible. Dentally, there was proclination of lower anteriors with normal angulation of upper anteriors with respect to SN plane. OPG Examination revealed all compliment of teeth (except upper lateral incisors) with vertically impacted maxillary and horizontally impacted mandibular third molars. The condyles appeared normal in size and form.

Figuure 3 : Pre Treatment Lateral Cephalogram

The case was diagnosed as a case of skeletal Class III malocclusion with downward and backward rotation of mandible resulting in skeletal open bite.

It was decided to treat the case in combination of orthodontic and surgical treatment. Orthodontically, it was decided to extract lower first premolars followed by vertical reduction genioplasty.

Fixed orthodontic appliance was placed (022 slots MBT mechanics) in patient s mouth from second molar bilaterally in both upper and lower arch.

Lower first premolars were extracted and the extraction space was utilized to relieve the mild lower anterior crowding and, retracting the lower anteriors. Upper arch was expanded along with coordination of lower arch. The severe open bite was corrected by intrusion of upper and lower molars along with supra eruption of upper and lower anterior teeth thereby rotating the occlusal plane anti clockwise.(Fig:4,)

Figuure 4 : Mid Treatment Lateral Cephalogram

Vertical reduction genioplasty was performed for reducing the anterior facial height and the chin prominence, after the orthodontic treatment. This combine orthodontic and surgical treatment resulted in giving the patient an acceptable and stable occlusion and facial aesthetics. (Fig: 5)

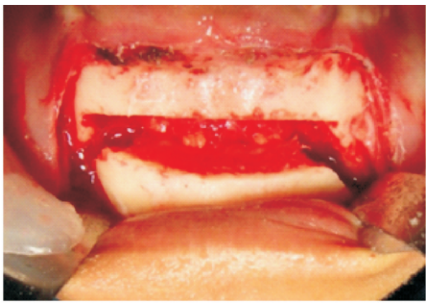

Figure 5 : Genioplasty

Figuure 6 : Post Treatment Extraoral

Figuure 7 : Post Treatment Intraoral

Discussion

Skeletal Class III malocclusion is one of the most common finding in patient having history of cleft lip and palate. This is because surgical scar tissue which is formed at the time of repair of palate retards the growth of nasomaxillary complex, if the palatal surgery is done before completion of growth.

In the present case, patient presented with retruded premaxillary segment and prognathic mandible and prominent chin. The present malocclusion was complicated with complete open bite and downward and backward rotation of mandible having increased lower anterior facial height. Surgical reduction of facial height and proper alignment of the teeth by orthodontic means are common denominators of successful treatment of this kind of situation. As the patient was non growing adult, there are many other possible treatment options for the present scenario like maxillary impaction with maxillary advancement causing forward autorotation of mandible with or without mandibular setback, Mandibular setback with vertical reduction genioplasty or just orthodontic compensation of the case by proclining the upper anteriors and retroclination of lower anterior by first premolar extraction in lower arch along with vertical reduction.

Maxillary impaction and advancement are major surgical procedures; moreover in this case as there was no vertical maxillary excess, downward and backward rotation of mandible was because of wedge effect created by extrusion of second molars resulting in severe open bite. As the patient had long lower anterior facial height, maxillary impaction and advancement with or without mandibular setback would have not addressed this situation.

Only surgical treatment of mandibular setback or reduction genioplasty or only orthodontic compensation of the malocclusion was not justified as patient presented with severe skeletal open bite and retrusive premaxillary segment and skeletal class III malocclusion.

The present case was treated by orthodontic and surgical means both. Orthodontic ally the lower second premolars were extracted and lower anteriors were retracted in the extraction space and moderate crowding in the lower arch was relieved. Most of the non-surgical approaches involve extractions, which are used in these patients not only to address the typical indications--crowding, incisor flaring, and bimaxillary protrusion- but also to allow forward movement of the posterior teeth (burning anchorage), thus closing the maxillomandibular angle and reducing anterior facial height.

In upper arch, anteriors were proclined there by compensating the retruded premaxillary segment. As the patient was skeletal Class III and there was prominent chin, the vertical reduction genioplasty was justifiable to reduce the prominent chin and increased lower anterior facial height.

Vertical Genioplasty is the adjunctive surgical procedure used in treatment of long face syndrome with skeletal Class III malocclusion. Most genioplasty procedures are done to improve the mandibular profile in order to obtain a more natural profile. Genioplasty can shorten or lengthen the lower

third of the face like in the present case it helped in reduction of facial height and chin prominence. Facial asymmetry may also be corrected by rotation of the chin-point to coincide with the midline. The advantages genioplasty are versatility, reliability and consistency in correcting problems in the sagittal and vertical planes to achieve adequate chin projection.

Post treatment patient achieved acceptable facial and smile aesthetics with good functional correction.(Fig:6,7)

Conclusion

Treatment of skeletal Class III malocclusion along with long face syndrome remains a challenge to clinicians. Careful diagnosis and appropriate treatment approach whether nonsurgical, surgical or combination of orthodontic treatment and surgical should be analyzed. The one of the treatment approach that is orthodontic compensation followed by vertical reduction genioplasty is highlighted through this article. The approach of treatment presented has practical clinical relevance.

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Seal Away Tooth Decay: A Case Report & Review

Kamate KS[1], Gupta B[2], Sharma S[2], Kumar J[3]

Abstract

Pits and fissures are the most susceptible sites for the development and progression of dental caries and keeping these areas clean is extremely difficult and at times impossible. Over a period of time sealants have evolved to a major extent and are successful in preventing dental caries. This article has a case presentation along with detailed review the indications, properties, caries-preventing capacity, recommendations, safety and optimum time-period for recall of pit and fissure sealants.

Key words : Pits & Fissures, Pit & Fisure Sealant, Dental Caries

Introduction

Dental caries is an infectious and transmissible disease, caused by cariogenic bacteria of the oral cavity. The incidence of the dental caries has vastly been reduced courtesy the introduction/inception of fluorides. Unfortunately fluorides are not as effective in preventing Occlusal caries (accounting for more than two third of caries in children) when compared to smooth surfaces due to the tricky morphology of the pits and fissures.

Several methods have been tried historically to deal with the pit and fissures on occlusal surfaces. Wilson in 1895 placed cement in pit and fissure, Bodecker in 1929 suggested enameloplasty to broaden the fissures to make the Occlusal areas more self-cleansing, Hyatt in 1924 and in 1936 advocated prophylactic odontotomy which involves insertion of small restorations in deep pits and fissures before carious lesions had the opportunity to develop. But the major disadvantage of all the above mentioned procedures was first, sound tooth structure had to be sacrificed and second, these were all more of treatment options rather than preventive approach.[1]

Later, several methods have been unsuccessfully tried in an attempt either to seal or make the fissures more resistant to caries. These included the use of topically applied zinc chloride & potassium ferrocynide, ammoniacal silver nitrate and the use of copper amalgam packed into the fissures. Pit and fissure sealants were introduced in 1967 and their effectiveness was recognized by the American Dental Association in 1971.[2] Pit and fissure sealants primarily work by forming a physical barrier that inhibits microorganisms and food particles from collecting in pits and fissures.[3] The increased susceptibility of the occlusal surfaces of the permanent molars to dental caries has mandated the use of pit and fissure sealants as a part of a comprehensive approach to caries prevention on an individual

Corresponding Author : Dr. Shivlingesh KK, Public Health Dentist, Reader, I.T.S Dental College, Greater Noida.
(M) 9560277157 E-mail – shivgesh@gmail.com

1. Reader, Dept. of Public Health Dentistry, I.T.S. Dental College, Greater Noida.
2. Senior Lecturers, Dept. of Public Health Dentistry, I.T.S. Dental College, Greater Noida.
3. Professor & Head, Dept. of Public Health Dentistry, I.T.S. Dental College, Greater Noida.

basis or as a public health measure for at-risk populations.

Indications for Placing the Sealant

Many authors strongly recommend the use of sealants for children after eruption of molar teeth. They also advocate that there is benefit in placing sealants within 4 years after eruption and that placement of resin-based sealants on the permanent molars of children and adolescents is effective for caries reduction.[4] However, none of the authors have advocated the use of sealant beyond adolescence.

Jokovic A, David Locker assessed two risk factors namely past caries experience (where susceptibility to onset of further caries was positively associated with a child's previous dmfs/DMFS scores) and pit and fissure morphology (where children with deep pit and fissures were at a greater risk of dental decay) and concluded that permanent molars appeared to remain at high risk for dental decay beyond 4 years after eruption.[4]

Based on the dentist's overall assessment of the individual's caries risk status and a thorough assessment of the tooth surface, other teeth such as premolars, third molars and the palatal surfaces of maxillary incisors can also be considered for sealant application.

In high risk populations(First Nations and Inuit groups), all children should receive sealants and in low risk populations the recommendation is to seal the molar teeth of susceptible children that is those who have already had caries at the time of assessment, those who are medically compromised and others at risk.[4]

Caries Risk Assessment

A Caries Risk Assessment Checklist (CRAC) has been recently developed in order to formalize a risk-based approach to the management of caries in children. The checklist takes into account the reasons that might put the patient at high caries risk i.e. previous caries experience, dietary habits, tooth morphology, deprivation (measured by medical card status) and medical and other conditions, together with the factors that might reduce a patient's caries risk (e.g. adequate exposure to fluorides, presence of fissure sealants).[5]

The risk of experiencing dental caries exists on a continuum and changes across time as risk factors change. Therefore, a patient's caries risk status should be re-evaluated periodically. There is not a single system of caries risk assessment that has been shown to be valid and reliable.[2] Therefore caries risk assessment should be integrated with the practitioners' professional expertise to determine treatment options.

It has been observed that placement of pit and fissure sealants significantly reduced the number of non-cavitated carious lesions in children, adolescents and young adults for five years after sealant placement, as compared with unsealed teeth.[3]

The authors are of the view that placement of sealants on primary molars is beneficial to an extent,[6] also supported by an Irish article which states that the impact of fissure sealants alone on reducing caries is likely to be less for primary teeth than for permanent teeth.[5] However they strongly recommend the placement of sealants on permanent molar teeth as both cost effective and efficacious in the prevention of caries.[4] This view was also supported by Beauchamp et al who found that placement of resin-based sealants on permanent molars of children and adolescents resulted in caries reduction.[3]

Clinical Detection of Non-Cavitated Pit and Fissure Carious Lesions

Visual examination after cleaning and drying the tooth is sufficient to detect early non-cavitated lesions in pits and fissures. It is important to note that external stain is not equivalent to a non-cavitated carious lesion. The use of explorers is not necessary for the detection of early lesions, as forceful use of a sharp explorer can damage tooth surfaces.[3,4] The clinicians can use radiographs if available, but cannot obtain radiographs for the sole purpose of placing sealants.

Case Report

A 10 year old male patient, reported to Department of Public Health Dentistry, with chief complaint of pain in right and left lower teeth since 1month.

On examination, he had poor oral hygiene and deep caries in relation to 74, 84 with the presence of deep fissures in relation to 36 & 46. Treatment plan involved restoring carious teeth 74 and 84 with help of GIC and application of Pit & fissure sealants to 36 & 46 (Figure 1).

Figure 1. Pre operative

The treatment was carried out in the following steps:

1. Scaling & polishing was performed
2. Isolation with help of cotton rolls was done (Figure 2).

Figure 2. Isolation

3. Acid etching was done with help of 37% phosphoric acid which increased the surface area of the tooth and helped in the formation of enamel resin interface (Figure 3).

Figure 3. Acid Etching

4. Tooth surface was washed and dried and frosted appearance was checked on tooth surface.
5. Application of sealant material (Helioseal) Figure 4

Figure 4. Application of Material

6. Light curing was done following manufacturer's directions Marginal integrity was evaluated and occlusal integrity was checked (Figure 5).
7. Patient was asked to report in case of any discomfort or else report after 6 months for evaluation.

Figure 5. Post Operative

Recommended Indications :

1) Sealants can be placed on permanent molars free of caries, on permanent molar tooth which have deep pit and fissure morphology, on permanent molars with sticky fissures or stained grooves.[5,6,7] When indicated, sealants should be applied as early as the tooth is sufficiently erupted to be isolated.[8]
2) Sealants should be placed on deciduous molars of children who are susceptible to caries.[9]
3) Sealants should be placed on first and second permanent molar teeth within 4 years after eruption.[5,6,7]
4) Resin based sealants should be the material of choice, till GIC sealants with better retention capacity could be developed.[5,6,7]
5) Glass ionomer may be used as an interim preventive agent when there are indications for placement of a resin-based sealant but concerns about moisture control may compromise such placement.[10,11]
6) The sealants should be monitored and reapplied when necessary to maximize their effectiveness.[2]
7) Sealants should be used in conjunction with other preventive measures.[5]

Recommended Contraindications :

1) Sealants should not be placed on partially erupted teeth, teeth with cavitation or dentinal caries.[5]
2) The standard acid-etching technique is found to be more retentive than self-etching bonding agents and hence self etching bonding agents are not recommended.[12,13]
3) Routine mechanical preparation of the enamel before acid etching is not recommended.[1,14,15]

Factors Affecting Retention

Isolation :

It is very important to adequately isolate the teeth since salivary contamination is one of the major causes for failure of the sealant in the first year.[16] Lingual aspects of Occlusal grooves in mandibular molars area is

particular at-risk surface for saliva contamination. Similarly, molars that are sealed with the operculum covering the distal marginal ridge of the occlusal surface have twice the probability for retreatment as teeth not treated until the entire marginal ridge was exposed.[17] Isolate the tooth to be sealed with either a dental dam or cotton wool rolls/isolation shields combined with effective aspiration.[5] When possible, a four handed technique should be used for placement of sealants.[3]

Sealant Materials Used

The main bone of contention was between resin based sealants and GICs.Reinforced GICs had better retention compared to regular GICs.[4] The resin-based sealants had best retention rates and were more effective in caries reduction than glass ionomer cement in permanent teeth of children and adolescents.[2] Retention was a major problem with GICs but if this problem were to be rectified, than there may be advantages to the GIC sealants through the release of Fluorides.[4]

The Effect Of Fissure Morphology And Eruption Time On Penetration And Adaptation Of Pit And Fissure Sealants

Nagano classified occlusal fissures on the basis of morphology into 5 types: V, U, Y, I, I and K. Grewal N et al found that the depth of penetration of the sealant was greatest in V shaped fissures followed by U type, Y type, I type and IK type fissures in decreasing order respectively. Penetration of the sealant to the base of the fissure occurred more frequently in shallow fissures than in deep fissure.[9] An invasive technique for the placement of sealants in constricted fissures has shown higher retention rates.[9]

Sealant Viscosity

Pilar baca et al[18] Conducted a study in which they compared the success rates of two unfilled sealants (Delton and concise), one fluoride and filled sealant (Delton plus) with a self-priming adhesive system (optibond Solo) and found that the best retention rates in both deciduous and permanent dentition was obtained using Delton (a non-Fluoride and unfilled sealant). The success rate was similar between all the four materials in the deciduous second molars and between the three sealants in the permanent molars, but Optibond Solo showed a worse success rate in permanent first molars (mandible). This was attributed to sealant contamination by saliva accentuated by the fact that the application was done by under-graduate students.

Other Modifications

There is limited and inconclusive evidence regarding the use of air abrasion as a cleaning method before acid etching and the use of burs for mechanical preparation both of which resulted in improved retention of sealants.[3] Sealant retention could also be improved by the application of a bonding agent containing an adhesive and primer between the previously acid-etched enamel surface and the sealant material.[3] The use of flowable resin, and pretreatment with an adhesive also enhance retention.[3]

Reduction Of Caries Increment By Use Of Sealants

Overall the reduction in caries incidence in children and adolescents after placement of resin-based sealants ranged from 86% at one year to 78.6% at two years and 58.6% at four years respectively.[2] Beiruti et al in their study compared GIC and rein-based sealants and

found the relative risk of caries to be 0.22, 0.32 and 0.28 at 3, 4 and 5 years after placement respectively.[19] In permanent molars alone, sealants were effective in reducing caries by 76.3% at 4 years and 65% at nine years (when sealants were applied as necessary).[19] However, when sealants alone were compared with placebo controls (either no treatment, fluoride varnish or mouth rinse treatment, or oral hygiene instructions) there was reduction in caries increment up to 50%.[5]

Effect of Dental Sealants on Bacteria Levels in Carious Lesions:

Sealants were effective in reducing total bacteria counts in carious lesions. The reduction increased with time since sealant placement. There was a 100-fold decrease in mean bacteria counts in two studies.[3] And a 1000-fold decrease in the remaining two studies. Thus when sealants are placed and retained, access to fermentable substrates is blocked and bacteria do not appear capable of exerting their cariogenic potential.[8]

Fluoride- releasing sealants were thought to be more caries preventive through the release of Fluorides. Menon Preetha V et al[2] compared the antibacterial property of two fluoride releasing sealants (Teethmate F1 and Helioseal-F) and a non-fluoride releasing sealant and concluded that Teeth mate –F1 was the only sealant that showed zones of inhibition against the two main bacteria (Streptococcus mutans and Lactobacillus acidophilus). They attributed this difference to the method of incorporation of Fluoride into the sealant where organic Fluoride compound is chemically bound to the resin (in case of teethmate-F1). Hence Fluorides and sealants should be used to supplement each other.

Cost-effectiveness of the Sealants :

Multiple Models have shown that bring selection criteria for sealants on the patient's caries risk is cost-effective.[3]

In order to assess the cost-effectiveness of the sealants, a systematic review was done in many European countries and after taking into account the various limitations, the conclusions arrived at were[5]:

In children at high caries risk, sealing first permanent molars was cost-effective.

When children were selected without any risk, the results were contradictory.

For children with low caries risk, the results were unclear on a long term basis

In order to see the overall cost-effectiveness of pit and fissure sealants, long-term monitoring was necessary.

Retrospective cohort study of 2,132 children continuously enrolled in the Iowa Medicaid program over a 4-year period found that while the cost of treatment associated with sealed first permanent molars was higher than that for unsealed teeth, the utility was also slightly higher. Sealing first permanent molars in low utilizers of dental services (i.e. children with one preventive visit or less per year) was found to be the most cost-effective approach for prioritizing resources.[20]

Two economic analyses compared the cost of three different sealant delivery strategies: 'seal all', 'Risk-based[21] and 'seal none'[22] Both studies found that, under baseline assumptions, the 'risk-based' approach was the most cost-effective strategy over a simulated 9 or 10 year period. The 'seal all' approach was the most effective, but also the most costly strategy.

Another study in Finland found that costs per child were 21% higher in the 'seal all' area compared to the 'risk-based' area, due mainly

due to the higher costs for restorative treatment required by children who had not attended for sealant in the 'seal all' area. However, there may have been fundamental differences in the caries profile and risk status of the 'non-sealed' children in the two areas: in the 'seal all' area, children without sealant were non-attenders, which would suggest that they were likely to have greater treatment needs when they did attend; in the 'risk-based' areas, children without sealant were assessed as low risk. Differences in background preventive programmes and caries levels between the two communities could also have biased the results of this study.[23]

Are Pit and Fissure Sealants Safe?

A systematic review on possible harm or toxic effects of sealant concluded that patients are not at risk of exposure to BPA from the use of dental sealants, but has issued precautionary measures to reduce potential exposure to BPA which include:

1. Rinsing the surface of the cured material for 30 seconds with water while using effective suction.
2. Getting the patient to rinse for 30 seconds and spit out after the procedure
3. Removing the surface residual monomer layer with pumice on a cotton pellet.

A comprehensive review of potential human reproductive and developmental effects of BPA estimated that approximately 99% of BPA exposure comes from diet and exposure from dental sealants was an acute and infrequent event with little relevance to estimating general population exposures.[20]

Optimum time for Reviewing Sealants

Sealants need to be maintained once applied. When sealants are placed in high caries risk children, the recall interval should not exceed 12 months.[24] If there is a concern regarding isolation or if the sealant is placed on a suspicious carious lesion than recall within 6 months would be appropriate. A 3-year sealant study involving children aged 5–14 years with partially or newly erupted first or second permanent molars found that irrespective of the methods of isolation, the re-treatment rate was higher at the first 6-month recall than at any other recall during the study (rubber dam or cotton rolls).[25]

Pit and Fissure Sealants & Nano-Composites :

A study comparing the flowable composites, pit and fissure sealants and nano-composites showed that micro leakage was highest with flowable composites and least with pit and fissure sealants. The nanocomposite values were intermediate. The nano-composite was found to be an excellent material for penetration into deep pit and fissures though it exhibited mild micro leakage and hence could be recommended for use in pediatric patients as a pit and fissure sealant.[26]

Conclusion

The use of pit and fissure sealants have been mainly used for primary caries prevention, but recent evidence suggests that it can also be used as a secondary preventive approach when used on early non-cavitated lesions. Therefore, sealants when used judiciously after taking into account the caries risk assessment could be an effective comprehensive approach.

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A Hollow Maxillary Complete Denture for Rehabilitation of Severely Resorbed Maxillary Ridge : A Case Report

Aggarwal A[1], Sharma A[2], Jayna A[3], Deol S[4]

Abstract

The basic principle for the success of complete denture lies on retention, stability & support. The severely resorbed maxillary denture bearing area poses a clinical challenge for successful prosthetic rehabilitation. This article presents a case report of a severely resorbed maxillary ridge with increased interarch space treated with a hollow maxillary denture.

Keywords: Complete Denture, Hollow Maxillary Denture, Light Weight Denture, Inter ridge Distance.

Introduction

Prosthetic rehabilitation of deficient edentulous ridges is a major problem in dentistry. Residual ridge resorption is a continuous process. Although resorption is more serious clinical problem in the mandibular arch, significant loss of alveolar bone in the maxillae can be equally problematic. Fabrication of successful complete denture prosthesis is the dentist's responsibility by incorporating various factors enhancing retention, stability and support. As resorption progresses, the maxillary arch becomes more narrower, more constricted with decreased supporting tissue, as a result there is large restorative space between the two ridges. Fabrication of complete denture in such cases result in a heavy maxillary denture, which can lead to poor denture bearing capacity i.e. decreased retention and resistance. This problem can be overcome by reducing the weight of maxillary denture, by making it hollow.

It has been suggested that gravity and the addition of weight to the mandibular complete denture may aid in prosthesis retention.[1,2] However, reducingweight of a maxillary prosthesis has been beneficial when an obturator is constructed for restoration of large maxillofacial defect.[3,4] Historically, various approaches have been described for achieving weight reduction in maxillary denture during laboratory processing by excluding denture base material from the planned hollow cavity of the prosthesis. For example: use of a solid 3-dimensional spacer, like dental stone,[5,6] cellophane wrapped asbestos[7], silicone putty[8], or modelling clay[9].

Holt[9] used a spacer and processed a shim of acrylic resin over the residual ridge, the two halves luted together. Fattore et al[10] fabricated an obturator by using a variation of the double flask technique. He added heat polymerized acrylic resin over the definitive cast and also processed minimal thickness of acrylic resin around the teeth using different drag. Both

Corresponding Author : Dr Anju Aggarwal, Senior Lecturer, Dept Of Prosthodontics, ITS Dental College, Hospital And Research Centre, Greater Noida. **(M)** 8800201519 **E-mail :** aries15dranju@yahoo.co.in.

1. Senior Lecturer, Dept of Prosthodontics I.T.S. Dental College, Hospital And Research Centre, Greater Noida.
2. Professor & Head, Dept. of Prosthodontics I.T.S. Dental College, Hospital And Research Centre, Greater Noida.
3. Professor, Dept. of Prosthodontics I.T.S. Dental College, Hospital And Research Centre, Greater Noida.
4. PG Student , Dept of Prosthodontics I.T.S. Dental College, Hospital And Research Centre, Greater Noida.

portions of resin were then attached using a heat polymerized resin. O'Sullivan et al[11] used silicon putty as spacer. A clear matrix of the trial denture base was made, which was then invested in the conventional manner and wax elimination was done. A 2mm thick heat polymerized acrylic shim was made on the master cast, using a second flask. Silicone putty was placed over the shim and its thickness was estimated using a clear template. The original flask with the teeth was then placed over the putty and the processing was done. The putty was later removed from the distal end of the denture and the openings were sealed with autopolymerising resin.

This article describes a technique for the fabrication of a light weight hollow denture using double flask technique.

Case Report

A 55year old female patient reported to the Department of Prosthodontics, with the chief complaint of missing upper and lower teeth and wanted the replacement of the same. On examination, it was found that both the upper and lower arches were completely edentulous and severely resorbed, with increased interarch space. For the rehabilitation of patient it was decided to fabricate hollow maxillary complete denture and conventional mandibular denture.

Technique:-

1. Preliminary and final impressions were made in conventional manner using impression compound and zinc oxide eugenol respectively. The wax record rims were fabricated and jaw registration was carried out, that suggested out that there is more than normal interarch space(freeway space). Teeth were arranged and try in was done.
2. Following satisfactory wax try in, the dentures were processed using double flask technique. Two interchangeable flasks were selected, which were used for making hollow maxillary denture.
3. Trial dentures were flasked in conventional manner. Wax elimination was done and residual wax was properly cleaned.
4. Thick sheet of wax was adapted over the maxillary cast. A sheet of wax was also adapted on the cope (cavity side) of the flask consisting of the teeth. Ensuring that flask closed completely with wax in place. The hinderances to closure were trimmed out.(figure-1)

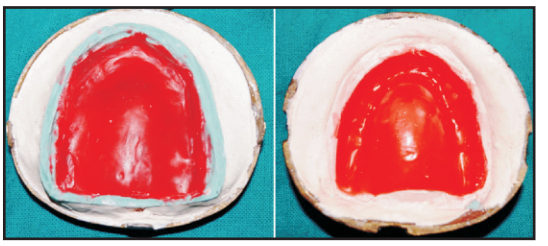

Figure-1- wax adapted over two parts of denture

5. Now the cope and the base part were flasked separately using parts of interchangeable flask.(figure-2)

Figure-2 : Two interchangeable flask having base and the cope part separate

6. Again the wax elimination was done and the packing, followed by curing of both

the flasks were done in conventional manner.

7. This resulted in two halves; i.e. a denture base and denture teeth, which has to be fused together.(figure-3,4)

Figure-3 : Seperately cured tooth part of denture

Figure-4 : Cured base part of denture

8. The two halves were closed together and checked for hinderances. Ensuring they should close properly.
9. A thin beading of autopolymerising acrylic was applied around the corners of the denture base and flasks were closed tightly. After polymerisation the denture was checked for complete seal by placing in water.(figure-5)

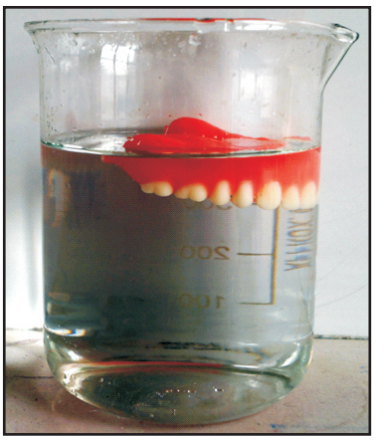

Figure-5 : Denture floating in water

10. Finished and polished denture was than inserted in the patient's mouth.(figure-6)

Figure-6 : Denture inserted in patient mouth

Discussion

Severely atrophic mandible is most common problem seen in clinical practice, but severely resorbed maxillary arch also poses similar problem. The technique described is simple and does not require any spacer. It reduces the weight of maxillary denture by 25%. Light weight maxillary denture somehow reduces the gravitational action and thus aids in retention, but care should be taken while fusing two halves so that the acrylic doesn't flow inside the part to be hollowed. Whenever the weight of the denture is the contributing factor to the successful resolution of a patient's problem, the hollow denture should be considered, with both an atrophic alveolar ridge and a greater than usual interocclusal distance.

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Restoring Esthetics by Clinical Crown Lengthening

Saxena S[1], Khatri M[2], Jain D[1], Bansal M[1],

Abstract

Clinical crown lengthening is a procedure designed to increase the extent of supra-gingival tooth structure for restorative or esthetic purposes. Crown lengthening procedure involves combination of tissue reduction or removal, osseous surgery and/ or orthodontics for tooth exposure. Crown lengthening should be performed by taking into account some important principles, like respect for the biological width, creation of a ferrule, placement and location of restorative margins. Periodontal health is the corner-stone of any successful restorative procedure. Hence, condition of periodontal tissues during restoration of the tooth, is important to the restoration's future success. This article focuses on different surgical treatment modalities for clinical crown lengthening leading to healthy periodontal tissue, successful restoration and future success.

Key words: Biological Width, Crown Lengthening, Restorative Margins.

Introduction

Clinical crown lengthening refers to procedures designed to increase the extent of supra-gingival tooth structure for restorative or esthetic purposes.[1] The concept of crown lengthening was first introduced by D. W. Cohen (1962) and is presently a procedure that often employs some combination of tissue reduction or removal, osseous surgery and/or orthodontics for tooth exposure. The amount of tooth structure exposed above the osseous crest must be enough to provide for a stable dentogingival complex and biologic width to permit proper tooth preparation and account for an adequate marginal placement, thus ensuring a good marginal seal with retention for both provisional and final restorations.[2]

The present case report depicts the use of surgical crown lengthening as a treatment modality in reduced vertical dimension. The most common surgical modality used to increase the clinical crown length is gingivectomy and the apically positioned flap in conjunction with resective osseous surgery. This technique will increase the clinical crown length with maintenance of biological width and the dentogingival complex will be re-formed.[3] Resective osseous surgery for exposure of adequate clinical crown length provides the proper placement of margins, enhances the retention[4] and creates a periodontal environment in which plaque control procedures can be more effectively performed.[5]

Case Series

Case 1

A 20 year male patient was referred from the

Corresponding Author : Dr. Sameer Saxena, Senior Lecturer Department of Periodontics, Institute of Dental Studies & Technologies, Modinagar, U.P. 201201 **(M)** +919412619458 **E-mail:** saxena.sameer27@gmail.com

1. Senior Lecturers, Department of Periodontics, Institute of Dental Studies & Technologies, Modinagar, U.P.
2. Professor & Head, Department of Periodontics, Institute of Dental Studies & Technologies, Modinagar, U.P.

Department of Conservative dentistry to the department of Periodontics, IDST, Modinagar for the lengthening of clinical crown. Clinical examination revealed carious left canine, with inadequate tooth structure on distal and palatal aspect for restoration. A post and core was planned and exposure of tooth structure was required for proper placement of margins. The gingiva consisted of a wide zone of keratinized tissue and sulcus depth was 2mm on disto-buccal and the palatal aspect as measured by William probe. The biotype was also relatively thick.

Case 2

A 24 year male patient, with carious right central incisor, involving the distal, buccal and disto-palatal aspect, leaving very less tooth structure available for placement of restoration margins. The sulcus depth was 2mm on buccal, distal and palatal aspect with sufficient width of keratinized tissue.

Case 3

This case was of a 22 years old patient with Ellie's class III fracture of upper right central incisor. A sulcus depth of 3mm on all aspects with thick and adequate keratinized tissues was seen on examination. A post and core was planned for restoration of crown. Gingivectomy was again required for the exposure of tooth structure, on all aspects for placement of margins without violating the biological width. Radiographic examination showed the osseous crest close to CEJ. The crown to root ratio was favourable.

After discussion with the restorative operator, surgical crown lengthening with osseous reduction was planned for the first two cases and gingivectomy was planned for the last case.

Treatment

Case 1: The apical extent of gingival excision was marked by bleeding points on the outer surface of the gingiva with the periodontal probe. The initial internal bevel incision was carried out in a scalloped manner. The thinning of the flap was done with the initial incision because it is easier to accomplish that at this time, than later with a loose reflected flap, which is difficult to manage. This initial incision was blended with a crestal incision given in the adjacent edentulous space and a second or crevicular incision made from the bottom of the sulcus to the bone to detach the connective tissue from the bone. The sulcus lining was then removed with the help of curette and the flap was reflected with a periosteal elevator (blunt dissection). The granulation tissue was also removed with a curette. Intra-surgical measurement was done from the newly created margin to the bone. As it was less than 3mm, osseous resection was performed by the use of rotary handpiece with carbide burs under copious irrigation. It was ensured that 3mm distance between the new gingival margin and the alveolar crest was maintained all over, so as, not to violate the biological width. Finally, the flap was sutured at the crest level, with 3-0 silk suture and periodontal dressing was given. The patient was given postoperative instructions and was asked to come after one week for suture removal. Final preparation (post and core) was done after eight weeks and the restoration margins were placed adequately in relation to the new gingival sulcus. (Figure 1-4)

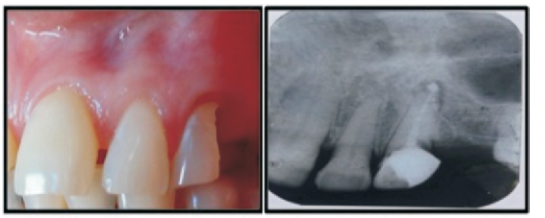

Figure 1. : Preoperative view of canine with inadequate tooth structure for restoration

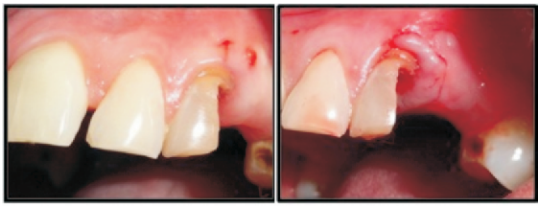

Figure 2 : Bleeding points marked followed by initial incision

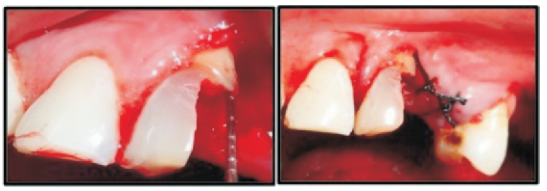

Figure 3 : Intra-surgical measurement and sutured flap

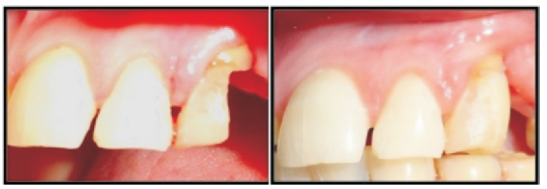

Figure 4 : Postoperative view with post and core build up

Case 2: An internal bevel gingivectomy was performed as described above followed by restoration of the crown.

Case 3: In this case as there was sufficient sulcus depth and there were short clinical crowns a gingivectomy with gingivoplasty was performed with an electrocautery. This was followed by temporization immediately and a final restoration after 8 weeks. (Figure 5)

Figure 5 : Fractured incisor treated by gingivectomy

Discussion

The preservation of a healthy periodontium is critical for the long term success of the restored tooth.[6] The health of the periodontal tissues is dependent on properly designed restorative margins. Although, supra-gingival restorative margins are preferred, sub-gingival margin placement is often unavoidable. Supragingival placement allows for ease of impression making[7], cleansing, detection of secondary caries and is associated with maintainable probing depths and healthy soft tissue.[8] However in cases of extensive caries, fractured tooth, inadequate crown lengths and increased esthetic demands the restorative margins have to be placed at or apical to the gingival margin. This results in deleterious effects on the periodontium, leading to inflammatory response and attachment loss especially when they encroach on the junctional epithelium and supracrestal connective tissue.[9] If restorative margins need to be placed near the alveolar crest, crown-lengthening surgery or orthodontic extrusion should be considered to provide adequate tooth structure while simultaneously assuring the integrity of the biologic width. Surgical crown lengthening is a useful procedure to provide tooth length for proper restoration of a tooth without compromising the periodontium or the retentive qualities of the restoration.[6]

The clinical examination revealed two carious teeth in first two cases and a fractured incisor in last case with reduced dimension for restorative margins. An internal bevel gingivectomy was performed in the first two cases with osseous resection. The initial incision accomplishes three important objectives: 1) it removes the pocket lining; 2) it conserves the relatively uninvolved outer surface of the gingiva, which, if apically positioned, becomes attached gingiva; and 3) it produces a sharp, thin flap margin for adaptation to the bone-tooth junction.[10]

The basic concept of crown lengthening for

restorative ease is to surgically move the bone crest to a more apical position, providing for sufficient coronal tooth structure for restoration, while allowing space for re-establishment of a new physiologic dentogingival dimension (biologic width).[11] The term biologic width is used to describe the junctional epithelium and connective tissue that attach to the root surface. Studies have indicated that the average lengths of the connective tissue attachment and junctional epithelium are 1.07 and 0.97 mm, respectively. Therefore the average length of the biologic width is about 2.04mm. The healthy gingival sulcus coronal to the junctional epithelium, which is not attached to the tooth surface, has an average depth of 0.69 mm.[12]

In contemporary practice, it generally is accepted that a 3-mm distance would significantly reduce the risk of periodontal attachment loss induced by subgingival restorative margins. Placing the restoration in close proximity to the osseous crest has been demonstrated in a human clinical study to induce chronic inflammation.[13] Moreover, results from an animal investigation involving histologic evaluation indicated that restorative margins impinging on the osseous crest may result in bone resorption and pocket formation.[14] A distance of at least 3 mm was maintained between the most apical extension of the restoration margin and the alveolar bone crest. This space allows sufficient room for the supracrestal collagen fibers that are part of the periodontal support mechanism, as well as providing a gingival crevice of 2 to 3 mm. If this guideline is used, the margin of the crown is finally positioned at its correct level, approximately halfway down the gingival crevice.[15]

The gingivectomy procedure was performed in the last case without reflection of flap and osseous resection procedure due to sufficient keratinized tissue and normal osseous crest relationship to CEJ. This procedure exposed more of the clinical crown and improved the appearance.

The final prosthesis was placed after a period of 8 weeks. Refinement of the tooth preparation should be performed 4 weeks later (8 to 10 weeks after the surgical procedure) as this will enable the proper placement of the margin of the restoration in relation to the new gingival sulcus.[3] Depending on the esthetic needs, the margin can be placed at the gingival crest or 0.5 mm into the healthy gingival sulcus. It does not have to be placed at the same level all around the tooth; a combination of supragingival, crestal and intracrevicular margins can be placed around the same tooth.[16]

Conclusion

Crown-lengthening is a viable option for facilitating restorative therapy or improving esthetic appearance. Surgical crown lengthening procedure with lowering of bone level is an effective technique that can be used to increase the height of clinical crowns in cases with reduced clinical crown heights for reestablishment of biologic width for placement of restorative margins.

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Use of Temporalis Fascia as an Interpositional Arthroplasty in Temporomandibular Joint Ankylosis – A Case Report

Kumar RA[1], Kumar S[2], Rastogi S[3], Kukreja P[3]

Abstract

Temporo-mandibular joint (TMJ) ankylosis is an extremely disabling affliction that causes problems in mastication, digestion, speech, appearance and hygiene. Surgery of TMJ ankylosis needs careful evaluation and planning to yield predictable results. Ankylosis may be corrected surgically by an array of procedures like gap arthroplasty, joint reconstruction and interpositional arthroplasty. Though many types of autogenous grafts and alloplastic materials are available for the interpositioning, the temporalis muscle graft offers significant advantages like ease of harvesting, minimal donor site morbidity and effective coverage of the arthroplasty site.

Key Words: Temporo-mandibular Joint Ankylosis, Interpositional Arthroplasty, TMJ Surgery, Temporalis Muscle, Temporal Fascia.

Introduction

Ankylosis of the temporomandibular joint (TMJ) involves fusion of the mandibular condyle to the base of the skull. When it occurs in a child, it can have devastating effects on the future growth and development of the jaws and teeth.[1] Furthermore, in many cases it has a profoundly negative influence on the psychosocialdevelopment of the patient, because of the obvious facial deformity, which worsens with growth.[2] Trauma and infection are the leading causes of ankylosis. However, in a young patient, a joint injury may not be noticed immediately. The first sign of a significant problem may be increasing limitation of jaw opening, usually noticed by the dentist. Pain is uncommon. Early diagnosis and treatment are crucial if the worst sequelae of this condition are to be avoided. Optimal results can be achieved only after a complete assessment and development of a long-term treatment plan.[3] We present a case report of TMJ ankylosis diagnosed and successfully treated in the early teen years.

Case Report

The male patient aged 12 years reported to the Department of Oral and Maxillofacial Surgery with chief complaint of limited mouth opening and difficulty in chewing since 7 years. On examination he had roundness and fullness, absence of condylar movement on left side. The preoperative interincisal mouth opening ranged between 5 mm with deviation of mandible towards left side (Fig. 1). CBCT showed enlargement of

Corresponding Author : Dr. Kumar Rakshak Anand, Senior Lecturer, Dept of Oral & Maxillofacial Surgery, ITS CDSR, Muradnagar, Ghaziabad. **(M)** 9711410024 **E-mail :** gr8doctor41@gmail.com

1. Senior Lecturer, Dept of Oral & Maxillofacial Surgery, ITS CDSR, Muradnagar, Ghaziabad.
2. Professor & Head, Dept of Oral & Maxillofacial Surgery, ITS CDSR, Muradnagar, Ghaziabad.
3. Readers, Dept of Oral & Maxillofacial Surgery, ITS CDSR, Muradnagar, Ghaziabad.

temporal and condylar components of left TMJ with an anterior exophytic condylar bone mass causing partial obliteration of left sigmoid notch (Fig. 2). Patient was operated using interpositional arthroplasty with temporalis fascia through Al-Kayat Bramley approach. The procedure was carried out under general anesthesia by fiberoptic nasotracheal intubation. Temporal head shave was done prior to surgery, after skin preparation. Al-Kayat and Bramley modified preauricular incision with temporal extension was placed and dissection was carried out in the subcutaneous plane to reach the superficial temporal fascia. After dissection of superficial temporal fascia with careful attention to superficial temporal artery, the dissection was carried in the loose areolar tissue, with care to the facial nerve. After reaching the zygomatic arch, the ankylotic mass was explored, after placement of a T-shaped incision, a minimum gap of 1.5 cm was created. The cut end of the ramus and glenoid area was smoothened using burs. The maximal interincisal opening was more than 34 mm, hence coronoidectomy was not required. The TMJ was lined using a combined temporalis muscle and fascia flap. We chose 6-7 cm as length and 2-3 cm as the width of the flap, however, the length of the flap was based on the requirement of the joint space (Fig. 3). The flap was rotated over the zygomatic arch and the flap was sutured medially, anteriorly and posteriorly with vicryl sutures. The wound was closed in layers. Physiotherapy was started from day 1, with active mouth opening exercises. (Fig. 4).

Fig. 1 : Pre Operative

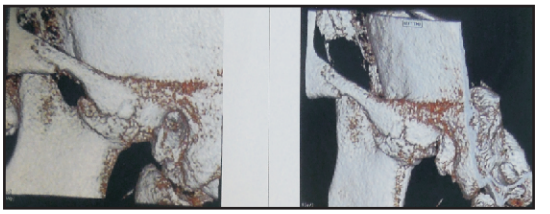

Fig. 2 : CBCT

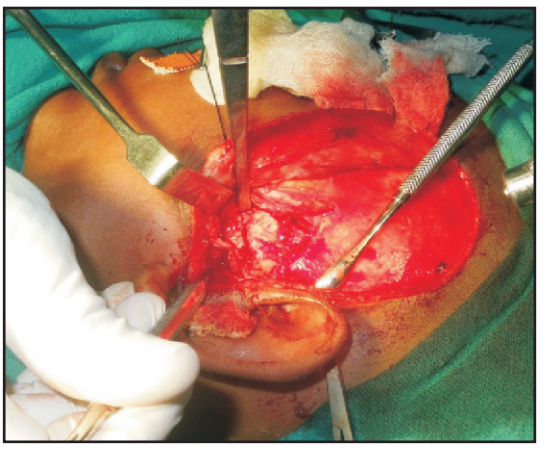

Fig. 3 : Intra- Operative

Fig. 4 : Post operative mouth opening

Discussion

Early ankylosis of TMJ in children can be a deterrent to normal mandibular growth. Therefore, early diagnosis of TMJ ankylosis and early surgical intervention is important.[3] Management of TMJ ankylosis is mainly performed through surgical intervention. Various techniques for the management of TMJ ankylosis have been described. However, no single technique has proved entirely satisfactory. The characteristic pathology of ankylosis is the formation of a bony mass, which replaces the articulation, resulting in restriction of mandibular movements. For this reason, treatment of TMJ ankylosis requires removal of a sufficient amount of bone to allow for free movement of the mandibular stump and interposition of some material between the remaining ramus and skull base.[4] It is necessary to use an interpositional material to prevent TMJ re-ankylosis after arthroplasty (or condylectomy). This particular aspect of the treatment has been the subject of numerous discussions. The use of various allogenic interpositional materials has led to serious complications, including foreign body reaction and migration.[5] Homografts, such as skin, temporalis muscle, or fascia lata, are considered as the material of choice for interposition.[6] In recent years, a pedicled temporalis myofascial or temporal fascia flap has been advocated in TMJ surgery to treat the TMJ ankylosis.[7] Advantages of these flaps in TMJ reconstruction include close proximity to the TMJ without involving an additional surgical site, adequate blood supply, autogenous origin, and maintenance of attachment to the coronoid process which provides movement of the flap during function, simulating physiologic action of the disc. Its proximity to the joint allows for a pedicled transfer of vascularized tissue into the joint area.[8] In this case a composite (fascia, muscle, and periosteum) axial flap was harvested, as described by Herbosa & Rotskoff (1990). The axial flaps were easily rotated inferiorly into the joint space. Rotation under the zygomatic arch prevents bulkiness and avoids the need for surgically reducing the thickness of the zygomatic arch, as suggested by Pogrel & Kaban (1990), when rotating the muscle over the arch.[9]

Conclusion

Interpositional arthroplasty using locally available temporalis muscle and fascia proves to be a valuable tool to fill the surgical defect and also to prevent recurrence. It also obviates the disadvantages of alloplastic materials as well as nonvascularized autogenous tissues.

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MSIs to Distalize the Entire Maxillary and Mandibular Arch in Borderline Cases: Two Case Reports

Gupta A[1], Gupta A[2], Chandna AK[3], Bhalla K[4]

Abstract

Bimaxillary protrusion has long been treated with the conventional approach of extraction of first premolars in both the upper and lower arches. But sometimes the patients refuse to undergo the extractions. And also in the borderline cases, the extractions can lead to the dished-in profile of the patient. In all these cases, distalization of the entire arch with the help of mini-screw implants can be a treatment alternative. Distalization of the upper or/and lower arch can also be used in class II and class III patients. The following are the two case reports showing distalization of the upper and lower arches with the help of mini-screw implants in the class I Bimaxillary protrusion patients.

Keywords- Distalization, Mini-screw Implants, Temporary Anchorage Devices

Introduction

Mini-screw implants (MSIs), often referred to as temporary anchorage devices (TADs), have become an accepted component of orthodontic treatment. Towards the end of 1980s, a number of clinicians focused on the use of mini implants for effective tooth movement. The use of mini-screw implants has added a new dimension in the field of Orthodontics and has enhanced the envelope of discrepancy. They are being used for various purposes like retraction, intrusion of anteriors as well as posterior teeth, distalization, mesialization, bodily movement, etc. by different authors. Recently, miniscrew implants and miniplates havebecome widely used to treat all types of malocclusions[1-4].The major advantage of these implants is that they make it possible to move multiple teeth without the loss of anchorage[5].

In borderline cases, the distalization of complete maxillary or/and mandibular arch can be a treatment alternative to decrease the protrusion of upper and lower lips instead of the conventional first premolar extractions.

Distalization of the entire arch aids in treating patients where the problem lies only in the dentoalveolar complex. The purpose of this article is to report two cases of Class I Bimaxillary malocclusion treated with distalization of both maxillary and mandibular arch.

Case Reports

Diagnosis and Etiology

Two patients with Class I Bimaxillary dentoalveolar protrusion are presented in this case report. The two cases had a very similar presentation of malocclusion. The pre-treatment facial photographs show convex profile with protrusive upper and lower lips. Nasolabial angle was acute. The pre-treatment intraoral photographs (Fig 1 & 2) demonstrate Class I molar and canine relationship with proclined upper and lower anteriors. In both the patients' hereditary basis of Bimaxillarydentoalveolar protrusion was

Corresponding Author : Dr. Ankur Gupta, P.G. Student, Department of Orthodontics, I.T.S Dental College, Hospital and Research Centre, Greater Noida, U.P E mail : ankur312002@gmail.com (M) 09873309899

1. Reader, Department of Orthodontics, I.T.S Dental College, Hospital and Research Centre, Greater Noida, U.P
2. P.G. Student, Department of Orthodontics, I.T.S Dental College, Hospital and Research Centre, Greater Noida, U.P
3. Professor and Head, Department of Orthodontics, I.T.S Dental College, Hospital and Research Centre, Greater Noida, U.P
4. Senior Lecturer, Department of Orthodontics, I.T.S Dental College, Hospital and Research Centre, Greater Noida, U.P

found.

Fig 1- Case 1-Pretreatment Intraoral

Fig 2 - Case 2- Pretreatment Intraoral

Lateral cephalometric evaluation suggested Class I Bimaxillary dentoalveolarprotrusion with acute nasolabial angle and protrusive upper, lower lips.

Panoramic radiograph showed normal morphology of condyle and mandible. All permanent teeth were present including the third molars.

Treatment Objectives

The treatment objectives are to decrease the bimaxillary protrusion, improve the facial esthetics and to maintain the buccal segment occlusion.

Treatment Alternatives

The two patients have both skeletal and dental Class I relationship with mild Bimaxillary protrusion. The conventional orthodontic treatment requires the extraction of maxillary and mandibular first premolar and decreasing the protrusion with a moderate type of anchorage. With aging, the lip droops down and it gives an aged appearance. So, the disadvantage of extracting first premolar is that it can lead to dished in profile on the long term basis.The second approach of treatment is to extract all the 3rd Molars and distalize the maxillary and mandibular arch using skeletal anchorage. The patient was presented with both the treatment alternatives and the advantages and disadvantages. It was decided to distalize the maxillary and mandibular arches using mini implants. Direct method involves the placement of implant distal to the second molars while indirect method involves placement of implant between the premolar and canine and distalization by placing the jigs.

Treatment Progress

Both the maxillary and mandibular arches were bonded with MBT 022 prescription. Initial levelling and alignment of both the arches were achieved by sequential wires of .014 inches NiTi, .019 X .025 NiTi. The extraction of 3rd molars was done after the levelling stage. After the extraction of 3rd molars, mini implants were placed in both the maxillary and mandibular arch for distalization. The retraction was done by .019 X .025 in SS wire. The method of distalization used in both the cases was different.

In the first case, the implants were placed on the external oblique ridge in the lower arch and on maxillary tuberosity in the upper arch. Direct force was applied for distalization by crimping the crimpable hooks on .019 X .0125 inch wire between the lateral incisor and canine. (Fig 3)

In the second case indirect method of distalization was used. The implant was

Fig 3- Case 1- Arch Distalization with Mini-Screw Implants

placed in between the maxillary and mandibular second premolars and first molars in all the quadrants. And the force was directed towards the molars by using the jigs and coil spring. (Fig 4 & 5)

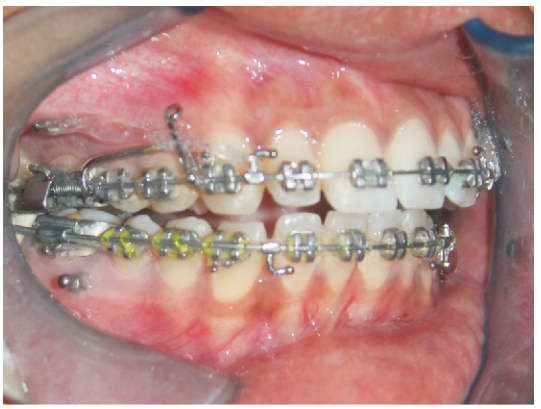

Fig 4 – Case 2- Right Lateral View, Arch Distalization with Mini-Screw Implants

Fig 5- Case 2- Left Lateral View, Arch Distalization with Mini-Screw Implants

Discussion

Numerous extraoral and intraoral modalities have been proposed for distalizing maxillary molars[6-18] and few have been reported for mandibular molars[2-4]. Each technique has a disadvantage of the need for patient cooperation, tipping movement, anchorage loss, and flaring of the incisors. Moreover, it is very difficult to distalize the complete arch. With the advent of mini-implants in Orthodontics, new innovations and techniques are possible. The skeletal anchorage provides absolute anchorage which is required for distalization of complete arch. In this case reports, both indirect method and direct method for distalization was used.

Thus, an alternative approach of distalizing the complete arch as well as treating the class I bimaxillary protrusion cases has been presented.

Conclusion

These case reports describe an alternative treatment approach for bimaxillary dentoalveolar protrusion. This alternative treatment involves the use of temporary anchorage devices in the maxillary and mandibular arches for distalization of the complete arch.

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Bite Registration Made Simpler-A Case Report

Gupta A[1], Chandna AK[2], Singla A[3], Puri A[3]

Abstract

Class II malocclusion is a major reason that patients seek orthodontic treatment. In growing patients with retrognathic mandible, myofunctional appliances are the treatment of choice. Use of removable functional appliances requires bite registration which demands a lot of precision on the part of orthodontist. However, during bite registration, vertical bite opening is a little difficult to record in comparison with sagittal advancement. The following article demonstrates a method to precisely record the bite for fuctional appliances, simultaneously making it comfortable to the patient.

Keywords: Bite registration, Class II, Functional appliances.

Introduction

Bite registration is a crucial factor in design and construction of functional appliances and demands a lot of precision and care on the part of clinician. Taken correctly, it is the most important factor in the success of functional appliance therapy.[1]

Patient is generally trained before registering bite to bring the mandible in correct sagittal relationship with maxilla. However vertical bite opening is a little difficult for the patient to remember.

In an ideal Class II skeletal case where overjet is around 7-8 mm, advancing the mandible in an edge to edge bite provides the required vertical opening as well as anterior vertical stop. Also, for such cases stops like exactobites[2] have been prepared which provide the necessary 2mm interincisal opening anteriorly. However in a case with pronounced overjet where stepwise advancement of mandible has to be done, such anterior vertical stop is not there.

If a stop is prepared for the lower incisors to rest on during mandibular closure from postural rest position (when the bite is being registered), it can become a lot easier to register a correct construction bite.

Clinical Technique

In this particular clinical technique, we have described a simpler methodology to prepare a vertical stop during construction bite registration

1. After training the patient for correct sagittal positioning of mandible, place a small piece of wax, 3-4 layered thick, which should lie on the anterior palatal area & cingulum area of upper teeth and ask the patient to bite on it for initial recording of vertical opening and horizontal advancement (*Fig 1*). The accuracy of horizontal advancement and vertical opening can be easily viewed in the posterior segment as there is no wax obstructing the vision posteriorly.

Corresponding Author : Dr. Anshul Singla, Senior lecturer, Department of Orthodontics, I.T.S Dental College, Hospital and Research Centre, Greater Noida, U.P **E mail** : dr.anshul@yahoo.co.in **(M)** +91-9871455802

1. Reader, Department of Orthodontics, I.T.S Dental College, Hospital and Research Centre, Greater Noida, U.P
2. Professor and Head, Department of Orthodontics, I.T.S Dental College, Hospital and Research Centre, Greater Noida, U.P
3. Senior Lecturers, Department of Orthodontics, I.T.S Dental College, Hospital and Research Centre, Greater Noida, U.P

Fig 1 – Small wax piece for bite registration

2. Take out the wax bite and cut it into two vertical halves exactly in the middle of the region of lower incisor indentations on the bite. Measure the vertical distance which extends from the superior surface of lower incisal edge to the superior surface of the bite which contacts the anterior palatal region. This distance determines the vertical bite opening of functional appliance anteriorly. Measure this distance accurately (*Fig2*).

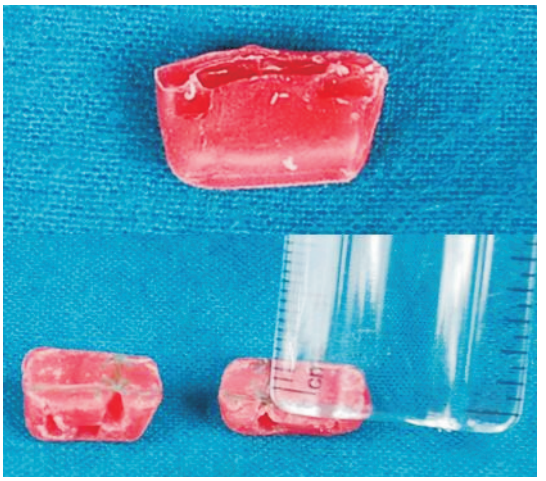

Fig 2 – Measuring vertical bite opening

3. In this technique a plastic syringe cap., which is very widely available, has been used to prepare a vertical stop. Cut out a small cylinder with the help of a diamond disc out of the syringe cap of the same length as measured in the previous step (*Fig, 3*). Make two grooves in the middle of this vertical stop for horizontal guidance.

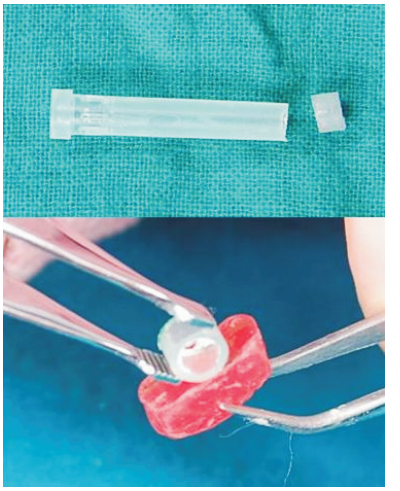

Fig 3- Measured cut out from plastic syringe cap to form vertical stop

4. Now fabricate a W shaped wax occlusal rim on the upper arch which extends to the anterior palatal region where lower incisal edges will contact. Soften the wax in the anterior region where the lower incisors will contact during bite registration and embed the obtained vertical stop in that region (*Fig 4*).

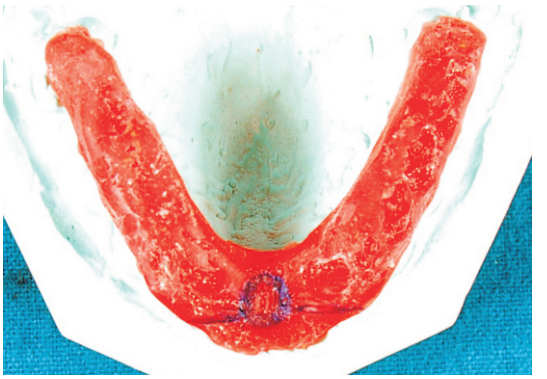

Fig 4- Vertical stop embedded in wax bite

The vertical stop should be completely cleared off the wax from the occlusal surface so that it is visible and the grooves

made on the stop should be extended to the wax rim on both sides with the help of an indelible marker. These markings will serve as horizontal guidance to position mandible anteriorly.

5. Soften the rim by heating it and place it in the patient's mouth.
6. Ask the patient to move the mandible anteriorly (as trained) to the mark made on the occlusal rim for horizontal guidance and to bite slowly on the occlusal rim till a resistance is felt (*Fig 5*). This resistance is provided by the vertical stop and it automatically provides the desired vertical opening.

Fig 5- wax bite with desired sagittal advancement and vertical opening

7. The bite now obtained will have the anterior vertical bite opening of the same length as the vertical stop prepared.

Conclusion

Thus, with the correct sagittal advancement of mandible and correct placement of the stop in the occlusal rim, an accurate construction bite can be attained easily.

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Achieving Predictable Esthetics in Smile Design – *Going the Digital Way*

Mehra P[1], Bhargava A[2], Gupta S[3]

The backbone of any indirect restorative procedure in dental practice is the efficiency of communication between the restorative dentist and the dental lab. However this communication is not always easy to achieve. There are still a number of gaps in the typical doctor-technician communication process. The dental surgeon might miss helpful information in their instructions. On the laboratory side, some dental technicians might struggle with effectively conveying the dental surgeon the information required by them[1].

The high esthetic demands of patients in current times tests the communication skills between doctors and their dental technicians. Patients expect a smooth process in the dental office with highly aesthetic results. These factors make importance of communication between the dentist and the laboratory even more pertinent.

In this era of digitalization, more and more dental labs are upgrading their technology. This has witnessed an increase in milled technology (CAD-CAM) in various fields like crowns and bridges, inlay and onlays, laminates, implant frameworks and even milled complete dentures.[2]

The restorative dentist should take maximum advantage of these designing softwares to convince patients more efficiently and provide better care.

Steps in CAD Designing for Predictable Anterior Esthetics (exocad Dental CAD GmbH, Germany)

1. Diagnostic impressions of both arches are made in elastomeric impression material to obtain multiple models of both arches.
2. Record the bite of the patient with bite registration material preferably silicone based.
3. Mock preparation of the abutments is done on the diagnostic model.
4. Send the prepared diagnostic model along with the bite record to the lab.
5. The lab scans both the models as well as the bite and virtually articulates it by software (Figure 1).
6. The lab designs the restoration on CAD and mails the file to the dentist. (Figure 2)
7. The dentist can suggest any changes in form if required.
8. This file can be mailed to the patient and also a coloured print out can be given.

Figure 1: Scanned diagnostic model with mock preparation of abutments

Corresponding Author : Dr Praful Mehra, Senior Lecturer, Dept of Prosthodontics, I.T.S Centre for Dental Studies & Research, Delhi-Meerut Road, Muradnagar – 201206, Ghaziabad (Uttar Pradesh) **(M)** +91-9811311171 **E mail :** dr.prafulmehra@gmail.com

1. Senior Lecturer, Dept of Prosthodontics, I.T.S Centre for Dental Studies & Research, Delhi Meerut Road, Muradnagar – 201206, Ghaziabad (Uttar Pradesh)
2. Professor & Head, Dept of Prosthodontics, I.T.S Centre for Dental Studies & Research, Delhi Meerut Road, Muradnagar – 201206, Ghaziabad (Uttar Pradesh)
3. Professor, Dept of Prosthodontics, I.T.S Centre for Dental Studies & Research, Delhi Meerut Road, Muradnagar – 201206, Ghaziabad (Uttar Pradesh)

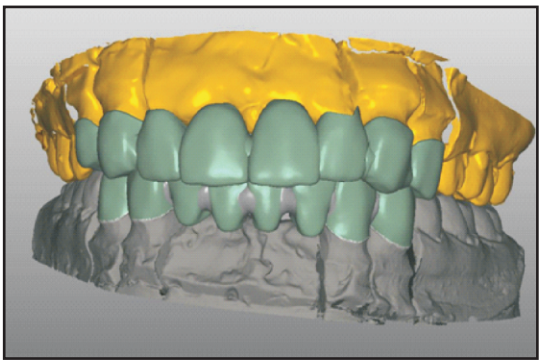

Figure 2: Computer Aided Design (CAD) of the prosthesis

9. The approved restoration can be fabricated in millable Poly methyl meth acrylate (PMMA) blocks.
10. This virtually planned restoration can be shown to the patient in physical form before any other procedure is done and suggestions of patient can be considered.
11. The CAD – CAM fabricated PMMA prosthesis can be used as provisional restoration and also aids in tooth preparation of the abutments.
12. This clears the doubts of the patient and eliminates the fear regarding the form of anterior esthetics that the he/ she will receive (Table 1).

Conclusion :

Every dental surgeon practicing restorative dentistry strives to deliver an esthetic prosthesis. However the patient might have different expectations and may require a few modifications. By working as a team, and utilizing digital tools designed to facilitate collaboration, dentists and dental technicians can provide patients with the best in restorative outcomes.

Acknowledgement:

The authors sincerely acknowledge the support of ***DentCeram International Laboratory, New Delhi*** *for helping in Computer Aided Designing (CAD)*

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Table 1 : Advantages of Digital Planning

FOR DENTIST	FOR THE PATIENT	FOR THE DENTAL LAB
Better restoration design	Can visualize the restoration prior to any procedure	Better communication with the dentist ensuring his faith
Ease in patient convincing	Can give suggestions for any particular change desired	The lab knows what the dentist and patient desires
The dentist knows what lab will deliver	Cost effective and time efficient	Lessens repetitions as everything is preapproved

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Dr. Hari Parkash
Director General, Editor-in-Chief
I.T.S Centre for Dental Studies & Research,
Delhi-Meerut Road, Murad Nagar,
Ghaziabad, India, 201206
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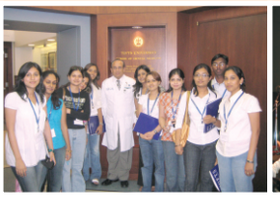

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Has a total experience of 36 years in the field of Dental Education, Practice and Research. He has served around the world with distinction with the Indian Armed Forces for over 2 decades. He is an invited faculty at Leeds Dental Institute, UK and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

Dr. Puneet Ahuja is the Principal of the College.

College OPD: The Out Patient Department (OPD) is a life line of any educational institute and the college boasts of a daily OPD more than 400 to 450 patients. The OPD is equipped with state-of-the-art equipment for diagnosis and treatment. The college has also established three satellite clinics at Village Ghodi Baccheda, Kasna and Noida.

Our students perform better: Kriti Puri got gold medal for securing fist 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 a collaboration with University of Leeds (U.K) for student exchange programme.

Greater Noida

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
- Three Dental Satellite Clinics
- 450 patients treated everyday
- Round the clock internet & Wi-Fi connectivity
- Free treatment & transport to poor patients

MDS
27 seats
in all nine specialities

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(Bachelor of Dental Surgery)
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