

DENTAL JOURNAL OF

INDIRA GANDHI INSTITUTE OF MEDICAL SCIENCES

DJIGIMS | VOLUME-02 | ISSUE NO. 01 | JAN. – FEB. 2023



AN OFFICIAL PUBLICATION OF THE
INDIRA GANDHI INSTITUTE OF MEDICAL SCIENCES, PATNA (INDIA)

(An Autonomous Institute of Govt. of Bihar-University established under the state legislation, Bihar act no. 10, 1984)

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OFFICIAL PUBLICATION OF INDIRA GANDHI INSTITUTE OF MEDICAL SCIENCES, PATNA, BIHAR, (INDIA)
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An official publication of Indira Gandhi Institute of Medical Sciences, Patna, Bihar, (India)

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Prof. (Dr.) Bindey Kumar
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Foreword

Greetings from IGIMS;

Dental Journal of the Indira Gandhi Institute of Medical Sciences (DJIGIMS), Volume-2 Issue-1, is headed towards publication by the Post Graduation Institute of Dental Education and Research, which is a matter of great pleasure and pride. I am confident that this issue will reflect the great advancement in the various subfields of dental sciences that have taken place since the publication of the last issue. I also have a lot of hope that the publishing of this journal would help significantly widen knowledge for many doctors, academicians and students seeking safe and efficient dental practices. I would like to take this opportunity to congratulate the Editorial Chairman, Editor-In-Chief, Journal Committee Members / Advisory Board Members and all the authors for their tremendous dedication and contribution.

I convey everyone my warmest greetings!

A handwritten signature in blue ink, appearing to read 'B Kumar', with a horizontal line underneath.

Prof. (Dr.) Bindey Kumar
Director, IGIMS
Chief Patron, DJIGIMS, Patna





Prof. (Dr.) A.K. Sharma
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From the Pen of Editorial Chairman

We are delighted to present Vol2 issue 1 of DJIGIMS . Publication of an article gives relaxation, feeling of self satisfaction and peace to the authors.

श्रद्धावाँल्लभते ज्ञानं तत्परः संयतेन्द्रियः।

ज्ञानं लब्ध्वा परां शान्तिमचिरेणाधिगच्छति।।

A person who is full of faith, who is devoted to it and who has subdued the senses, obtains knowledge. One who obtain the knowledge she/he attains its owns to the supreme peace. I congratulate the authors & Editorial team for their efforts & imitation of knowledge

Prof. (Dr.) A.K. Sharma
Editorial Chairman, DJIGIMS, Patna





Dr. Nimmi Singh

Associate Professor, (OMR)
PGIDER, IGIMS, Patna

From the Pen of Editor in Chief

Two years ago, a new initiative was launched by Post Graduate Institute of Dental Education & Research, Indira Gandhi Institute of Medical Sciences. This was in the form of their first Dental Journal. I am proud to say that this successful project worked upon by many is now ready for its second volume. A successful venture like the DJIGIMS has been brought to life by the efforts of multiple groups and for that, I would firstly thank the Editorial Team for being the backbone. I am also grateful to the authors and researchers who contributed their studies to this journal in order to make information and educational research available nationwide on this platform. They have created innovations, modern technologies, found new and safe methodologies and put their findings out to make the field of Dentistry safer and efficient. I hope the hard work and brilliance continues to push the DJIGIMS to greater successes and that it provides to all in the field of Dentistry what we at IGIMS dreamed it to.

Dr. Nimmi Singh

Editor in Chief, DJIGIMS, Patna







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RAE ENDOTRACHEAL TUBES SIZES FOR CHILDREN UNDERGOING CLEFT LIP AND PALATE SURGERY.

Ravi Anand¹, Ganesh Kumar Ram², Nitin Kumar³, Siddharth Singh⁴

ABSTRACT:

Background: Appropriate sizes (internal diameters) of RAE endotracheal tubes in children with cleft lip and palate, who generally have delayed growth and development in early infancy have not been explained.

Objectives: The aim of the current study was to identify the proper size of REA endotracheal tube for intubation used for cleft lip and palate surgery and intubation outcomes in these patients.

Material and methods: 60 cleft lip and palate patients were selected for analytic cross-sectional study. The proper tube size was determined by normal children formula. Then tube size was confirmed by patients' minimum resistance to intubation, proper ventilation, and appropriate air leakage at an airway pressure of 15-20 cm H₂O. Number of attempts of intubation and the largest endotracheal tube size were recorded.

Results: The average age, weight and height of patients were 22.40±4.85 months, 9.88±1.28 kg, 72.40±24.50 cm respectively. The average RAE endotracheal tube size and frequency of intubation trials were 4.25±0.78 and 1.62±0.70, respectively. 6 cases required RAE endotracheal tube size smaller than the recommended size.

Conclusions: In cleft lip and plate child, the predicted RAE endotracheal tube size was similar to standard normal child tube size. Smaller RAE tube size was required for subglottic stenosis.

KEYWORDS: Children; REA endotracheal tube; cleft lip and palate; general anaesthesia.

INTRODUCTION:

Cleft lips and palates surgeries are the most common birth deformities corrective surgeries.¹ Cleft lip deformities occur with the second highest incidence among Asians (2.1 in 1000) and the highest among Native Americans (3.6 in 1000 births). However, it has the lowest incidence in blacks (0.41 in 1000)². The incidence of cleft palate does not differ among ethnic groups and is reported as 0.5 in 1000 live births. These clefts are associated with other multiple anomalies. More than one hundred syndromes are described in association with cleft lip and palate but fortunately, they are very rare³. Few more common anomalies associated with cleft lip and palates are Pierre Robin syndrome, micrognathia, glossoptosis, Treacher Collins, and Klippel Feil.⁴

The cleft lip and palate children faces many difficulties during drinking and eating. They also have breathing problems, improper dental development, facial beauty

problems, psychological problems and oral and listening deficiencies, which eventually cause death if not treated. Therefore, patients are more concerned for surgery as soon as possible. Cleft lip and palate repair surgery and their anaesthetic management, both are challenging for the surgeon and the anaesthesiologist⁵. Anaesthetic management for cleft lip and palate surgery is complicated and difficult intubation is reported from 4.7 to 8.4% of the patients⁶⁻⁸.

Difficulties decrease with increasing age⁹. Contrary to these finding, Kohtijani et al. standard normal children endotracheal tube size was advised for cleft lip/palate patients¹⁰. The of this study was to identify the proper size of RAE endotracheal tube in intubation for cleft lip and palate patients and their outcomes.

METHODS:

In this analytic cross-sectional study, 63 cleft lip and/or palate patients were selected for corrective surgery for cleft lip and palate at Indira Gandhi Institute of Medical Sciences, Patna between November 2020 to May 2022. Inclusion criteria were unilateral/ bilateral cleft lip, unilateral/ bilateral cleft

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palate, combined cleft lip and palate of age group of 10 weeks to 6 years of either sex. The exclusion criteria were previous history of intubation for a long time, history of ICU admission and presence of syndromic features. Demographic findings, surgical history and admission, other anomalies were reported. All patients underwent surgery under general anesthesia after proper written consent from parent. Intubation was performed by single anesthesiologist to prevent any bias. Frequency of intubation trials and the largest endotracheal tube size were recorded for all patients. Proper tube size was defined by the Cole formula ($\text{age}/4 + 4$) for RAE endotracheal tubes without cuff, the Motoyama formula ($\text{age}/4 + 3.5$) for RAE cuffed endotracheal tubes in two-year children or older, and the Khine formula ($\text{age}/4 + 3.0$) for cuffed endotracheal tubes in children younger than two. The proper size was confirmed with their minimum resistance to intubation, proper ventilation reported by anesthesiologist and an appropriate air leakage at an airway pressure of 15-20 cm H₂O. After failed intubation, smaller size of endotracheal tube would be tried. Number of attempts of intubation and the largest endotracheal tube size were recorded.¹¹

RESULTS:

Sixty cleft lip/palate patients were enrolled in this study. Of them 35 patients or 58.3% were male and 25 patients or 41.67% were female. Their age average was 22.40 ± 4.85 months, with 2.5 month for the youngest and 72 months for the eldest. The average weight, height and head circumference under operation were 9.88 ± 1.28 kg, 72.40 ± 24.50 cm and 44.11 ± 5.81 , respectively. Demographic data shown in Table 1. The unilateral cleft lip (23.33%) and bilateral cleft palate (28.33%) were the commonest types of cleft. The complete cleft was found in 28 cases (46.7%) and incomplete cleft was found in 32 cases (53.3%). The incidence of different variations of cleft is shown in Table 2. Associated anomaly was reported in 16 patients (26.66%), among them the cardiac anomaly was the commonest (6 patients out of 16) with ASD in 3 patients, Tricuspid regurgitation in 2 and VSD in 1 patient. The history of previous surgery was positive in 12 cases (20.0%). The

average size of the REA endotracheal tube was 4.25 ± 0.78 with the average of 4. The range of from 3.5 to 6. The average of the normal endotracheal tube for the same age was 4.37 ± 0.76 with the average of 4. The average of intubation trials was 1.62 ± 0.70 with the mean of 1. The range of intubation trials was 1-3. Only 1 trial in 30 cases (50%), 2 trials in 18 cases (30%) and 3 trials for 12 cases (20%) of patients were recorded. Twenty cuffed endotracheal tubes (33.3%) and forty without cuff (66.6%) were used in this study. Considering the size of REA endotracheal tubes, in 6 cases (10%) the subglottic stenosis was observed which was associated with the smaller size of the REA endotracheal tube. No air leakage was reported in 20 cm underwater, while in 6 cases (10%), ventilation pressure was observed in above 30 cm. In 6 cases with subglottic stenosis, 2 (33.3%) was observed in unilateral cleft palate, 2 (33.3%) in unilateral cleft lip, 1 (16.65%) in unilateral cleft lip and palate, and one case (16.65%) were in bilateral cleft lip and palate. Subglottic stenosis was mostly found in unilateral cleft lip and palate patients, however difference was not significant. The subglottic stenosis was reported in one patient out of 14 (7.1%) with surgical history, and in six patients out of 46 (13%) with no surgical history. The presence of subglottic stenosis in patients with no surgical history was not significant (p -value = 0.88). The average intubation trials in patients with subglottic stenosis were $78/0 \pm 72/1$. The average intubation trials in patients without subglottic stenosis were $83/0 \pm 63/1$. There was no significant difference found between these two groups (p -value = 0.77). In Table 3, different REA endotracheal tube sizes were presented. Table 3 shows the largest size of RAE endotracheal tube in unilateral cleft lip and bilateral cleft palate and these might be due to the age difference.

Table 1: Demographic data.

	Mean±SD or n
Age (in months)	22.40±4.85
Gender (Male/Female)	35/25
Weight (in Kg)	9.88±1.28
Height (in cm)	72.40±24.50
Head Circumference	44.11±5.81



Table 2 Frequency of cleft lip and palate types

Deformity type	No. of patients	Percent (%)
Unilateral cleft lip	14	23.33
Bilateral cleft lip	5	8.33
Unilateral cleft palate	8	13.33
Bilateral cleft palate	17	28.33
Unilateral cleft lip and palate	5	8.33
Bilateral cleft lip and palate	11	18.33

Table 3 The REA endotracheal tube sizes in different clefts

	Mean	SD	95% IC		Min	Max
			Lower bound	Upper bound		
Unilateral cleft lip	4.37	0.76	3.87	5.68	3.50	6
Bilateral cleft lip	4.48	0.51	4.01	4.57	3.50	5
Unilateral cleft palate	4.82	0.61	4.06	5.45	4	5.5
Bilateral cleft palate	5.27	1.86	2.47	6.38	4	6
Unilateral cleft lip and palate	4.30	0.77	3.41	5.46	3.50	5.5
Bilateral cleft lip and palate	4.18	0.37	3.75	4.31	3.50	4.5

DISCUSSION:

Cleft lip and palate patients need early surgical management. In these patients, identifying appropriate size of RAE endotracheal tubes is difficult due to varying degree of delayed growth and development in early infancy and its association with subglottic stenosis and other anomalies. Cleft lip and palate are the most common congenital anomalies of facial area. Anaesthetic management for cleft lip and palate surgeries poses difficulties in intubation^{3,5}. The congenital anomalies with medical conditions and subglottic stenosis also responsible for difficult anesthesia.¹¹ In this study, 60 cleft lip and palate patient with the average age of 21.39 months of age were investigated. The average of the RAE endotracheal tube size and the frequency of the intubation trials were 4.37 ± 0.76 and 1.63 ± 0.8 , respectively. The minimum trial was one, however the maximum trials was 3. Difficult intubation was found in 40% of the patients. No intubation failure was detected. This finding was different from the findings of Adenekan et al. who reported one intubation failure

and only one difficult intubation¹². Desalu et al. observed 2% intubation failure and 2% difficult intubation in their study¹³. The narrowest airway is the subglottis in children.^{14,15}

In the current study, subglottic stenosis was found in 6 (10%) cleft lip and palate children including 2 case in unilateral cleft palate, 2 cases in unilateral cleft lip, 1 case in unilateral cleft lip and palate, and 1 cases in bilateral cleft lip and palate. In this study, only nonsyndromic patients were included, thus overall rate of subglottic stenosis in cleft lip and palate is more than this result. Similarly, Knapp et al. the subglottic stenosis in five patients (33%) was associated to Pierre Robin syndrome which one of its triad is cleft palate¹⁶. In children associated to anomalies, the subglottic stenosis is commonly seen and increases with age. Accordingly, the RAE endotracheal tube size and type can be different from the normal children. Knapp et al observed 73% of the patients required smaller tracheal tubes than usually used for normal children of same age and sex group¹⁶. In the current study, however, only 6 out of 60 children (10%) needed smaller tracheal tubes than those usually used for normal children of similar age and sex. The bilateral cleft have more developing defects like laryngeal anomalies. Although result was not significant, 5 of them had unilateral cleft versus 2 with bilateral cleft. Limitations are selection bias, small sample size and excluding syndromic patients which associate more frequently with bilateral cleft. Our findings were similar to the findings of Kohjitani et al. who studied 236 cleft lip and cleft palate patient and did not report any cases of smaller tracheal tubes used from those used in normal children of similar age and sex.¹⁰

CONCLUSION:

In cleft lip and plate child, the predicted RAE endotracheal tube size was similar to standard normal child tube size. However, in syndromic child, where incidence of subglottic stenosis is high, requires smaller RAE tube size than normal predicted size. This study was restricted to a small sample of patients with limited range of age. Further study with larger sample size is required for proper guidelines for intubation in



cleft lip and palate patients.

Conflict of interest: Nil

Financial support: Nil.

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NICOTINE DEPENDANCE IN LIGHT OF STRESS: UNSEEN ENEMY IS ALWAYS THE MOST FEARSOME!

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ABSTRACT:

Context: The estimated number of tobacco users both smoked and smokeless forms is escalating at alarming rates in South-east Asian countries especially India. Likewise neuro-psychiatric disorder is an unheralded public health crisis worldwide. Perceived stress may be regarded as fearsome unseen enemy executing backstage role in tobacco addiction.

Aims: To assess the nicotine dependence and stress in tobacco chewers. Further to investigate correlation between stress and nicotine dependence among patients visiting in dental school in India.

Methods and Material: This prospective, cross sectional study was based on self administered questionnaires. The study population included 35 patients with tobacco chewing habit. Perceived stress was measured by the Perceived Stress Scale (PSS-10). The Fagerström Test for Nicotine Dependence- Smokeless Tobacco (FTND-ST) was used to measure nicotine dependence. Further correlation between perceived stress and nicotine dependence was analysed.

Results: The data so obtained was tabulated and subjected to statistical analysis using the statistical package of social sciences 25.0 software (SPSS Inc., Chicago IL). Chi-square test was applied and binary logistic regression model was calculated using all socio demographic variables. In the present study, the subjects with moderate stress had a positive association with nicotine dependency

Conclusions: This study illustrate that perceived stress is associated with nicotine dependence. Chewing has been found to act as a stress reliever as well as being associated with uncontrollable social and economic stressors disproportionately affecting all.

KEYWORDS: Perceived stress, Nicotine dependence, Motivational interviewing, Tobacco addiction, Fagerström Test Nicotine Dependence- Smokeless Tobacco (FTND-ST) , Perceived Stress Scale (PSS-10).

INTRODUCTION:

Tobacco abuse is a serious health challenge around the world. It has transformed into an epidemic resulting in enormous disability, disease and death. The tobacco epidemic is one of the biggest health threats today. It kills about 8 million people a year, including around 1.2 million deaths from exposure to

second-hand smoke. In 2020, 22.3% of world population used tobacco, 36.7% of men and 7.8% of the women.

The tobacco situation in India is complicated than any other country in the world with availability of diverse smoking and smokeless tobacco products. According to the Global Adult Tobacco Survey, the prevalence of tobacco use among males in India is 48% compared with 20% among females. It is estimated that more than one-third (35%) of adults in India use tobacco in some form or the other.²

Tobacco is foremost cause of preventable mortality and morbidity in the majority of developing countries. It is associated with wide spectrum of diseases such as cancers, cardiovascular diseases, strokes, and pulmonary diseases. Nicotine is highly addictive, stimulant alkaloid present in tobacco. Nicotine

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dependence comprises tolerance, sensitization, physical dependence, and psychological dependence.³

The United Nations, WHO and the World Bank have called the existing prevalence rate of neuro-psychiatric disorder approaching 1 in 4 individuals worldwide as 'unheralded public health crisis'.⁴ Improving mental health is of critical importance to the nation's health, and to the management of long-term health conditions. Perceived stress may be linked to addiction through several mechanisms. One proposed mechanism of Nicotine dependence is by its influence on self control. People who would like to quit, but are exposed to high levels of psychological stress, may have an insufficient capacity to control their cravings. Therefore the degree of nicotine dependence elucidate perceived stress.¹

SUBJECTS AND METHODS:

This cross sectional, descriptive study, designed in accordance with Helsinki's guidelines, was conducted in the Oral Medicine and Radiology Department of a dental school in India, after obtaining ethical clearance from the institutional ethical committee. This study was designed to assess the nicotine dependence and stress in tobacco chewers. Further correlation between stress and nicotine dependence in tobacco chewer was analysed. A total of 35 patients with tobacco chewing habit were given two self administered Questionnaires. Patients willing to participate and ready for follow-up visits were only included. A prior written informed consent was also obtained and confidentiality was assured. The questionnaire assessed the nicotine dependence and stress in patients separately. The Nicotine dependence was measured using the Fagerström Test for Nicotine Dependence (FTND) -Smokeless Tobacco (FTND-ST).⁵ Stress was assessed using the Perceived Stress Scale (PSS-10).^{6,7}

Patients aged 18 years or above with tobacco chewing habit history of 1 year or more were included in the study. Patients with multiple habits like smoking, alcohol, drugs were excluded. Patients who were mentally unstable or cognitively impaired were

excluded. A structured questionnaire was used to collect the following information: (i) socio-demographic variables: age, gender, marital status, education, monthly household income, number of people living together; (ii) health-related variables: perceived health, cessation advice by any medical professional, severe/chronic illness, mental illness; (iii) tobacco related variables: age started tobacco, years of tobacco chewing, cohabitation with another chewer, number of times chewing per day, previous quit attempt, number of previous quit attempts, time of last attempt, reason to quit, high-risk situation; (iv) psychosocial variables: self-perceived stress, self-perceived depression, difficulty and confidence in quitting. Thereafter, each participant was given 10 minutes time to fill the two questionnaires FTND-ST and PSS-10. Completed forms and the questionnaires were thoroughly validated. The data so obtained was tabulated and subjected to statistical analysis using the statistical package of social sciences 25.0 software (SPSS Inc., Chicago IL). Chi-square test was applied and binary logistic regression model was calculated using all socio demographic variables. All reported probability values (p values) are based on two-sided tests and compared to a significance level of 5%.

All patients received counselling, and pharmacotherapy was prescribed if needed. An average of four face-to-face counselling sessions were conducted over the first 8-week intensive treatment phase by doctors who were all trained in tobacco cessation counselling. Phone follow-up and counselling were also offered during the treatment phase and between. The stage of change theory⁸ and motivational interviewing techniques⁹ were adopted. The medications included nicotine replacement therapy (NRT) and non-NRT. The former included nicotine patches, gum, lozenges, and inhalers. Oral medications included varenicline (12 weeks, 1mg, twice per day) and bupropion (12 weeks, 150mg, twice per day). Medications were prescribed according to the patients personal preference and clinical conditions.



RESULTS:

The study comprised of total 35 adult patients (30 males and 5 females) with habit of tobacco chewing. The mean age of the patients was 35.9 years. The data analysis was done using the statistical package of social sciences 25.0 software (SPSS Inc., Chicago

IL). Chi-square test was applied and binary logistic regression model was calculated using all socio demographic variables. All reported probability values (p values) are based on two-sided tests and compared to a significance level of 5%.

Table 1 illustrates the stress among study subjects using perceived stress scale who were tobacco chewers and visited our dental care unit. About 65% of the study subjects in various age groups were found to be moderately stressed. Overall about 37% of the stressed subjects were in the age group of 25-34 years.

VARIABLES AGE GROUPS	PSS-10 (n %)			X 2	p-VALUE	TOTAL (n%)
	LOW(0-13)	MODERATE(14-26)	HIGH (27-40)			
18-24	2 (5.7%)	4 (11.4%)	0 (0.0%)	2.70	0.952	06 (17.2%)
25-34	5 (14.2%)	7 (20.0%)	1 (2.8%)			13 (37.2%)
35-44	2 (5.7%)	5 (14.2%)	0 (0.0%)			7 (20.0%)
45-54	1 (2.8%)	4 (11.4%)	0 (0.0%)			5 (14.2%)
55 & above	1 (2.8%)	3 (8.5%)	0 (0.0%)			4 (11.4%)
Total	11 (31.4%)	23 (65.8%)	1 (2.8%)			35(100%)

TABLE 1- DISTRIBUTION OF STUDY SUBJECTS BASED ON PSS-10.

Table-2 depicts the nicotine dependence among the study subjects who were tobacco chewers and visited our dental care unit. The p-value was found to be statistically significant in the various age groups of the nicotine dependent subjects. About 11% of the study subjects had low nicotine dependency further 20% of the study subjects had moderate nicotine dependency and about 68% of the study subjects had high/very high nicotine dependency. Finally 37% of the nicotine dependant subjects were found to be in the age group of 25-34 years.

VARIABLES AGE GROUPS	PSS-10 (n %)			X 2	p-VALUE	TOTAL (n%)
	LOW(0-13)	MODERATE(14-26)	HIGH (27-40)			
18-24	1 (2.8%)	4 (11.4%)	1 (0.0%)	21.9	0.005*	06 (17.2%)
25-34	0 (0.0%)	1 (2.8%)	12 (34.2%)			13 (37.2%)
35-44	3 (8.5%)	1 (2.8%)	3 (8.5%)			7 (20.0%)
45-54	0 (0.0%)	1 (2.8%)	4 (11.0%)			5 (14.2%)
55 & above	0 (0.0%)	0 (0.0%)	4 (11.0%)			4 (11.4%)
Total	04 (11.4%)	07(20.0%)	24 (68.5%)			35(100%)

*Statistically significant

TABLE 2-DISTRIBUTION OF NICOTINE DEPENDENCE AMONG STUDY SUBJECTS.

Table-3 describes the correlation of stress in nicotine dependent study subjects. About 11% of nicotine dependant subjects had low stress levels. Further 20% of nicotine dependant subjects had moderate stress and 68% of nicotine dependant subjects had high/very high stress. Overall 65% of the total nicotine dependent subjects were moderately stressed.

VARIABLES PSS	Nicot Depend (n%) (FTND-ST)			X2	p-VALUE	TOTAL (n%)
	VERY LOW/LOW(0-4)	MEDIUM(5)	HIGH/VERY HIGH (6-10)			
LOW	1 (2.8%)	3 (8.5%)	7 (20.0%)	0.975	0.914	11 (31.4%)
MODERATE	3 (8.5%)	4 (11.4%)	16 (45.7%)			23 (65.7%)
HIGH	0 (0.0%)	0 (0.0%)	1 (2.8%)			1 (2.8%)
Total	04 (11.4%)	07(20.0%)	24 (68.5%)			35(100%)

TABLE 3- DISTRIBUTION OF NICOTINE DEPENDENCE AMONG STUDY SUBJECTS.



Table 4 shows the results of binary logistic regression analysis which reveals the significant association of level of nicotine dependence with stress. Odds ratio (OR) between nicotine dependence and Perceived Stress Scale with 95% confidence interval (CI) for stress according to binary logistic regression was found to be statistically significant. Those with nicotine dependence and habit of tobacco chewing had 1.2 times greater probability of having stress compared to a normal individual.

VARIABLES	REGRESSION COEFFICIENT	p- VALUE	ODDS RATIO	p-VALUE	95% CONFIDENCE INTERVAL
PSS	0.203	0.802	1.225	0.251	5.98
AGE	0.510	0.536	1.665	0.331	8.37
GENDER	-1.662	0.122	0.190	.023	1.56

* Statistically significant

TABLE 4- LOGISTIC REGRESSION MODEL FOR NICOTINE DEPENDENCE (FTND-ST) WITH PSS-10 AGE AND GENDER.

DISCUSSION:

Tobacco and Psychological stress are considerable health challenges world faces today. The number of tobacco users is uprising on alarming rates in the South-East Asian countries like India, Pakistan, Bangladesh and Thailand. Nicotine dependence is determined by a single or combination of factors like individual, genetic and psychosocial factors. Consequently, psychological stress plays a crucial role in initiation and extent of tobacco chewing.

Nicotine dependence can be determined by Fagerstrom Test for Nicotine Dependence (FTND). It is an economical, non-invasive method to determine nicotine dependence. It helps the clinician determine the degree to which a patient is nicotine dependent.⁵ The Fagerstrom Test for Nicotine Dependence-Smokeless Tobacco (FTND-ST) is a modified form of Fagerstrom Test for Nicotine Dependence (FTND) used to acquire the magnitude of nicotine dependence among smokeless tobacco users.⁵ High levels of nicotine dependence among tobacco users could probably be due to perceived stress. Failures, unemployment, bad company, professional, financial or family, health problems are just few reasons when a person is entrapped into viscous circle of addiction. Subsequently, tobacco cessation becomes complicated and thus leads to physical dependence, psychological dependence and many disease and disorders.²

Motivational interviewing (MI) is a cognitive-behavioural technique that aims at patient identification and behavioural changes that put them

at risk of developing health problems or may be preventing optimal management of a chronic condition.⁹

MI is based on the principle of Transtheoretical model also known as the Stages of change model.⁸ This model identifies a cycle of change that people swivel through, sometimes up to seven times, before effecting permanent change. The steps include pre-contemplation, when the individual is not considering change; contemplation, when they are favourably disposed to change but have not made concrete plans or adopted any action; planning, when strategies have been selected but not yet utilised; and action, when attempts have been made to; and finally the maintenance phase, when people make deliberate attempts to continue with the change programme. This model also differentiates between a lapse (a temporary return to the previous behaviour) and a relapse (a permanent return to the behaviour being changed).^{8,9}

Perceived stress is an important factor influencing the efficacy and satisfaction of individual in modern day conditions. Perceived stress is described as "the feelings or thoughts that a person has about how much stress they are under over a given period of time".¹⁰ Perceived stress has been found to be associated with greater odds of smoking in several cross-sectional studies.^{11,12}

Present study is distinctive for the reason that very few studies are currently available that correlates perceived stress and smokeless tobacco.

Perceived stress was evaluated by the Perceived



Stress Scale (PSS).^{6,7} PSS is most extensively used psychological instrument to determine the perception of stress. It assesses the extent to which situations in one's life are considered as stressful. It is a 10-point scale devised to approximate how unpredictable, uncontrollable, and overloaded respondents find their lives. The scale also known as PSS-10 includes a number of direct questions about current levels of experienced stress.^{6,7}

This study explored the influence of perceived stress on nicotine dependence on various parameters. In our study the level of stress was not proportional to age. As stress may be found in any individual regardless of age group. Few studies earlier do quote increased stress with increased age^{13,14} but in our study increasing age predispose to stress this correlation was not established. Most of the study subjects with tobacco chewing habit were moderately stressed in our study. Furthermore there was a positive association of nicotine dependence and age of the study subjects in our study. In other words the nicotine dependency tends to increase with increasing age. In the present study the subjects with moderate stress had a positive association with nicotine dependency. It is consistent with findings of other studies done earlier.^{15,16,17} Multiple logistic regression analysis revealed significant association of level of nicotine dependence with stress. Hence, those with stress had greater nicotine dependence and profound habit of tobacco chewing. Odds ratio (OR) between nicotine dependence and PSS with 95% confidence interval (CI) for stress according to multiple logistic regression was found to be statistically significant.

The limitations of this study include cross-sectional design, small sample size and use of self-administered questionnaires which could be biased as there are probability that the individuals over or under estimate their responses. The number of independent variables studied for the association with nicotine dependence had to be limited. An excess of parameters in the data would have led to unstable regression coefficient estimates.

Further studies facilitating professional trained

interviewers and counsellors with larger sample size and more parameters may be incorporated to attain more appropriate result. It is proposed that every health care institution must have deaddiction centre operated by well trained professionals, counsellors assisted with audio and visual aids. Thus, underlying psychological stress which is the basis of nicotine dependence could be dealt in further earnestly. Therefore, this study must be carried out on a larger scale with a bigger sample size to create awareness and educate the people regarding perceived stress playing an imperative role in nicotine dependence.

CONCLUSION:

This study illustrates that perceived stress is associated with nicotine dependence. Chewing has been found to play an important role as a stress reliever associated with uncontrollable social and economic stressors disproportionately affecting all irrespective of age gender or class. Our research shows that psychosocial factors such as the inability to control important things in life and emotional isolation seem to be important mediators for the relationship between stress and tobacco dependence. Stress is a fundamental concept for understanding both life and evolution. Thus, stress and tobacco are the major challenges of the modern world. When considering policy implications, in order to decrease tobacco related morbidity and mortality, it is crucial to consider emotional conditions and reduce levels of stress. Thus taking seriously the psychological considerations we should intervene based on evidences, findings and recommendations put forward in this study.

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RELATIONSHIP OF MAXILLARY AND MANDIBULAR BASE LENGTH WITH DENTAL CROWDING IN CLASS II MALOCCLUSION

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ABSTRACT :

Objective: To assess the effect of dental crowding on the cephalometric parameters particularly maxillary and mandibular base lengths in Angle's class II malocclusion.

Materials and Methods: Pre-treatment study model of seventy patients with class II malocclusion were collected and divided into two groups according to mild and moderate crowding and compared for maxillary and mandibular base length. study model analysis and cephalometric analysis were carried out to measure space discrepancy and cephalometric parameters respectively and then statistically analysed with the help of Student's t-test.

Results: Subjects with complete class II malocclusion with moderate to severe mandibular crowding have statistically significant smaller apical base lengths as compared to the subjects with less crowding. Maxillary and mandibular apical base lengths are inversely related to severity of crowding.

Conclusions: Study revealed and supported the concepts that decreased maxillary and mandibular effective lengths are an important factor which is associated with dental crowding in patients with complete Class II malocclusion.

KEYWORDS: Crowding, Class II malocclusion, Apical base length.

INTRODUCTION :

Dental crowding has been the chief complain for most of the patients to visit an orthodontist to achieve an ideal smile. It is one of the most common types of malocclusion worldwide. Dental crowding is identified as a difference between tooth size and arch size that causes teeth to rotate, impact or otherwise erupt in improper positions. Although, it is established that dental crowding can be the result of changes in human evolutionary trends as well as certain hereditary and environmental factors, the importance of investigating the various clinical characteristics that contribute to it should be emphasized during the overall orthodontic treatment planning. These factors could be of skeletal, dental or soft tissue origin. These include tooth size, tooth shape, dental arch dimensions, oral and perioral musculature,

mandibular and maxillary body lengths and direction of growth of jaws etc.¹ The association between dental crowding and tooth size has been examined by many researchers, but discrepancies were present between their conclusions. It is hypothesized that tooth size is not the only determining factor for dental crowding. In an investigation performed by Howe et al. crowded and non- crowded groups were compared using study models and it was concluded that arch dimensions greatly contribution to dental crowding than tooth size. Other researcher found the same correlation between arch dimensions and dental crowding.^{2,3} Additionally, some cephalometric features are associated with a greater amount of dental crowding. Sakuda et al.⁴ found that patients with crowding in the permanent dentition had a smaller mandibular body length. Leighton and Hunter⁵ found smaller mandibular body length in patients with severe crowding in the mixed and permanent dentition. Identification of the existing contributing factors of dental crowding will help us in employing appropriate treatment strategy as well as achieving stable post treatment results. In general,

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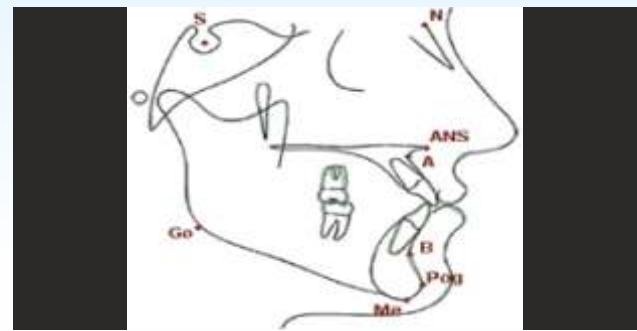
subjects with Class II malocclusion have lesser mandibular length than subjects with normal occlusion and Class I malocclusion.⁶⁻¹⁰ However, the relationship between the apical base length and anterior crowding in Class II malocclusion needs much more detailed study in different human races and has not been studied. Therefore, the aim of this study was to assess maxillary and mandibular base length correlation with the amount of dental crowding in local population with complete class II malocclusion and the results obtained can help us in determining treatment protocols for malocclusion with specific etiologies.

MATERIAL AND METHODS :

The Sample of seventy Bihari patient with permanent dentition up to first molars (ages 18-25 years) with bilateral Class II molar relationship and all teeth fully erupted to the occlusal plane were included in the study. Patients with mesiodistal loss or excess of tooth material as a result of caries and restorations, abnormal dental conditions such as impaction, transposition and congenitally missing teeth, prosthetic replacement, previous or ongoing orthodontic treatment, transverse discrepancies such as cross-bite or scissor bite were excluded from the study. The sample was divided in two study groups according to pretreatment mandibular anterior crowding. Group 1 consisted of twenty five patients with more than 3 mm crowding and Group 2 had forty five patients with crowding of less than 3mm.

Arch length discrepancy (ALD) was calculated as the difference between the arch perimeter and the sum of total tooth materials. The space available was measured as the arch perimeter from the mesial aspect of the permanent first molar to its antimere with a brass wire. Similarly, space required was measured as the sum of the individual tooth widths starting from the mesial aspect of the first permanent molar to its antimere using a digital vernier caliper with sharpened points. Negative values indicate crowding and vice versa. Standardized lateral cephalograms were obtained from all selected subjects. Lateral cephalograms were traced and

cephalometric analysis was performed (Fig.1). Linear and angular measurements were taken from all the samples and subjected to statistical analysis.



S- Sella, N- Nasion, ANS- Anterior Nasal spine, Pt A, Pt B. Pog- Pogonion, Go-Gonion, Me- Menton.

Gn- Gnathion, Co - Condylion

Fig 1. Cephalometric tracing with landmarks

STATISTICAL ANALYSES :

Spearman's RANK correlation test was applied to see the relationship between mandibular and maxillary base length and dental crowding. The mean value of the each and every parameter, used in cephalometric analysis, was also compared between two group statistically by means of student's t-test to find out any significant difference between the two groups. All the data was tabulated and the difference between the two groups was analysed statistically by student's t-test. P value of < 0.05 was considered significant.

RESULT :

Smaller maxillary and mandibular apical base lengths was found in subjects with moderate to severe dental crowding (≥ 3 mm) compared to those with mild (<3mm) crowding (Table 1)

Mandibular Crowding	5.13	1.65	0.54	0.89	4.59	.001
Co-A(mm)	81.82	4.52	86.14	5.27	24.32	.006
Co-Gn(mm)	103.46	5.01	108.00	6.04	24.54	.0016
Maxillary Crowding (mm)	8.68	3.88	3.25	3.69	5.43	.0001
	Mean	SD	Mean	SD	Differe nce	PValue

Inter group Comparison Concerning the Amount of Crowding and Apical Base Lengths (t-tests) (Table-1)

DISCUSSION :

It is generally said that an accurate clinical diagnosis leads clinician towards path of to successful treatment. So, in the same way orthodontic diagnosis has given highest priority to provide stable and good results and is based on anatomical, physiological and biological factors and also on the aesthetic judgment of the orthodontist. An assessment of the amount of crowding or spacing is one of the primary steps in orthodontic diagnosis and treatment planning. Amount of the discrepancy between arch length and tooth size in the incisor region often dominates the consideration for or against premolar extraction. The groups studied here included only patients with a complete bilateral Class II molar relationship, allowing Class II malocclusions to be clearly characterized. Group was selected according to the severity of mandibular crowding. Group 1 consisted of patients with more than 3 mm mandibular crowding, while Group 2 consisted of patients with less than 3 mm mandibular crowding. Both group were compared and results showed that subjects with moderate to severe dental crowding had smaller maxillary and mandibular effective apical base lengths compared with subjects without crowding or less dental crowding (Table 1). So, a weak to moderate inverse correlation was found between the amount of crowding and the apical base length of the maxilla and mandible. Based on the results of the present study, it can be speculated that midface and mandibular effective lengths (Co-A and Co-Gn) would correlate to a given range of mandibular dental crowding. Previous study conducted by Janson et al. showed similar findings, but in their study malocclusion was not specified. Therefore, effective lengths of the apical bases can be inversely associated to the amount of dental crowding independent of the type of malocclusion.

It is interesting to note that although the groups were selected according to mandibular crowding, the group with severe crowding also showed significantly greater maxillary crowding. This seems reasonable because there was significant correlation between the maxillary and mandibular effective lengths and

crowding. Therefore, it can be concluded that severely crowded subjects are more likely to present shorter effective apical base lengths and that the shorter the base lengths the greater the likelihood for crowding. This is especially applicable to subjects with complete Class II malocclusion, but it can be extrapolated to other types of malocclusions based on similar studies.¹¹⁻¹³

CONCLUSION :

The results of the present study reveal that significantly smaller apical base length is present in the subjects with complete class II malocclusion with moderate to severe mandibular crowding compared to the subjects with less crowding so it can be concluded that significant inverse correlations exist between degree of crowding and maxillary and mandibular apical base lengths.

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SOFT – AND HARD–TISSUE CHANGES FOLLOWING TREATMENT OF CLASS II DIVISION 1 MALOCCLUSION WITH TWIN BLOCK– A RANDOMIZED CONTROL TRIAL

Richashree¹, Rashi Chauhan², Swapnil Shivajirao Nangare³, Yamini Chandra⁴, Pooja. P. Shanker⁵

ABSTRACT :

Background : The purpose of this study was to examine change in soft tissue and hard tissue profile of class II div 1 malocclusion patients. Lateral cephalogram of the patients were obtained at the time interval of T1 and T2. Material method- 30 class II div 1 patients were examined. Out of which 17 were girls and 13 were boys. Skeletal, dentoalveolar and soft tissue were analysed using lateral cephalogram of the patient.

Result : Pre and post treatment cephalogram analysis show a significant change in SNB, ANB, Z angle and upper lip measurement.

INTRODUCTION :

Kingsley was the first to use the appliance for forward positioning of mandible in the year of 1879. Appliance introduced by Kingsley consist of clasps on molars, labial wires and a bite plane extending posteriorly¹. Myofunctional appliance was introduced by Robin 1902 and Andresen 1908. Myofunctional appliance enhances the mandibular growth in class II patient. Large scale of functional appliances has been put forward to amplify the mandibular growth and correct bite by forward positioning of mandible²⁻⁶. Refinement of facial aesthetic is a key to success of orthodontic practice. The contemporary paradigm of soft tissue enhancement underlines the importance of this issue⁷. One of the most frequently occurring orthodontic condition is class II div 1 malocclusion. This particular malocclusion is about 20%-30% of all orthodontic patients⁸. Class II malocclusion is characterised by retrognathic mandible, anterior displacement of the maxilla, increased vertical dimension of posterior maxilla, mandibular fossa in

posterior position, maxillary constriction and a combination of factors. In general, maxillary and mandibular incisors are well-positioned, differently from maxillary incisors which tend to be protrusive⁹⁻¹². Characteristic features of class II div 1 malocclusion includes retrusive chin, convex profile, incompetent lips and deep mentolabial sulcus¹³. Such condition leads to negative psychological consequences and reduced self-confidence of patient¹⁴. Some published article

suggests that myofunctional appliances are considered to be effective in improving overjet¹⁵⁻¹⁸. According to some authors treatment timing plays a significant role in supplementary lengthening of mandible when functional appliance is opted at pubertal growth spurt^{19,20}.

MATERIALS AND METHODS :

The sample size consists of 30 patients. Out of which 17 were girls and 13 were boys. Mean age was 9.8 years + 14 months and 11.2 years +14 months respectively. Twin block appliance was fabricated using adams clasps on upper first molar labial bow in the upper arch. In the lower arch adams clasp was fabricated on premolar and ball end clasp was given in between lower central incisor and between canine and lateral incisor on both the quadrant. The active phase of the treatment lasted about 14 + 2 months.

Inclusion criteria

- Class II molar relation

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- Class II canine relation
- Class II skeletal pattern
- Reterognathic mandible
- Orthognathic maxilla
- Overjet more than 4mm

Exclusion criteria

- Craniofacial syndrome
- Congenitally missing tooth
- Lower incisor protrusion
- No history of previous orthodontic treatment

Patients were instructed to wear the appliance full time except for meals and brushing. Bite registration at the start of treatment was kept with 4mm advancement, further increments were added depending on the overjet. Amount of vertical opening was according to the freeway space i.e., 2-4mm beyond it. Treatment was continued till the time patients achieved class I molar relationship and overjet of 2mm. upper inclined plane was given post twin block appliance.

Standardized lateral cephalogram, dental cast and photograph were obtained twice at T1 before the start of the treatment and T2 after the treatment. Various skeletal, dental and soft tissue measurements were taken. Lateral cephalometric radiographs taken at T1 & T2 were traced and the values were measured. In order to evaluate various soft tissue and hard tissue landmarks.

Measured data were analyzed using SPSS software version 22 (SPSS Inc, Chicago, IL, USA). P value <0.5 was considered to indicate statistical significance.

RESULT :

In this research, 30 patients treated with twin block were evaluated pretreatment and posttreatment. The paired t- test is used evaluation of pretreatment and posttreatment cephalometric measurements. Table 1 and tale 2 shows soft tissue and hard tissue change before and after the treatment respectively.

As illustrated in table 1 it signifies significant change from pre posttreatment values of upper lip -E line, lower lip- E line and Z - angle (P<0.001) was seen .

Variables	Pretreatment (T1)	Posttreatment (T2)	P Value
Upper lip thickness	12.6 ± 1.8	14.8 ± 1.4	3.388-E05
Lower lip thickness	13.6 ± 1.4	15.1 ± 1.2	.0004
Pog-Pog'	11.8 ± 1.5	13.5 ± 2.3	.0086
Me- Me'	7.4 ± 1.6	8.8 ± 1.3	.0019
Nasolabial angle	103.5 ± 6.8	106.4 ± 7.7	.1937
Interlabial gap	3.3 ± 1.3	2.4 ± 1.1	.0214
Upper lip -E line	-0.72±2.12	-2.37±2.32	0.000*
Lower lip- E line	0.01±2.96	-1.38±2.82	0.001*
Z-angle	66.44±7.63	70.60±6.47	0.001*

Table 1- soft tissue result of pretreatment and post-treatment.

Variables	Pretreatment	Posttreatment	P value
SNA	81.64±2.31	81.84±2.19	0.632
SNB	76.20±2.48	78.12±2.59	0.000*
ANB	5.48±1.71	3.72±1.65	0.000*
Incisal inclination	85.92±2.29	85.72±3.06	0.664
Overjet	6.42±2.42	3.72±1.57	0.000*
Overbite	4.26±1.95	3.11±1.63	0.007*
IMPA	94.22±6.67	95.92±7.35	0.089
N-Pog	9.64±4.42	6.96±4.25	0.000*

Table 2:- Hard tissue result of pretreatment and post treatment

DISCUSSION :

Using functional appliances therapy not only bring about skeletal and dental changes but it also brings about change in soft tissue profile of the patient. At the same time opting functional appliance eliminates the need of extraction. The aim of this research was to evaluate the effect of myofunctional appliance on soft issue and hard tissue in growing individuals. Facial appearance plays a major role in social well- being of individuals. Many researchers shows that the stretch of the muscles and the adjacent soft tissues of the facial skeleton leads to repositioning of the forward shift of mandible to its original place also causing headgear effect on maxilla^{21,22}. In our research it was observed that a significant change was noted in upper lip to E line, lower lip to E line and Z angle. Hard tissue evaluation states significant change in SNB, ANB, overjet, overbite and N-Pog. Illing et al²³ in his study rooted that there is more pronounced reduction in the inclination of maxillary incisors with twin block group compared to that of bass and bionator group.

In our research upper incisor to palatal plane, showed

significant reduction from pretreatment to post treatment.

CONCLUSION:

The conclusion of our research is myofunctional appliance (twin block) bring about change in hard tissue and soft tissue. Patient's facial esthetics improves. Since, treatment was started at the growing phase so, change in mandibular length was observed . which was also due to true mandibular growth and repositioning of mandible also.

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COMPARATIVE EVALUATION OF APICALLY EXTRUDED DEBRIS FOLLOWING ROOT CANAL PREPARATION WITH PROTAPER, HYFLEX, WAVE ONE AND SELF-ADJUSTING FILE SYSTEMS

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ABSTRACT:

Objective: Extrusion of any particles periapically while root canal preparation may cause post-operative complications such as flare-ups. The reason of this in vitro study was to take a look at out the extent of apically extruded particles with use of rotary and reciprocating nickel-titanium instrumentation systems.

Materials and Methods: Sixty freshly extracted human mandibular first premolar teeth were randomly selected and assigned to four groups (15 tooth/group) according to use of four instrumentation system such as Reciprocating single-file system WaveOne, full-sequence rotary Hyflex, ProTaper and self-adjusting file(SAF) while root canals preparation. The root canals were biomechanically prepared and irrigated with bidistilled water. The apically extruded debris and irrigants were gathered in pre weighted eppendorf tubes in all four groups which then compared and statistically analyzed with help of analysis of variance and the Post hoc Student-Newman-Keuls test.

Results: Findings suggested that WaveOne, ProTaper and Hyflex rotary system create significantly more debris compared to Self-Adjusting File rotary system ($P < 0.05$).

Conclusions: It was concluded that all used systems resulted in extrusion of apical debris to some extent but Full-sequence rotary instrumentation produced less particles extrusion compared to reciprocating single-file systems.

KEYWORDS: Apical extrusion, Hyflex, reciprocating motion, WaveOne, Protaper, Self adjusting file.

INTRODUCTION:

One inherent trouble associated to all root canal shaping and cleansing methods is extrusion of particles through the apex into the periapical tissues which undoubtedly create post-operative complications such as acute inflammation and flare-ups which are characterised by pain, swelling inflicting unscheduled visits of the victims ensuing in inter appointment emergency. Different factors which have an effect on the volume of particles extruded are radial lands, flute depth, tapers, cross-section, operational kinematics of the file structures used and treatment approach.

In today's scenario it is found that all biomechanical

root canal preparation technique are associated with apical extrusion of debris to some extent, even if the preparation is maintained short of apical foramen despite of use of variety of strategies and newly advanced instruments.

The ProTaper cross-section is equivalent to reamer, with three machined reducing edges and convex core. ProTaper system follows step wise variable tapers of each instrument that create "progressive preparation" three dimensionally in every directions. The cross section of Hyflex nickel-titanium files is very much similar to EndoSequence and is produced by use of an innovative technology which control material's reminiscence. WaveOne single-file nickel-titanium instruments is claimed to prepare entire root canal with single file in reciprocating action with enough size and taper. These are made of Martensitic NiTi alloy that is manufactured with progressive thermal process and available in sizes of 21.06, 25.08 and 40.08. The Self-Adjusting File (SAF) is the first

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endodontic file with a unique design that does not have a metal shaft. It is a thin-walled gap file with an asymmetrically pointed cylinder with a 1.5 mm diameter made of a NiTi lattice with a rough outer surface that is compressible in a canal. The file operates with use of a handpiece that approves a vertical vibration with 3,000 to 5,000 vibrations per minute and 0.4 mm amplitude conforms to the canal structure and lets in uninterrupted irrigation all through the way of canal.

The apically extruded debris can be used to examine effectiveness of different instrumentation used for root canal preparation. So the aim of this study was to determine effectiveness of WaveOne, HyFlex, ProTaper and Self-Adjusting File system in terms of generation of apically extruded debris during root canal preparation by measuring their quantity.

MATERIALS AND METHODS:

Sixty freshly extracted human mandibular premolar teeth due to orthodontic and periodontal cause were randomly selected according to inclusion criteria which is used to be the single rooted mandibular premolar tooth with single root canal and apical foramen with root curvature between 0° and 10°. Radiographs were taken both mesiodistally and buccolingually to have a look for internal resorption, root canal calcification and their curvature. Teeth with crack, internal and external resorption, root caries, root canal calcifications and open apex were excluded from the study. Sixty selected teeth were randomly allocated into four experimental groups with fifteen teeth in each group. The soft-tissue remnants present on external root surface were cleansed and then preserved in phosphate-buffered saline solution. To preserve associated tooth lengths, all tooth have been measured and the crown sectioning was done with a high-speed bur under copious water spray till equal lengths obtained. Access cavity preparation completed in each tooth and all exterior tooth surfaces had been blanketed with two coatings of nail paint besides 1 mm of apical foramen. A 15 K-file used to determine the working length till apical foramen. The working length was reestablished by subtracting 1

mm from this measurement. Each individual tooth held in a preweighed eppendorf tube used as debris collection apparatus which was once constant indoors a glass vial with the resource of rubber plug. There should be no possible contact made between the eppendorf tube and glass vial. The tube was vented with a 25 gauge needle to distribute stress equally inside and outside.

For each file, the persona torque and rotational pace programmed in the endomotor was used, whereas Wave-One used in a reciprocating motion. All the preparations was done by single operator. The training sequences was as follows

1. Group 1: ProTaper was used with gentle in-and-out motion in recommended sequence up to F4 (40/06) till the working length.
2. Group 2: Hyflex file was used according to manufacturer's recommendations i.e., 06/20, 06/25, 06/30, 06/35, 06/40.
3. Group 3: WaveOne file (40/08) was used in reciprocating motion.
4. Group 4: Self-Adjusting File system(SAF) (2.0 mm diameter, 21 mm length) was used in each canal till working length for four minutes with continuous irrigation of distilled water at a rate of 5 ml/min. after establishing the glide path using 15 K-File followed by 20 K-File to the working length. The irrigation needle placed coronal to bother the regional resistance used to be encountered.

The eppendorf tube was removed from the glass vial after root canal preparation. Teeth placed in tube were removed from it and their root apex rinsed with 1 ml of bidistilled water which used to be gathered in preweighed eppendorf tube and weighed by means of digital microbalance. All the eppendorf tubes were then incubated at 37°C for 15 days to evaporate moisture until weighing the dry debris. Each eppendorf tube weighted consecutively three times on digital microbalance. The weight of extruded particles in each tube calculated by subtracting pre weighted tube from the weight of tube with dried debris. The weight of extruded particles calculated rapidly in this way for four groups and analyzed



statistically with Kruskal-Wallis one-way analysis of variance and Post hoc Student-Newman Keuls test at a significant level of P less than 0.05.

RESULTS:

All instrumentation techniques produced significant amount of extruded debris. The mean weight of apical extruded debris of four experimental groups is shown in Table 1.

The difference of mean value of extruded debris with different instrumentation was significant ($P < 0.05$).

Table I Comparison of mean values of debris extrusion

Method	Mean (g)	P value
SAF	0.047	0.01
Protaper next	0.091	
Wave one	0.054	
Hyflex	0.051	

Table II Pairwise comparison of mean values of different file systems

Pairwise comparison	System	Mean difference	P value
SAF	Protaper Next	-0.052	0.05
	Waveone	-0.021	0.06
	Hyflex	-0.018	0.09
Protaper Next	Waveone	0.008	0.05
	Hyflex	0.008	0.05
Waveone	Hyflex	0.008	0.07

Amount of apically extruded debris after the use of the WaveOne (0.054 g) was more in contrast with the Hyflex (0.051 g). SAF (0.047 g) showed considerably least amount of debris extrusion. On Statistical analysis by post hoc student-Newman-keuls test it was found that apically extruded debris produced by reciprocating single file Hyflex, WaveOne and ProTaper was appreciably greater when compared to SAF and this difference was statistically significant ($P < 0.05$). However, no statistical great distinction was found between WaveOne and ProTaper ($P > 0.05$).

DISCUSSION:

The main objective of root canal treatment is to achieve healthy environment inside of root canal. Debris such as dentine chips, necrotic pulp tissue, microorganisms and irrigants get extruded into

periapical tissue during biomechanical preparation of root canal which causes endodontic flare up and this is one of the principle cause of postoperative pain felt by patient. Many factors affect the extent of extruded particles such as the instrumentation technique, type and size of instrument and irrigation solution.

In this study, all instrumentation systems used for canal preparation extrude debris apically in vitro, but SAF (0.047 g) showed statistically significant least amount of debris. This effects may be explained by differences in file structure and their motion kinetics. Self adjusting file is a single, hollow file system that has no cutting edge or flutes. The back and forth grinding motion of SAF combined with the continuous flow of the irrigation efficaciously clean the canals. Pressure build-up can be eliminated in the root canal space because the irrigant simply escapes by the use of openings in the file lattice which favour greater reduction of particles extrusion in the SAF group. There have been various studies comparing the efficacy of SAF in extruding debris apically with V-Taper, ProTaper Next, ProTaper Universal and WaveOne, which showed least debris extrusion with SAF. Single file systems simplify the instrumentation protocol and at the end much less apical extrusion of particles occurs. Hyflex (0.051 g) showed more extruded debris than SAF. The cross-sectional design of Hyflex is very much similar to EndoSequence. The unwinding of spirals while preparing root canals is a well-known feature of Hyflex file systems. Elmsallati et al (2009) concluded that the short pitch design instruments extruded less debris than the medium and long ones. The unwinding feature of the Hyflex instruments might be the reason for the greater extrusion of debris with the system. The reciprocating single file system showed drastically larger apical particles extrusion compared to the full-sequence rotary NiTi units ($P < 0.05$). This variations may be due to variation in treatment approach and cross-sectional designs of files used for preparation. Bürklein et al. also found that more debris were extruded apically after canal preparation with WaveOne and ProTaper as they have three cutting edges with radial lands to



assist the blades and a incredibly small chip space. This structure may also enhance debris transportation towards the apex when used with a reciprocal motion. On the contrary, coronal transportation of dentinal chips and debris occurs with continuous rotation like a screw conveyor.

Many studies have been conducted which concluded that maintenance of apical patency in mesiobuccal roots of maxillary molars resulted in less apical extrusion of sodium hypochlorite. Myers and Bernard Law favoured reassessment of apical dentinal plug to decrease amount of apically extruded debris, irrigants and to prevent over instrumentation. A similar study has proven that maintaining apical patency is correlated with less apically extruded debris in contrast to tooth in which the constriction remained intact.

In this study, the working length was taken 1 mm short of the apical foramen. Myers and Montgomery confirmed that working length 1 mm short of apical foramen causes less periapical particles extrusion. Precautions must be taken when these effects are transferred to the scientific situation due to zero returned stress used in this study design and in addition gravity can carried the irrigating solution out of root canal. This is a well known draw back of in vitro study designs with no periapical resistance. It has been recommended that the floral foam utilization can simulate periapical tissues resistance. Bidistilled water was used as irrigating solution instead of sodium hypochlorite to prevent increase in potential weight due to NaOCl crystal formation.

Previous research have demonstrated that with every rotation while preparing canal with rotary and balanced-force techniques, there is tendency to pull dentinal particles into the flutes of the file and direct it closer to the coronal part of canal. In case of engine-driven devices early flaring of the coronal part of root direct particles toward the orifice, preventing its compaction in the root canal. Ruiz-Hubard et al. studied that apical extrusion of debris with utilization of crown-down technique were much less in curved

and straight canals compared with the step-back technique. Garlapati et al. Found that K3 rotary file extruded less debris with use of crown down method. Zarrabi et al. studied ProFile, RaCe and Flex Master rotary devices with the step-back approach and found the similar results that step-back method extruded more particles and irrigants apically with use of rotary instruments. Ghivari et al. found similar finding that is step-back method extruded higher extent of particles and irrigant compared to hand and rotary Ni-Ti systems. De-Deus et al. noted that there is no significant difference in particles extrusion between common ProTaper Universal approach and single-file ProTaper F2 used in reciprocating movement. This result is similar to earlier study by Bürklein and Schafer which showed reciprocating single-file system extruded more debris in contrast to the full-sequence rotary NiTi instruments.

In the current study, the Group three (WaveOne) has greater apical extrusion of debris in contrast to Group one (ProTaper), Group two (Hyflex) and group four (Self-Adjusting File) suggesting that reciprocation motion would possibly cause more apical extrusion compared with continuous motion during root canal preparation.

CONCLUSION:

In this study it was found that WaveOne file system is associated with more apical extrusion of debris compared with ProTaper, Hyflex and Self-Adjusting File which supported the possibility that reciprocation motion used in single file system would cause more apical extrusion compared to continuous motion used in full sequence rotary NiTi instruments during root canal preparation.

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LUNG TRANSPLANT IN COVID 19 – THE IMPENDING NEED OF SALVAGE THERAPY

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ABSTRACT:

A worldwide pandemic of unparalleled scope in the last century has been brought on by the coronavirus illness of 2019 (COVID-19). The current review demonstrated that, in certain patients with severe, persistent COVID-19-associated ARDS, lung transplantation is the only viable alternative for survival. Carefully chosen patients can undergo the surgery successfully, with favourable early post-transplant outcomes.

KEYWORDS: COVID 19, respiratory, lung transplant, pulmonary Fibrosis.

INTRODUCTION:

Various end-stage lung disorders can be treated by lung transplantation; however, individuals who have had an acute lung damage from an infectious source are often not candidates for the procedure.¹ Although there have been a few isolated cases of lung transplantation for COVID-19 associated acute respiratory distress syndrome (ARDS),²⁻⁴ there is not enough information to guide the selection of suitable recipients, the timing of the transplant, or the results of the transplant. Lung transplantation as a treatment for individuals with severe ARDS related to COVID-19 is also constrained by a number of unresolved issues. For instance, the allograft lung may experience a recurrence of the SARS-CoV-2 or superinfecting pathogens linked to viral pneumonia in the native lung. The SARS-CoV-2 infection may cause severe pleural and pulmonary hilar inflammation, which might provide technical challenges for the transplant surgery and result in longer ischemia times, the requirement for intraoperative blood transfusions, and post-transplant graft failure. Additionally, post-transplantation recovery may be hampered and results may be worsened by the severe de-

conditioning brought on by protracted mechanical breathing, sedation, and neuromuscular blockade.

COVID 19 - Facts and figures:

India recorded more than 35 million cases of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) as of January 1, 2022, second only to the United States prior to the current surge brought on by the Omicron strain. A COVID death rate of 345 per million people is inferred by India's official cumulative COVID death count of 0.48 million, which is roughly one-seventh of the US mortality rate. Due to insufficient COVID death certification, chronic disease misattribution, and the fact that the majority of fatalities occur in rural regions frequently without medical assistance, it is commonly thought that India's reported COVID death total are underreported.⁵

COVID 19 - Disease progression

Coronavirus disease 2019 is the phrase used to describe the clinical appearance of SARS-CoV-2 infected individuals (COVID-19). After the first illness phase, which is characterised by viral reaction symptoms and signs including fever, dry cough, and lymphopenia, the majority of patients (about 80%) experience mild to moderate symptoms and recover. However, during the initial period of dyspnea and hypoxemia, a sizable portion of patients experience worsening host inflammatory response symptoms, which can range from life-threatening organ dysfunction including acute respiratory distress syndrome, shock, and heart failure. In the general

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population as well as in specific lung disorders, protracted disease courses and chronic physical and psychological damage are extensively recognised.⁶ According to Jan C. Kamp et al observations, several patients had clinical conditions that appeared stable for up to 10 days following the commencement of SARS-CoV-2 symptoms. Following this, they noticed a fast decline in respiratory function or even a drop in oxygen saturation without shortness of breath, which in many cases necessitated the need for critical care. Silent hypoxemia, a well-described characteristic of COVID-19, is the phrase used to characterise an asymptomatic reduction in oxygen saturation.

Contemplation and consideration for lung transplant:

Cypel M and Keshavjee S⁷ outlined 10 factors that should be carefully taken into account when determining whether a patient with COVID-19-associated Acute Respiratory Distress Syndrome (ARDS) is a candidate for lung transplantation. The likelihood of a favourable outcome is likely to be increased by the following elements.

1. Candidates must first be under 65 years old. Existing data from ECMO bridge to lung transplantation reveals that older patients had worse results.
2. Transplant candidates should only have single-organ dysfunction.
3. Enough time should be given for the healing of the lungs. Given the poor long-term survival chances of lung transplantation, it is desirable for the patient to be able to survive without a transplant (about 60 percent at 5 years). After several weeks to months on extracorporeal membrane oxygenation (ECMO) and total organ failure, prior investigations have demonstrated that lungs severely damaged by influenza or bacterial pneumonia can recover to maintain life with non-limiting function. It is uncertain if COVID-19 will recover at a slower rate than other infectious agents. According to French data, individuals with COVID-19-related ARDS on ECMO had a recovery rate that is comparable to those with

ARDS from other causes. Despite the lack of a current guideline, in our opinion, transplantation should not be considered before 4-6 weeks have passed from the onset of the first clinical indications of respiratory failure.

4. Fourth, there should be radiological evidence of advanced fibrosis or significant bullous destruction, both of which are indicators of irreversible lung illness.
5. The patient has to be awake and able to talk about the transplant. In patients with ARDS, transplantation frequently takes place without first-person permission. Patients must be aware of how a transplant affects their quality of life. Acute respiratory sickness can be psychologically distressing and often impossible to overcome, as can waking up after a lung transplant with a life of immunosuppression and problems.
6. While they are waiting for a transplant, patients should be able to take part in physical therapy. The outcomes of these patients have clearly improved, according on data from ECMO bridge to transplant.
7. Patients must meet the remaining standard requirements for transplantation, such as a sufficient body mass index and the absence of any other significant comorbidities, including severe coronary artery disease.
8. The patient must have recently negative SARS-CoV-2 PCR results or deep respiratory tract sample infectivity testing demonstrating the absence of a live virus. Evidence suggests that PCR-positive individuals, including those who are asymptomatic, have a considerably greater death rate following surgical treatments.
9. The transplant centre has to have extensive knowledge in high-risk transplantation. Some of the most difficult and riskiest operations include lung transplantation in patients who are bridging ECMO for ARDS. As a result, only facilities with extensive ECMO bridging experience ought to provide the technique. In order to do this, patients with COVID-19 who undergo lung



transplantation may benefit significantly from referral to a small number of specialised centres.

10. There should be a large donor pool available to the centre, as well as a low waiting list death rate. This element will keep donor organ allocation fair and equitable and give patients who are more likely to survive the chance to receive a life-saving organ transplant.

Lung injury and COVID 19:

Unknown but likely multifactorial, the mechanisms by which SARS-CoV-2 produces lung damage include the cytokine release syndrome that follows, ventilator-induced lung damage, drug-induced pulmonary toxicity, subsequent nosocomial pneumonia, and thrombosis.⁸

Literature evidence for Outcome:

In an editorial by Amy Roach et al⁹, the authors reported that the average number of lung transplants per centre for respiratory failure caused by Covid-19 was 2.5 (with a range of 1 to 25). A total of 214 lung transplants were performed, of which 197 (92.1%) were bilateral lung transplants (including 2 heart-lung and 5 lung-kidney transplants) and 17 (7.9%) were single-lung transplants (including 1 lung-kidney transplant). The authors believed that lung transplantation may be an appropriate therapy for certain patients with irreversible respiratory failure caused by Covid-19 since the 3-month survival rate among these patients approximated that of individuals who received lung transplantation for reasons other than Covid-19.

The outcomes of lung transplantation in three patients with respiratory failure linked to COVID-19 that is not resolving were reported by Ankit Bharat et al¹⁰. In order to find SARS-CoV-2 RNA in explanted lung tissue from the three patients as well as in extra control lung tissue samples, they used single-molecule fluorescence in situ hybridization (smFISH). On the explanted lung tissue from the three transplant recipients as well as the warm postmortem lung biopsies from the two patients who had passed away from pneumonia caused by COVID-19, they performed extracellular matrix imaging and single-

cell RNA sequencing. SARS-CoV-2 was not found in the lungs of these five patients with protracted COVID-19 disease, according to smFISH, but histology revealed substantial signs of damage and fibrosis that matched end-stage pulmonary fibrosis. In order to find parallels in gene expression across cell lineages, they used machine learning to compare single-cell RNA sequencing data from the lungs of patients with late-stage COVID-19 to those from the lungs of patients with pulmonary fibrosis. According to their research, some COVID-19 patients experience severe fibrotic lung disease, making lung transplantation their sole chance for life.

Ankit Bharat et al¹¹ conducted a multicentric trial among severe COVID cases. At six high-volume transplant centres in the USA (eight recipients at three centres), Italy (two receivers at one centre), Austria (one recipient), and India (one recipient), 12 patients with COVID-19-associated ARDS had bilateral lung transplantation between May 1 and September 30, 2020. (one recipient). Prior to transplantation, chest imaging revealed substantial lung damage that did not get better in spite of extracorporeal membrane oxygenation and protracted mechanical breathing. Due to extensive pleural adhesions, hilar lymphadenopathy, and increased intraoperative transfusion needs, the lung transplant process was technically difficult. The explanted lungs' pathology revealed significant, persistent acute lung damage with signs of lung fibrosis. SARS-CoV-2 didn't reappear in the allografts. All COVID-19 patients were able to wean themselves off extracorporeal life support, and their short-term survival rates were comparable to those of transplant recipients who did not have the virus.

At Temple University Hospital, Norihisa Shigemura et al.¹² conducted an analysis of prospectively collected data from lung transplant recipients who had pneumonia caused by the COVID-19 virus and patients who were being evaluated for lung transplantation for COVID-19 sequelae. There were 8 fatalities out of 511 lung transplants from 2016 to 2019 and 5 deaths out of 131 lung transplants in



2020, for a total mortality rate of 25% (13/52) among lung transplant recipients with COVID-19 pneumonia (1.6 percent). Three of the five recipients of transplants who passed away afterward were infected with COVID-19 while hospitalised in the ICU after the transplant process and died of progressive septic shock despite receiving all possible therapies, including ECMO. The recipient's age above 70, the presence of stage 3 or worse chronic renal disease, and higher sequential organ failure assessment (SOFA) and 4C scores at the time of admission were all revealed by multivariate analysis as significant risk factors for death (P 0.05).

Ryoung-Eun Ko et al¹³ is to summarised the collective experience of Lung transplant (LT) for patients in Korea who have severe COVID-19-related ARDS. In South Korea (June 2020-June 2021) a countrywide multicenter retrospective observational research was conducted with subsequent LT for severe COVID-19-related ARDS. Prior to LT, all 11 patients had rehabilitation while being maintained by venovenous ECMO. After ECMO cannulation, patients underwent transplantation at a median time of 49 days (IQR, 32-66). Within 72 hours following LT, two people experienced primary graft malfunction (18.2 percent). One patient passed away 4 days after LT from sepsis, while another required retransplantation owing to graft failure. Ten patients are still alive and doing well after a median follow-up of 322 days (IQR, 299-397). Post-transplant results were comparable across the two groups when compared to previous LTs following bridging with ECMO (n=27).

Despite the above said evidence, a lot of doubt around the possibility of lung recovery and the reversibility of lung damage, the purpose and timing of Lung transplantation for respiratory distress due to COVID 19 remains unclear. A recent analysis¹⁴ of the United Network for Organ Sharing (UNOS) database revealed a total of 63 patients who were listed for LTx from May 2005 to December 2018 with a primary diagnosis of nonCOVID-19-associated ARDS. 39 of the 63 people on the waiting list who requested a lung transplant did so. 16.7% of the 24 patients who

remained on the waitlist but did not receive a lung transplant had their names removed owing to clinical progress.

Factors affecting Lung transplant outcome:

Previous research revealed a link between pre-LT physical function and post-transplant morbidity and death.¹⁵⁻¹⁷ Patients with severe COVID-19-related ARDS also experienced ICU-acquired weakness, much like other ARDS patients.¹⁸ To avoid patient-ventilator dyssynchrony and ventilator-induced lung damage as well as lengthy stays in the intensive care unit, these patients frequently underwent severe sedation. Therefore, when treating ARDS caused by COVID-19, ICU-acquired weakness might get worse.

CONCLUSION:

In conclusion, when therapy has been escalated to extended to hospitalisation due to disease severity, lung transplantation has a therapeutic function for carefully chosen patients with COVID-19. Despite receiving several weeks of the best medical care, patients who still require mechanical ventilation or ECMO, have advanced disease severity, radiological signs of irreversibility, and a high risk of developing life-threatening complications should only be given consideration for lung transplantation. A minority of individuals who experience severe COVID-19-related chronic pulmonary fibrosis may also be candidates for lung transplantation. To identify individuals who are likely to develop irreparable lung disease and could benefit from early lung transplantation, further research is required. It becomes necessary to navigate such a difficult technique successfully in order to rescue more people even with a shortage of donor organs and medical experts during the pandemic as the disease spreads without showing any signs of stopping. To that purpose, it is important to carefully develop lung transplantation in patients with post-COVID lung failure, and we also need to pay attention to the existing mortality of patients infected after lung transplantation.

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DIABETES AND ORAL HEALTH CONSIDERATIONS: A REVIEW.

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ABSTRACT :

Diabetes Mellitus is now a global epidemic. With the rise in oral complications associated with diabetes, the dentists are concerned about the morbidity related to these. Oral health considerations involve those relating to adverse effects on gums, teeth, tongue as well as the delay in wound healing. Many a times, diabetics suffer discomfort and are not able to maintain proper oral hygiene owing to these oral complications thereby leading to significant rise in morbidity and mortality. It is imperative that such patients be made aware of the relationship that exists between oral hygiene and diabetes.

KEYWORDS: Diabetes Mellitus, Oral complications, Oral health.

INTRODUCTION:

The human body is incredible as it possesses ability to maintain a stable and constant internal environment. It depends on hormones and chemical signalling pathways to respond to external stresses, such as changes in temperature, pH and blood glucose levels, through its complex and well-regulated endocrine system. This steady state is termed "homeostasis." However many a times this balance is disturbed leading to disorders. Diabetes mellitus (DM) refers to a group of metabolic disorders in which the body's ability to produce or respond to insulin is impaired.¹ This results in abnormal carbohydrate metabolism that eventually leads to elevated blood glucose levels. As Martin Silink, past-president of the International Diabetes Foundation (2003-2006), expressed, 'diabetes is understood by few and ignored by many'.² Diabetes is a condition where the body either fails to

produce insulin (Type 1 diabetes) or the insulin that is produced is no longer as effective (Type 2 diabetes). Ketoacidosis or severe hypoglycaemic conditions can be encountered by diabetic patients. Patients with chronic diabetes are prone to affect the oral environment³ and adversely effect their kidneys (nephropathy), nerves (neuropathy), eyes (retinopathy), liver (non-alcoholic fatty liver) with generalized weight gain (obesity).⁴ Oral complications affecting the gum and teeth are quite common³ and this negatively affects their quality of life (QoL).⁵

DIABETES AND PERIODONTAL CONSIDERATIONS:

Periodontitis is the inflammation of the tissues surrounding the teeth causing these soft and hard tissues to shrink, thereby leading to loosening and loss of teeth. Patients with diabetes have been found to invariably have inflammatory periodontal issues,^{6,7} and if the control is poor the severity is even more.^{6,8} Hyperglycaemia associated with diabetes may lead to increase,^{9,10} decrease^{9,11} or change,^{12,13} in subgingival microbiota affecting periodontal tissues. The accumulation of plaque micro-organisms in diabetic patients causes irreversible periodontal tissue destruction.^{14,15}

DIABETES AND ORAL CANDIDIASIS:

The high prevalence of oral candidiasis in diabetic patients,¹⁶ is due to the immunosuppressive effect of Diabetes Mellitus on the patient which causes the

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normal commensal yeast, *Candida albicans* to stick to oral mucosa leading to Candidiasis.¹⁷

DIABETES AND HALITOSIS:

Odoriferous microorganism which produce volatile sulphur compounds leading to malodor have been found to be present in higher numbers in subgingival plaque and tongue coating of diabetic patients.¹⁸

Halitosis was found to be about 52% in patients with controlled diabetes while 76% patients with uncontrolled diabetes had oral malodour.¹⁹

DIABETES AND CARIES:

Diabetes Mellitus favours growth of acidogenic bacteria as hyperglycaemia is responsible for increased levels of fermentable carbohydrates, hence such patients are prone to carious teeth,²⁰ and superimposed with improper oral hygiene maintenance, the carious lesions percolate down the root canals and hence periapical pathologies are more prevalent.^{21,22}

DIABETES AND IMPLANTS CONSIDERATIONS:

In patients with Diabetes Mellitus the implants take longer time to osseointegrate,²³ More so in patients with poorly controlled glucose levels.²⁴ The breakdown of the peri-implant tissues is much more in patients with hyperglycaemia, irrespective of whether they are smokers or not.^{25,26}

DIABETES AND SALIVARY EFFECTS:

Diabetes leads to decrease in the production of saliva (hyposalivation) or in some patients xerostomia leading to dry mouth. Since saliva is home to oral microbiomes, underproduction of saliva leads to changes in their composition.²⁷ The increase in acidic oral environment is detrimental to the hard and soft tissues and leads to caries and periodontal problems; as well as difficulty in chewing, swallowing and speaking.²⁸

DIABETES AND TASTE CHANGES:

Diabetes Mellitus leads to taste disturbances because of its direct effect on the nerves supplying the taste buds.²⁹ Hence patients with Diabetes Mellitus frequently complain of taste impairment.³⁰

DIABETES AND BURNING MOUTH SYNDROME:

Diabetes Mellitus due to hyperglycaemia affect the microvasculature thereby leading to neuropathy and hence contributes to the complex burning mouth syndrome. A transdisciplinary approach is sought to deal with other local and systemic factors.^{31,32}

DIABETES AND WOUND HEALING:

Patients with diabetes are more prone to develop infections in the oral cavity and have slow healing wounds.^{33,34} This is mainly because the oral bacterial infections get an environment where hyperglycaemic conditions are superimposed upon a weak immune system of the diabetic patient.³³

Hyperglycaemia effects the lining of blood vessels making them less flexible; with the result small blood vessels are damaged and hence severely hampering healing of wounds.^{34,35}

DIABETES AND CANCER:

Patients with Diabetes Mellitus are more prone to cancer.³⁶ The delayed wound healing in patients with Diabetes Mellitus aggravates the oral wounds and leads to increased risk of developing traumatic ulcers and disorders of temporomandibular joint: as well as development of benign migratory glossitis and fissured tongue.³

DIABETES AND OSTEONECROSIS OF THE JAW:

Diabetes affects the peripheral microvasculature leading to decrease in nutrition to the jaw bone affecting both osteoblastic and osteoclastic activity required for remodelling.³⁷ Hence the patient is predisposed to Osteonecrosis of the jaw (ONJ).^{38,39}

DIABETES AND COGNITIVE FUNCTION:

The impairment of glucose metabolism in patients with Diabetes Mellitus causes cognitive decline.⁴⁰

Hence such patients can progressively have Alzheimer's disease; which has been named "type 3 DM."⁴¹

DIABETES AND SARS-COV-2 VIRUS:

COVID-19 patients with underlying co-morbidities like Diabetes Mellitus are at a risk of developing painful ulcers,^{42,43} and necrotizing periodontitis.⁴⁴

Alternatively patients with Diabetes Mellitus having



periodontitis can act as harbours to SARS-CoV-2 virus,^{45,46} in their periodontal pockets.^{45,47} and gingival crevicular fluid⁴⁸; thereby increasing the mortality rate of diabetic patients infected with the virus.⁴⁹

DIABETES AND QUALITY OF LIFE:

Oral health and Quality of life (QoL) are strongly related to each other,⁵⁰ hence focus on improving oral health conditions is important in Diabetes Mellitus.^{51,52} Since patients with Diabetes Mellitus suffer from tooth loss due to periodontal or periapical pathologies, their masticatory efficiency is compromised. Moreover, the use of partial or complete (fixed or removable) prosthesis is problematic due to salivary and mucosal changes. Chewing of healthy whole grain products as well as fruits and vegetables which are hard but laden with much needed nutrients and fibers is quite challenging.^{53,54} This compels them to switch to softer and processed foods which are easy on the oral apparatus but at the same time have high glycaemic index score⁵⁵; loaded with not only sugar and fat but devoid of nutrients.⁵⁶

DENTAL MANAGEMENT CONSIDERATIONS:

Before initiating treatment of a diabetic patient, dentists must appreciate important dental management considerations. In doing so, dentists can help to minimize the risk of an intraoperative diabetic emergency and reduce the likelihood of an oral complication of the disease.

THESE INCLUDE:

- Consult with patient's physician to assess diabetes control
- Confirm that patient has eaten and taken medications before initiating treatment
- Anticipate and be prepared to manage hypoglycaemia
- Prevent, treat and eliminate infections promptly
- Do not use or recommend aspirin-containing compounds
- Achieve profound local anesthesia
- Ensure excellent oral hygiene and provide profound preventive care

- Reinforce regular diet and medication regimen before and after dental appointments
- Take glucometer reading if patient is high risk, on insulin or having surgery

Cortisol is an endogenous hormone that increases blood glucose levels. Because cortisol levels are typically higher in the morning and during times of stress (e.g., a dental procedure), it is advisable that diabetic patients are scheduled for morning appointments.⁵⁷ In taking this precaution, the dentist reduces the risk of a hypoglycemic episode.

The most common intraoperative complication of DM is a hypoglycemic episode.⁵⁷ The risk is highest during peak insulin activity, when the patient does not eat before an appointment or when oral hypoglycemic medication and/or insulin levels exceed the needs of the body. Initial signs and symptoms of hypoglycemia include hunger, fatigue, sweating, nausea, shaking, irritability and tachycardia.⁵⁸

If a hypoglycemic episode is suspected, the dentist should stop dental treatment immediately and administer 15 g of oral carbohydrate via a candy, juice or glucose tablet.⁵⁹ If the patient is unconscious or cannot swallow, the dentist should seek medical assistance. Following treatment, the dentist must remember that diabetic patients are prone to infections and delayed wound healing. This is especially true for a diabetic patient whose condition is uncontrolled. Therefore, depending on the dental procedure, some consideration should be given to providing antibiotic coverage. If treatment will result in an interruption to the normal dietary regimen, the dentist should consult the patient's physician regarding a potential adjustment of insulin and antidiabetic medication doses. Notably, salicylates are known to potentiate the effect of oral hypoglycaemic agents by increasing insulin secretion and sensitivity.⁶⁰ To avoid unintended hypoglycaemia, aspirin-containing compounds should not be used by patients with DM.

PREVENTION OF ORAL MANIFESTATIONS:

The current body of evidence is not enough to prevent type 1 DM.⁶¹ Oral manifestations of type 2 DM can be



prevented through several approaches that are aimed at ensuring proper brushing and flossing behaviours, encouraging patients to visit the dentist for a routine check-up and controlling blood glucose levels.⁶²

The patients with dentures should be advised to remove dentures at night and keep them properly cleaned.⁶² Giving oral health education to relatives and friends could be beneficial as well because more than 55% of DM patients could be influenced by them.⁶³ The Internet can be used to educating DM patients because of its growing use among people.⁶⁴ It was reported that prediabetic patients were found to have deteriorated periodontal health as demonstrated by worse periodontal parameters, and glycemic control was shown to reduce the severity of these parameters.⁶⁵ Early identification, assessment, and management of patients who are at risk of developing DM require a dentist's active role in diagnosing the condition in previously undiagnosed individuals.

CONCLUSION:

Diabetes Mellitus is a public health crisis and health care professionals should play their roles to prevent and control the disease and its oral and other systemic complications. There is a high prevalence of DM, especially in high and middle-income countries. In addition to millions of people diagnosed with DM, a considerable proportion of the population is undiagnosed. The condition causes huge economic and financial burden to the healthcare systems in addition to increased morbidity and mortality. Oral complications of DM are numerous and include periodontal disease, hyposalivation, dental caries, halitosis, delayed wound healing, taste and salivary dysfunctions, candidiasis, and burning mouth syndrome. Increasing awareness and knowledge about the DM, its association with oral health including oral complications among patients can help prevent DM and improve their quality of life.

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INFLAMMATORY /REACTIVE HYPERPLASIA'S: A REVIEW.

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ABSTRACT :

The reactive lesions are comparatively common in the oral cavity that dentist face during routine examination because of the frequency with which the tissues are injured. They frequently result from a well-known provocation or injury such as plaque, calculus, or foreign bodies. Diagnosis and development of a treatment plan is difficult if dentists are not aware of the prevalence and clinical symptoms of these lesions. The aim of this article was to review the clinical features of various reactive hyperplastic lesions of the oral cavity. The most commonly found lesions are irritational fibroma, pyogenic granuloma, epulis fissuratum, peripheral giant cell granuloma.

KEYWORDS: Epulis fissuratum, Peripheral giant cell granuloma, pyogenic granuloma, Irritational fibroma.

INTRODUCTION :

Inflammatory hyperplasia is used to describe a large range of usually occurring nodular growths on oral mucosae that histologically represent inflamed fibrous and granulation tissue.¹

Reactive hyperplastic lesions are tumor -like hyperplasia which show a response to a low grade irritation or injury such as chewing, food impaction, calculus and overhanging dental restorations. Reactive lesions of the oral cavity are accompanying with injuries of soft tissue and comparatively common oral lesions.² Kfir et al (1980) have precisely classified reactive hyperplastic lesion into an irritating fibroma, pyogenic granuloma, peripheral giant cell granuloma, and cement-ossifying fibroma.³ These lesions are frequently seen in the gingiva, followed by other areas. Females predilection more than males 4, 5 the age ranged from 1st to 7th decades, with a mean incidence of 2nd -3rd decades.^{5,6}

Classification:

They are classified depending on the location as

- Occurring only on gingiva
- 1. Peripheral ossifying fibroma
- 2. Gingival polyp
- 3. Gingival enlargement

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- Commonly associated with gingiva

1. Pyogenic granuloma.
2. Peripheral giant cell granuloma.

- Not occurring on Gingiva

1. Irritational fibroma
2. Inflammatory papillary hyperplasia
3. Pulp polyp
4. Nodular fasciitis

IRRITATION FIBROMA :

- The term "fibroma", which implies a benign neoplastic proliferation of fibrous connective tissue therefore the term "focal fibrous hyperplasia" which recommends a reactive tissue response is more preferable. The lesion appears as a raised mass that is pedunculated or sessile with a smooth surface, and is frequently the same color as that of neighboring mucosa. The distinguish of reactive hyperplasia from true fibromas by the presence of the immunohistologic features (CD34, alpha-SMA, vimentin, Ki-67 and TGF-Alpha) of this irritation fibroma. The frequently involved site is the buccal mucosa along the line of occlusion and sessile lesion on the gingiva, mostly in the interdental papilla of the anterior teeth in adults.⁷ The size of lesion varied from smaller than 0.5 cm (25.3%), 0.5-1.0 cm (30.14%), and 1.0-1.9 cm (22.58%). The nuchal type fibroma associated with Gardner's syndrome.¹⁵ Conventional surgical excision and eradication of irritating factors are



the choice of treatment for irritation fibroma with a low recurrence rate.



Figure1: irritational fibroma present on the left lateral border of tongue

PYOGENIC GRANULOMA [granuloma pediculatum, benignum, benign vascular tumor, pregnancy tumor, vascular epulis, Crocker and Hartzell's disease].¹⁶

Pyogenic granuloma is one of the most communal objects liable for causing soft tissue enlargements. Clinically, the young lesions are highly vascular, red or reddish purple, regularly elevated and ulcerated, and bleed easily, whereas older lesions tend to be extra collagenized and pink in form.⁷ pyogenic granuloma is a misnomer as the lesion is not associated with pus formation and it is composed of granulation tissue histologically, it show necrotic white material clinically so these lesions refer as pyogenic granuloma¹⁰. Almost in one-third of the lesions a history of trauma can be detected pyogenic granuloma may display a rapid growth, but usually reaches its maximum size within weeks or months. The size of the lesion varies from a few millimeters to several centimeters in diameter. In 75% of all cases, the most often affected site is the gingivae followed by the lips, tongue, and buccal mucosa. Maxillary gingivae are more predominant than mandibular gingivae, and anterior areas more frequently involved than posterior area. A female predilection and a propensity to affect children and young adults. Surgical excision is the treatment of choice.¹⁰ after surgical excision of gingival lesions, curettage of underlying tissue is suggested. Excision with 2 mm margins at its clinical periphery and to a depth to the periosteum or to the causative agent. Any foreign body, calculus, or defective restoration should be eradicate as part of the excision.¹⁸



Figure2: pyogenic granuloma present in maxillary ant. Region of gingiva in relation with 11,21,22

PERIPHERAL OSSIFYING FIBROMA :

The Peripheral ossifying fibroma is thought to originate from the superficial periodontal ligament and this raised lesion may look smooth and pink or ulcerated and erythematous.⁷ Lesion regularly less than 2cm in diameter, but up to 8cm have been listed as well. Tooth mobility, tooth migration, and bone destruction have been noted in some cases. This lesion occurs wholly on the gingivae with up to 60% of cases being stated in the anterior areas of the maxilla (incisor cuspid region). Two theories have been suggested to explain the pathogenesis of the lesion: It might originate from a calcified pyogenic granuloma, or it may rise from an overgrowth and proliferation of various components of connective tissue in the periodontium, but the main cause is up till now to be clarify. It is principally a lesion of teenagers and young adults with a peak occurrence being between 10 to 19 years. Females are commonly affected than males, primarily during their 2nd decade of life, due to fluctuations of estrogen and progesterone. Treatment usually includes surgical excision, and the lesion should be excised down to the periosteum. The recurrence rate has been assessed to be between 8% and 20%.⁸



FIGURE3: peripheral ossifying fibroma on maxillary ant.

Region in relation with 21, 22

Image courtesey: Paulo S. G. Henriques, Luciana S. Okajima, Marcelo P. Nunes, Victor A. M. Montalli, "Coverage Root after Removing Peripheral Ossifying Fibroma: 5-Year Follow-Up Case Report", *Case Reports in Dentistry*, vol. 2016, Article ID 6874235, 6 pages, 2016. <https://doi.org/10.1155/2016/6874235>

PERIPHERAL GIANT CELL GRANULOMA

[peripheral giant cell tumor, osteoclastoma, reparative giant cell granuloma, giant cell epulis and giant cell hyperplasia of the oral mucosa.

Peripheral giant cell granuloma is one of the most frequent giant cell lesions of the jaws and initiates from the connective tissue of the periosteum or the periodontal membrane. It is not a true neoplasm but somewhat a benign hyperplastic reactive lesion occurred in response to local irritation such as tooth extraction, poor dental restorations, ill-fitting dentures, plaque, calculus, food impaction, and chronic trauma. Clinically, it demonstrates as a firm, soft, bright nodule or as a sessile or pedunculated mass and with sporadically ulcerated surface. The color of lesion, varies from dark red to purple or blue. It is situated in the interdental papilla, edentulous alveolar margin or at the marginal gingival level.⁷ The mandible is predominant than the maxilla, it is usually less than 2 cm in diameter, but larger sizes are seen seldom. Progressive growth in some cases causes bone and root resorption⁸ giving cup-shaped radiolucency called cupping resorption.



Figure4: peripheral giant cell granuloma present on mandibular anterior region of gingiva in relation to 31, 32,33,34,35,

(Abhay K, Rajendra B, Sanjeev O, A Retacent Intraoral Growth - Peripheral Giant Cell Granuloma, *Journal of Periodontal Medicine & Clinical Practice*, vol-2, issue-1, jan-April,2015)

Epulis Fissuratum [denture induced hyperplasia]

Epulis fissuratum is a reactive lesion of the oral cavity commenced by low grade chronic trauma from dentures. The lesion seems as an asymptomatic single fold or multiple folds of hyperplastic tissues in the alveolar vestibule along denture flanges with a smooth surface, soft to firm consistency, and a normal in color. Rarely in the bottom of the folds, severe inflammation or ulceration may be seen. Maxilla affected more than the mandible, entirely on the facial aspect of the alveolar ridges .the size varies from <1 cm to huge lesion. It is manage conservatively or surgically depending on the size of the lesion.⁸



Figure5: epulis fissuratum giving as an exophytic with smooth surface accompanying with an ill-fit mandibular denture.

{Image courtesey: Hamed Mortazavi, Yaser Safi, Maryam Baharvand, Somayeh Rahmani, Soudeh Jafari, "Peripheral Exophytic Oral Lesions: A Clinical Decision Tree", *International Journal of Dentistry*, vol. 2017, Article ID 9 1 9 3 8 3 1 , 1 9 p a g e s , 2 0 1 7 . <https://doi.org/10.1155/2017/9193831>}

Inflammatory papillary hyperplasia:

Inflammatory papillary hyperplasia (IPH) is a benign lesion of the oral mucosa which is characterized by the growth of one or more nodular lesions, determining about 2mm or less. The lesion almost entirely involves the hard palate. Nevertheless, in rare instances, it also has been seen on the mandible. The lesion is mostly asymptomatic and the color of the mucosa may vary from pink to red.¹¹ these lesions in inflammatory stage look as red, soft masses and convert to pink and firm when they mature to fibrous stage. It can occur at any age .but, most commonly occur in the 3rd to 5th decade of life with a male predilection. In to ill-fitting denture, *Candida albicans* has an etiologic role. Less

extensive lesions are subsided by eradicating the denture at night and improving oral hygiene. Patients can also benefit from antifungal agents. Various surgical methods have been recommended for the treatment of this lesion such as excision of partial thickness or full thickness, curettage, cryosurgery and electro surgery.



Figure 6: Upper edentulous ridge showing papillary nodules at the labial aspect of the ridge.

Image courtesy: Samiha Yousef Sartawi, Shaden Abu-Hammad, Nesreen A. Salim, and Salah Al-Omouh, *International Journal of Dentistry* Volume 2021, Article ID 7338143, 8 pages <https://doi.org/10.1155/2021/7338143>

Pulp polyp [chronic hyperplastic pulpitis or proliferative pulpitis or pulpitis aperta]

Clinically it seems like a proliferative red mass seen in the occlusal portion of the molars in individuals with higher immunity. It is the protective reaction against the tissue inflammation causing hyperplastic changes. It is occasionally associated with mild pain along with large carious cavitated lesions and may be related with rare history of bleeding. Histologically it shows abundant granulation tissue with many blood vessels.¹⁴ It appears as a smooth, soft to firm, red to pink, pedunculated, or sessile mass conquering the entire carious cavity in the involved tooth similar to an enlarged gingival tissue. The size of the lesion varies from < 1cm in diameter to large masses (about 4cm).⁸



Figure 7: Pulp polyp related with carious primary first mandibular molar.

GINGIVAL POLYP [localized gingival enlargement or epulis]

Gingival Polyp, which are focal fibrous hyperplastic lesions. They purely represent a reactive hyperplasia of fibrous connective tissue in response to trauma or irritation. The prime reason for the incidence of gingival polyp is ascribed to local factors such as caries, overhanging margin, calculus and tooth malposition. It can develop in the proximal tooth cavity near the gum area similar to a class II cavity. Rarely, it swollen pale pink gums, enlarge to fill the area in the tooth cavity. It usually occurs in border area cavity of the teeth with adjoining teeth (class II cavity).³ Enlargement of the gum can be abridged by incision, minor surgical procedures, undergone anesthetized conditions. The gold standard for this treatment is surgical excision performed with a scalpel, electrocautery or lasers.¹⁶



Figure 8: gingival polyp present in carious proximal surface of 1st mandibular molar.

Table I: Difference between pulp polyp and gingival p

	GINGIVAL POLYP	PULP POLYP
Origin	Originates from gingiva.	Originates from pulp
Spread	Runs towards center	Runs outwards from the center
Base	Broad base	Narrow stalk
Tooth surface involved	Proximal surface	Occlusal surface
Attachment	Can be separated from the tooth	Attached to the tooth
Bleeding on probing	Bleeds easily on probing.	May not bleed easily
Treatment	Excision /local debridement.	Endodontic/Extraction

Nodular Fasciitis and Proliferative Myositis

Nodular fasciitis, a non-neoplastic connective tissue proliferation, usually happens on the trunk or extremities of young adults. It appears as a rapidly



growing nodule that histologically mimics a malignant mesenchymal neoplasm (sarcoma) but that clinically acts in a benign fashion. It encounter at all ages, with the majority during the 4th and 5th decades. Has no gender predilection. The most communal oral site is the buccal mucosa, maximum have an exophytic presentation, and growth rates are variable. It has specific microscopic features that permit for the diagnosis, and the principal cell type is the myofibroblasts. Proliferative myositis and focal myositis are lesions of skeletal muscle that have analogous clinical features and are differentiated by histopathologic findings. Rare cases seen in the tongue and in other neck and jaw muscles. Proliferative myositis is a reactive fibroblastic lesion that infiltrates around individual muscle fibers. In spite of the terminology, these lesions do not show histologic signs of inflammation.¹

GINGIVAL ENLARGEMENT

Inflammatory gingival enlargement:

Inflammatory gingival enlargement occurs in locations of poor oral hygiene where there is accumulation of plaque, supra-gingival calculus formation, impaction of food, or the existence of provoking factors like hormonal changes or other systemic diseases. The clinical diagnosis of is forthright, with tissues displaying a glossy edematous bright red or purplish red color and a tendency to hemorrhage on slight provocation. A fetid odor may outcome from the decomposition of food debris and buildup of bacteria. In long-standing cases of inflammatory enlargement, there may be an accompanying loss of periodontal attachment leading to periodontal disease. Affecting principally the maxillary anterior region may be detected in mouth breathers. Hormonal changes (such as during pregnancy or puberty) may amplify the local immune response to local factors The impaired collagen synthesis accompanying with vitamin C deficiency (scurvy) may also complicate inflammatory gingival enlargement. Amplify the local immune response to local factors and contribute to gingival enlargement. Treatment begins with the establishing of excellent oral hygiene, along with the eradication of all local

and/or systemic predisposing factors if possible. This contains a professional debridement (supragingival scaling or subgingival root planing) and prophylaxis and improving of faulty restorations, carious lesions, or food impaction site.¹



Figure 9: inflammatory gingival enlargement present on lower anterior region of gingiva.

CONCLUSION:

The inflammatory and reactive hyperplastic lesions present usually in oral cavity secondary to injury and local factors which can imitator benign and rarely malignant lesions. The complete removal of local irritants with follow-up and maintenance of oral cleanliness helps to prevent the recurrences of such lesions. We included a classification regarding oral peripheral exophytic lesions, divided into lesions occurring only on gingiva, commonly associated with gingiva and not occurring on gingiva. Upon confronting a peripheral exophytic mass in the oral cavity a clinician should have knowledge about the some features such as surface texture, shape, color, and consistency in order to categorize the lesion, and progress along the decision to reach a logistic differential diagnosis.

Declarations:

Funding: None

Conflict of interest: None

Ethical approval: None

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IMPORTANCE OF HISTORY TAKING IN DENTISTRY.

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ABSTRACT:

Medical or dental professionals deal with humans who can communicate and discuss their problems; even people with special needs learn to communicate with sign languages. But alas in the fast paced life many of the professionals want to finish treating the person in their own ways, as they deem fit; rather than listening to what the patient is going through and what his/her expectations from the treatment are. Discussions take a back-seat; even though treatment following diagnosis and based on presenting complains should be the driving force. Communication with the adult patient or with the paediatric patient and their guardians sets the environment where important information regarding the patients behaviour, their concerns and apprehensions can be ascertained culminating in wholesome treatment outcomes. Not only does this instil confidence in the patients and guardians but also makes treatment goals easily achievable for the professional.

KEYWORDS: History, communication, effective treatment.

INTRODUCTION:

A patient entering a dental set-up has some oral and/or dental issues which need to be resolved. Since this is the age of social media where information is available on the click of a button; many of them come with plethora of information regarding their problems.¹

Lot many patients still may not have such information, especially the not-so-young generation or those with rural background.² However what is common to both the groups is their concern regarding the existant condition and the treatment modalities available which they need to thoroughly discuss and only go ahead with the treatment if they feel satisfied.³ It is very important for the dental practioner to know about the patient's expectations from the treatment and let them know much before starting the

procedure whether these expectations can be met totally/ partially/ or not at all. This can be achieved only and only if the practioner is a good listener and is able to communicate his decisions in an effective way. Having skilled pair of hands and delivering satisfactory results is what comes next in the pipeline. It is imperative that consent forms be filled by the adult patient or the guardian of paediatric patient clearly stating the risk factors involved; so that the patient is in the know-how of pros and cons of the treatment and the clinician can produce the same in medico-legal issues.⁴

HISTORY OF PRESENTING COMPLAINT:

The great physician of 19th century, William Osler supposedly said to his pupil, "Listen to your patient; he is telling you the diagnosis."⁵ R Macbeth Pitkin added to this "And she just might be telling you the best management too."⁵ This underlines the importance of knowing straight from the patients mouth his/her complains his/her way. As regards the clinician, he should lead the patient to ascertain the history of his problem and should include

- Patients or guardians initial observations of problem;
- Whether the condition is acute or a chronic one;
- Whether treatment regarding the same was

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- attempted early or not;
- Causes of recurrence (if treatment done earlier);
- Practitioners previously consulted for the present complain, if any. Reason for discontinuation of treatment under him/her.
- Any other local or systemic conditions under treatment

MEDICAL HISTORY:

A thorough medical history forms the backbone for treating patients with dental issues. By simply ignoring the systemic conditions and focussing only on the dental issues the dentist runs the risk of encountering medical emergency during the procedures as well as encountering failures of his treatment since many systemic conditions affect dental outcomes.⁶ A dental practitioner can help diagnose many systemic diseases by just paying attention to their oral manifestations.⁶ According to Mahlon, the first step towards patients care is to involve them in understanding their problem, to communicate and attend to their concerns.⁷ It is only when the patient feels confident enough with the attending practitioner will he/she share valuable details with regards to his/her conditions; that ultimately are gold standards to determine the diagnosis. Hence patient-approach of the practitioner is a must for proper history taking which is the first step to successful treatment outcomes.⁸ There are studies to support that 90% of untoward situations occurring during dental procedures can be avoided if the practitioner is aware of the patients systemic background.⁹ It is not however always easy to get thorough and proper history from the patient and proper history taking is no less than an art.¹⁰ Since the source of the information is the patient, so it is only by building a rapport with the patient can we expect him/her to divulge details regarding oneself.¹¹⁻¹³

Studies have shown that having the patients involvement right from history taking to decision-making with regards to treatment outcomes has reduced medical expenses by about 15 to 30 %.¹⁴ Both the dentist as well as the patient are in the know-how of risks.^{15,16}

- Risks that the patient may encounter during procedures
- Risks that the dentist may encounter while performing the procedures

Hence, before the start of any procedure communicating with patient and listening to them not only yields better results but has economic gains too.¹⁴

MEDICAL CONDITIONS:

There are several medical condition which need thorough evaluation before the start of dental procedures. If the patient is suffering from an acute or chronic systemic or local conditions, details have to be sought regarding the same. This may even require referral to the concerned specialist to rule out any uncontrolled condition which may require delaying the dental procedure. It is only when the condition returns to near normal can the dental procedure be initiated.

- **Blood dyscrasias:** Patients with various blood dyscrasias like leukemia, anaemia, thrombocytopenia etc are at a risk of bleeding profusely and have compromised immunity. Patients with sickle cell anaemia carry general anaesthetic risk.
- **Cardiac patients:** Patients with unstable angina or with history of cardiac surgeries are at a risk of bleeding profusely if anticoagulant thereby is not stopped 2 to 5 days before dental surgeries in consultation with the patient's cardiologist. Care has to be taken while administering local anaesthetic without vasoconstrictor. Valvular heart diseases will require prophylactic antibiotic coverage to avoid the risk of development of Subacute bacterial endocarditis.
- **Respiratory patients:** Care has to be taken that patients with Chronic obstructive pulmonary diseases and Asthma are not given Non-steroidal anti-inflammatory drugs and carry their inhalers as they may pose dental emergencies during procedures.
- **Gastro-intestinal ailments:** The acidic reflux problems in patients with Gastro-oesophageal reflux disease leads to erosion of dental tissues making them prone to sensitivity.



- **Hepatic ailments:** Alcohol or bacterial / viral inflammatory changes in liver lead to altered metabolic functions, thereby making the person more prone to infections and bleeding disorders.
- **Neurological disorders:** Patients with Parkinson's disease or Epilepsy will require special attention and consultation with attending consultant.
- **Temporomandibular joint dysfunctions:** Such patients may not be able to adequately maintain mouth opening during dental procedures.
- **Pregnancy:** It is better to avoid dental procedures till the birth of child . If absolutely necessary second trimester is preferred but consultations with referring Gynaecologist is a must.
- **Drug history and allergy:** If a patient is allergic to any substance that has to be avoided. Anticoagulant therapy has to be stopped; Gingival overgrowth due to phenytoin and Steroid therapy leading to decreased immunity has to be assessed before any surgical procedures.

SOCIAL HISTORY:

- **Occupational history:** It gives an idea with regards to any occupational exposure to agents having detrimental effect on health. Moreover the patients availability can be assessed and appointments scheduled accordingly.
- **Dietary habits:** Diet play an important role in the development or progression of dental ailments. Excessive consumption of sugary, processed and carbonated products predisposes to caries as well as periodontal involvement of persons
- **Smoking and alcohol addictions:** Smoking and/ or alcohol consumption with its ill-effects on lungs and liver respectively decrease the immune power of a person.

DENTAL HISTORY:

It is of utmost importance to know about the patients anxiety levels while visiting the dental clinic. If the patient is visiting a dentist first time or previously has visited any such place and his/her previous experiences. This helps to assess the co-operation that the patient will have during the procedures.

Assessing the patients oral hygiene maintenance regimen also gives a fair idea of how the patient will follow the post-procedural advise and thereby contributing towards successful maintenance of the treatment.

- **Toothbrushing:** whether the patient brushes once or twice or more frequently, the type of tooth brush and toothpaste used.
- **Interdental cleaning:** whether the patient uses interdental cleaning devices like floss, interdental brushes, single-tufted brushes etc. Does the patient have a habit of using toothpicks.
- **Mouth rinse:** whether the patient rinses after meals with plain water or medicated rinses.
- **Gum massage:** whether the patient follows massaging gums with finger tips, with gum astringents or never does so.

All this provides a valuable information to the dentist regarding the level of oral hygiene awareness of the patient and hence compliance expected from them during treatment.

CONCLUSION:

Appropriate diagnosis needs a thorough and comprehensive patient history. Many a times, clinicians "rush to judgement" during initial examination. A natural bias of a specialist is to characterize problems in term of his or her interest. This bias must be recognised and consciously rejected. Diagnosis must be comprehensive with interview of patient and parent forming an essential part alongwith clinical examination and evaluation of diagnostic records.

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AN UNUSUAL SOCIAL HABIT LEADING TO A FOREIGN BODY IN TEETH

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ABSTRACT:

In children, discovery of a foreign body in teeth is often diagnosed accidentally which may be lodged due to a traumatic injury or it may be a self-inflicted injury. However, in adults, it may be due to a social habit and the patient usually reports only when he/she experiences pain and then the foreign object is discovered in radiographic examination.

In this article, we present a case report of a 23-year-old male with a ball pen nib lodged into the lower molar teeth due to an unusual social habit, which the patient himself was unaware about and the subsequent removal of the foreign body.

KEYWORDS: Foreign body, diagnosed accidentally, social habit, ball pen nib, molar teeth.

INTRODUCTION:

Impaction of foreign objects in the oral cavity is quite common among children because of their habit of placing various objects in their mouth and is often diagnosed accidentally¹. Similar reports in adults are however, infrequent. We present an incidental detection of a self-introduced unusual foreign body in molar tooth, about which the patient himself was unaware.

CASE HISTORY:

A 26-year-old male reported to the emergency room with the chief complaint of pain in the lower back left tooth region for past 2-3 days. The pain was dull in nature, continuous and aggravated on taking food. He also gave history of ongoing root canal treatment with respect to 37.

Clinical examination revealed a temporary restoration with respect to 37 (which was given after access opening done in the same tooth) and a partially erupted 38.

An orthopantogram [OPG] was advised which revealed a horizontally impacted 38 impinging onto the distal aspect of 37 and proximal caries with respect to 37 [Figure 1]. However, a small cylindrical

artifact was evident on the radiograph appearing to be located in between teeth 37 and 38 that was not visible on clinical examination.



Figure 1. Orthopantogram showing a well-defined radiopaque foreign object in the tooth. The retrieved ball point of the pen [Inset]

The patient was unaware of this foreign object that was detected on the OPG. Upon asking, the patient gave a history of picking his teeth with a ball point pen, mostly after food.

After a failed attempt to retrieve the foreign object with a probe and a tweezer was made, surgical removal of the impacted 38 was planned. A modified ward's incision was given and the periosteum was reflected. Odontectomy of 38 was done and the crown and roots were sectioned apart. The sectioned crown portion of 38 was removed first which aided in the removal of the foreign object which was wedged between the crown of 38 and the cervical portion of 37. The object was identified to be the tip of a ball point pen [Figure 2]. The roots of the sectioned tooth

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were then removed and wound closure was done with silk suture after thorough irrigation of the extraction socket.

DISCUSSION:

Foreign bodies lodged in teeth can be metallic or non-metallic. The metallic objects can be readily identified from routine radiographs because of their radio-opaque nature. These include broken instruments, canal obturation materials or foreign objects inserted by the patient himself¹. Among the various self-inserted objects are pencil leads, needles, metal screws, beads, nails, pins, wooden tooth picks and tooth brush bristles.

Complications reported due to these foreign objects include pain, swelling, infection, recurrent abscesses and chronic maxillary sinusitis of dental origin². Actinomycosis following placement of piece of jewellery chain into a maxillary central incisor has also been reported³.

A ball point pen is a pen that dispenses ink usually in paste form over a metal ball at its point. The components of a ballpoint tip include the freely rotating ball that distributes ink on the writing surface, a socket holding the ball in place, and a self-contained ink reservoir, a narrow plastic tube supplying ink to the ball. The tip can be detached from the plastic tube when a twisting force is applied that can happen during tooth picking using the pen. Our patient was apparently unaware of this detachment.

After such an accidental radiological detection, detailed case history and clinical evaluation are necessary to come to a conclusion about the nature and size of the foreign body. Careful instrumentation with patience is needed for retrieval of the foreign body. The patient should be counselled about oral hygiene and abstain from such practices.

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ACANTHOMATOUS AMELOBLASTOMA IN ANTERIOR MANDIBULAR REGION: A RARE CASE REPORT

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ABSTRACT:

After odontoma, ameloblastoma is the second most common odontogenic tumor. Ameloblastoma is locally aggressive and exhibit high tendency of recurrence. It arises from the remnants of odontogenic epithelium, odontogenic cystic lining and the basal layer of the oral mucosa. Ameloblastoma accounts for 1% of all odontogenic cyst and tumors, and 9-11% of various odontogenic tumors of the jaw. There is no sex predilection, it affects both the genders equally, and male to female ratio is 1:1. Clinically it present as painless, slow-growing odontogenic tumor, usually involves mandibular posterior region. There are several histological varieties of ameloblastoma but the acanthomatous variety being one of the rarest. We present a case of acanthomatous ameloblastoma involving mandibular anterior region.

KEYWORDS: Ameloblastoma, Acanthomatous, Odontogenic, benign tumour.

INTRODUCTION:

The term "Ameloblastoma" is the combination of two word "amel" which mean enamel and "blastos" which means the germ.¹ The tumor originates principally from the remnants of dental lamina.

Historically, the first description of ameloblastoma reported by Cusack in 1827. Later in 1885, the term "adamantinoma" was introduced to the literature. Ivey and Churchill in 1930 coined the term "Ameloblastoma". The most accepted definition of ameloblastoma was given by Robinson in 1937, as "usually unicentric, nonfunctional, intermittent in growth, anatomically benign and clinically persistent."¹ The World Health Organization (WHO) (1991) defined ameloblastoma as a benign but locally aggressive tumor with a high tendency to recur, consisting of proliferating odontogenic epithelium

lying in a fibrous stroma.²

It is considered to be odontogenic tumour of epithelial tissue, principally of enamel organ-type, lacking the differentiation to the point of hard tissue formation. Mutations in genes that belong to MAPK pathway (most common mutation is the BRAFV600E) have been discovered in genetic studies of many ameloblastomas.³

World health organisation in 2005 classifies ameloblastoma into for category of solid / multicystic, extraosseous / peripheral, desmoplastic and unicystic types. Currently in 2017, two modifications has been undertaken- a) The term "solid/multicystic" was removed because of its no biologic significance and the confusion with unicystic ameloblastoma b) Desmoplastic ameloblastoma removed from the clinical classification and reclassified as a histological subtype. Thus the new clinical subtypes of ameloblastoma are conventional ameloblastoma, Unicystic ameloblastoma and peripheral / extraosseous ameloblastoma.⁴

Here, we are reporting a case of acanthomatous ameloblastoma of anterior mandible, crossing the midline, which is rarest of its own.

CASE REPORT:

A 63-year-old male patient came to the department of oral and maxillofacial surgery at Dental College Azamgarh with a chief complaint of swelling in his lower front region of the jaw. (Figure1) The swelling was gradual in onset, and slow growing. There was

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positive history of trauma 4 year back with negative history of any toothache, or any reduction in the size of the swelling, paresthesia and discharge. Only little discomfort was reported during biting food.



Figure 1- Extra oral photograph of patient showing diffuse swelling over the anterior mandibular region

On clinical examination, a solitary diffuse swelling over the anterior mandibular region, measuring approximately 4X5 cm was present. (Figure1). The skin overlying was stretched, smooth and normal in color with no other significant findings. It was firm and non-tender on palpation.

On intraoral examination, a solitary swelling in the lower vestibule region with vestibular obliteration in relation with 44, 43, 42, 41, 31, 32, 33 and 34, measuring approximately 3.5X4.5 cm was present. Mucosa overlying was smooth, stretched and normal in color. On palpation, it was soft to firm in consistency and non-tender. Based on clinical examination, a provisional diagnosis of radicular cyst was given. Central giant cell granuloma, periapical cemental dysplasia and ameloblastoma were given as differential diagnosis. On vitality testing, the tooth was vital. On FNAC, the straw color fluid was seen. (Figure 2)



Figure 2- FNAC- Straw colour fluid Aspirated

On radiographic examination, panoramic radiograph revealed well defined unilocular radiolucency in the periapical region of 44, 43, 42, 41, 31, 32, 33, and 34

measuring about 4x2.5cm, extending mesio-distally from mesial of 45 to the distal of 35 and supero-inferiorly from alveolar crest to the 0.8mm superior to the lower border of mandible in the 42, 43 regions. The internal structure was completely radiolucent. Root resorption is present in relation with 44, 43 and 42.(Figure 3).



Figure 3 -Panoramic radiograph showing unilocular radiolucency in relation with 44, 43, 42, 41, 31, 32, 33 and 34.

CBCT scan revealed a well-defined hypodensity measuring 4.1x2.4cm in relation with the periapical region of 44, 43, 42, 41, 31, 32, 33 and 34. (Figure 4) The borders of the pathology are well-defined and non-corticated, internal structure of the pathology is totally hypodense. Perforation of the labial cortical plate is noted. (Figure 5) Root resorption is noted with respect to 31, 32, 33, 41, 42 and 43. Based on radiological feature, radiological diagnosis of infected periapical cyst in relation with mandibular anterior region was given, and radiological differential diagnosis of unicystic ameloblastoma was given.

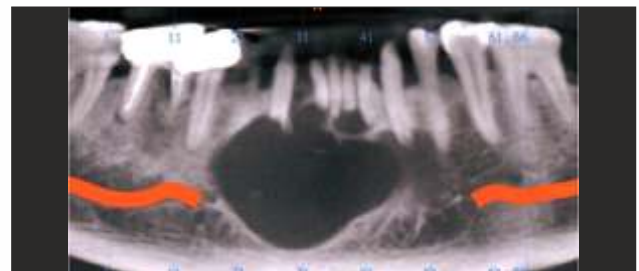


Figure 4 CBCT View showing well -defined hypo-density in relation with 44, 43, 42, 41, 31, 32, 33 and 34.

The FNAC report showed presence of polymorphs, lymphocytes, histiocytes and degenerated cells in a hemorrhagic background with occasional squamous cells. No malignant cells were seen. Incisional Upon biopsy, there were solid epithelial nests with peripheral palisading ameloblastic cells and a central



squamous metaplasia consistent with an acanthomatous ameloblastoma. (Figure 6).

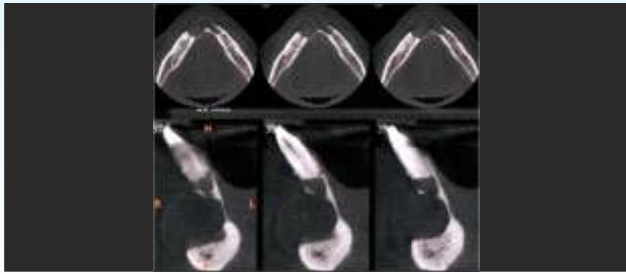


Figure- 5 - Axial section and oblique coronal section of CBCT showing well-defined hypo-density with labial plate perforation.

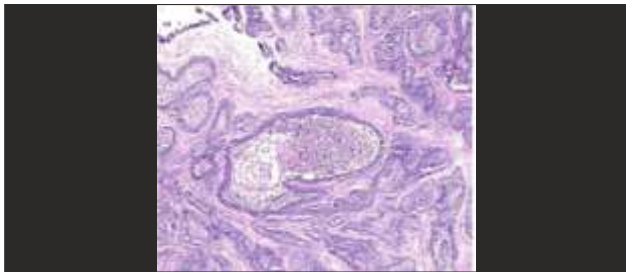


Figure-6 Histopathological view showing solid epithelial nests with peripheral palisading ameloblastic cells and central squamous metaplasia

After obtaining the consent from the patient and routine blood investigations, the surgery was performed under local anesthesia. A crevicular incision was made to disclose the pathology and enucleation of the lesion as a conservative surgery was performed with removal of upto 5 mm of bone with round bur including surrounding healthy bone (Figure 7).

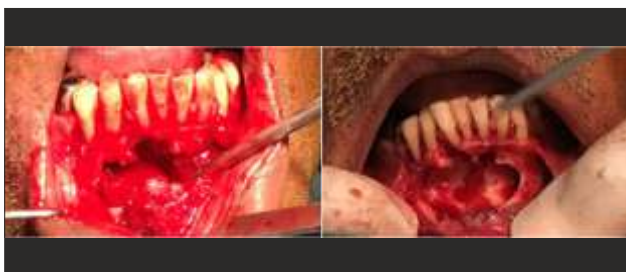


Figure7 - Enucleation of the lesion with removal of 1 to 2mm of bone

The application of Carnoy's solution after conservative excision was done. Following the excised specimen's histological examination, acanthomatous ameloblastoma was confirmed (Figure 8). Post operative follow up did not show any

adverse complications. (Figure 9). Patient was kept under periodic follow-up to check for any recurrence. A post operative radiograph made after 2 year showed healing lesion with bone formation.



Figure 8 -Excisional biopsy samples



Figure 9-Post operative panoramic radiograph after 2 years showing post surgical healing

DISCUSSION:

Ameloblastoma is benign origin, arises from remnants of odontogenic epithelium, dental lamina or enamel organ and exhibits high recurrence rate. If it is left untreated, it exhibits destruction and deformity due to its local aggressive and invasive behavior.^{1,2}

Usually ameloblastoma occurs during third to fifth decade, but in contradictory acanthomatous ameloblastoma found to be many in seventh decade of life.⁵ In our case the acanthomatous ameloblastoma reported in a patient of 6th decade of life.

It can occur both in maxilla or mandible but most commonly it occurs in mandible (about 80% of the cases) in posterior region. Out of 80% of ameloblastoma, 70% are located in the area of the ascending ramus or the molars.⁵ In contrast to this, our case reported with the lesion in the mandibular anterior region, which is rare and was also crossing the midline

Clinically, ameloblastoma is slow growing, painless swelling with expansion in buccolingual direction. The lesion can grow enormously, lead to facial deformity,

malocclusion, loosening of teeth, perforation, soft tissue invasion and paresthesia.^{5,6} There was significant labial cortical plate destruction with root resorption in our case.

Chair side investigation usually includes fine needle aspiration cytology (FNAC). Usually FNAC can results in different fluid on aspiration such as straw colored, white thick creamy, blood or pus and sometime air. Ameloblastoma usually gives either straw colored fluid or negative results on aspiration based on different subtype. Our case we aspirated straw colored fluid which was suggestive of cystic changes.⁷ Different modalities of imaging investigations can be performed to evaluate and assess the pathology such as periapical, occlusal, panoramic, cone beam computed tomography (CBCT), computed tomography (CT), and magnetic resonance imaging (MRI). CT and CBCT usually help radiologist to evaluate the bone characteristics, while MRI is helpful in providing details of soft tissues which get involved by the lesion.⁸

Radiographically, ameloblastoma present as either unilocular or multilocular radiolucency. Conventional ameloblastoma usually presents with multilocular radiolucency due to the presence of bony septa creating internal compartments. Initially these internal compartments are smaller giving honeycomb appearance; later the compartments become bigger and lead to soap bubble appearance. On the other hand unicystic ameloblastoma present as unilocular radiolucency, which can be misdiagnosed as radicular cyst. It can also show expansion, displacement of the teeth with knife edge root resorption radiographically.^{7,9} In our case, panoramic and cone beam computed tomography (CBCT) revealed well defined unilocular, non-corticated radiolucency directing toward unicystic ameloblastoma radiographically.

Histopathologically, the follicular and plexiform patterns are the most common whereas acanthomatous ameloblastoma is one of the rare types.⁸ According to Adebisi et al, the most common histopathological type reported is follicular (64.9%),

followed by plexiform (13.0%), desmoplastic (5.2%) and least acanthomatous (3.9%).⁹ Acanthomatous type, histopathologically shows central squamous cell differential with peripheral palisading ameloblastic cells and keratin formation, as seen in our case.

The treatment of ameloblastoma consist of conservative or radical surgery. In radical approach marginal or segmental resection is done with at least safety margin of 1.5-2 cm of normal bone. Radical approach is commonly used for large ameloblastoma or for more aggressive variants whereas, enucleation or enucleation with bone curettage is the common conservative approach used particularly for unicystic type.¹⁰ Our case was treated with enucleation of the lesion as a conservative surgery with curettage upto 5mm of bone removal including surrounding healthy bone along with application of Carnoy's solution.

Ameloblastoma has potential for local invasion and has high tendency of recurrence. The recurrence rate varies from the type of treatment performed. Recurrence rate is lesser (13%-15%) for surgical resection while for curettage it is found to be high (90%-100%).^{4,5} The conventional ameloblastoma has a high recurrence rate compared to unicystic ameloblastoma due to the presence of fibrous connective tissue capsule. Recurrence of the lesion is due to the infiltrative property of the tumor into the cancellous bone. Thus regular follow up is utmost mandatory to evaluate the recurrences in future. We have follow-up the case for more than 2 years with no sign of recurrence, and bone formation in the area of the lesion showing healing.

CONCLUSION:

Though ameloblastoma is the common tumor of the jaw, acanthomatous type of ameloblastoma is very rare. Very few case of acanthomatous ameloblastoma is reported in the literature occurring in elderly aged patient in anterior region of the mandible crossing midline. Also, ameloblastoma has high recurrence rate, so long term follow up is mandatory at regular intervals to rule out recurrence after surgery.

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RADICULAR CYST : A CASE SERIES WITH REVIEW OF LITERATURE

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ABSTRACT :

Radicular cysts are the most common odontogenic cystic lesions of jaws, these are inflammatory in origin. These cysts result from the proliferation of cell rests of Malassez in the periodontal ligament as a consequence of inflammation, following pulpal necrosis of a nonvital tooth. The condition is usually asymptomatic but can result in a slow-growth in the affected region. On radiography the lesion is often seen as a round or oval, well circumscribed radiolucent area involving the apex of the infected tooth. Nonsurgical management should be the treatment of choice of a radicular cyst. However, periapical surgery is often considered, if the lesion is extensive and fails to reply to a nonsurgical approach.

The case report is of a 43-year-old male patient with the complaint of swelling in an anterior region of maxilla since past 2 months which was gradually increase in size with no history of any pain or pus discharge. Patient had history of root canal treatment with upper right canine 10 years back.

The second case report is of 45-year-old male patient with the complaint of pus discharge from destructed teeth in anterior region since one month. No intraoral and extra oral swelling present.

The third case report is of 15 yrs. old male patient with the complaint of pain in upper anterior tooth since 7 days. Patient had history of root canal treatment with right lateral incisor 2 months back.

The definitive diagnosis was made based on clinical, radiological and histopathological examination. Both the case reports discusses detailed description of clinical, radiographic, histopathologic features, pathogenesis, and its surgical management.

KEYWORDS: Bay cyst, Radicular Cyst, Nonvital tooth.

INTRODUCTION:

A cyst is defined as a pathological cavity having fluid, semi fluid, or gaseous contents, which is not created by accumulation of pus (Kramer, 1974).¹ Cysts are classified into odontogenic and nonodontogenic based on the tissue they arise from. Odontogenic cysts are often broadly divided into developmental and inflammatory cyst based on their aetiology. Radicular cyst and lateral periodontal cyst are classified as inflammatory odontogenic cysts. The

most common inflammatory odontogenic cysts in tooth bearing areas of the jaws are radicular cysts (apical periodontal cyst, dental root end cyst).² They originate from an epithelial rest of Malassez in periodontal ligaments secondary to inflammation.³ They are most often found at the apices of the involved teeth with infected or necrotic pulps; however, they will even be found on the lateral aspects of the roots in relation to accessory root canals.⁴

Radicular cyst is mostly seen during the third and fifth decades of life, and common in males.⁵ clinically radicular cysts are symptomless and are noted when radiographs are taken of non-vital teeth. Patient complains of slowly enlarging swelling.⁶ Radiographically most radicular cysts appear as round or pear-shaped unilocular radiolucent lesions within the periapical region. The cysts may cause root resorption or displacement of adjacent teeth.⁶

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Histopathologically, the radicular cyst is a chronic inflammatory lesion with a closed pathological cavity. It is lined by non-keratinised stratified squamous epithelium.³ Radicular cysts must be totally enucleated surgically to remove all epithelial remnants. Endodontic treatment or extraction leads to spontaneous healing of radicular cyst.⁷

The present case series documents with the cases of radicular cyst in anterior maxilla along with its histopathology and surgical management.

CASE REPORT: 1

A 43-year-old male patient with the complaint of small sized gradually growing swelling in an anterior region of maxilla since the past 4 months. The swelling was not associated with any pain or pus discharge. The patient does not recall any history of trauma. Patient had history of RCT with right upper canine 10 years back and apical puff was achieved, which was confirmed radiographically. His past medical history was non-contributory.

Extraoral examination revealed no facial swelling or obvious facial asymmetry. On intraoral examination, (fig.A & B) there were restorative filling with teeth 12. Inspectory findings revealed an asymptomatic diffuse buccal swelling on the right side, which was extending from 11 anteriorly to 14 posteriorly. The swelling measured about 2 cm × 1.5 cm in its largest dimension. No evidence of any surface changes / bleeding / sinus opening / pus discharge. On palpation, the swelling was non-tender, ovoid in shape, soft in consistency, non-fluctuant, and non-pulsatile with no mobility of the involved teeth. The overlying palatal mucosa appeared normal.

The patient was advised for routine cone beam computed tomography for right maxilla for radiological evaluation, which revealed that buccal and lingual cortical plate were intact. (Fig. C) There was a homogenous radiopacity in 12 region. A well-defined radiolucent lesion noted at periapical region with 12. It extends from mesial aspect of 13 tooth root till mesial aspect of 21 tooth root region size approximately 1.25 cm × 1cm. Expansion of lingual and buccal cortical plates were noted. Periphery of

shape of lesion shows well defined smooth and corticated borders on radiograph. There was no evidence of root resorption/displacement of the adjacent Teeth. The radiographic findings were suggestive of radicular cyst.



FIG. A: Intraoral swelling on buccal sulcus



FIG. B: Normal palatal mucosa

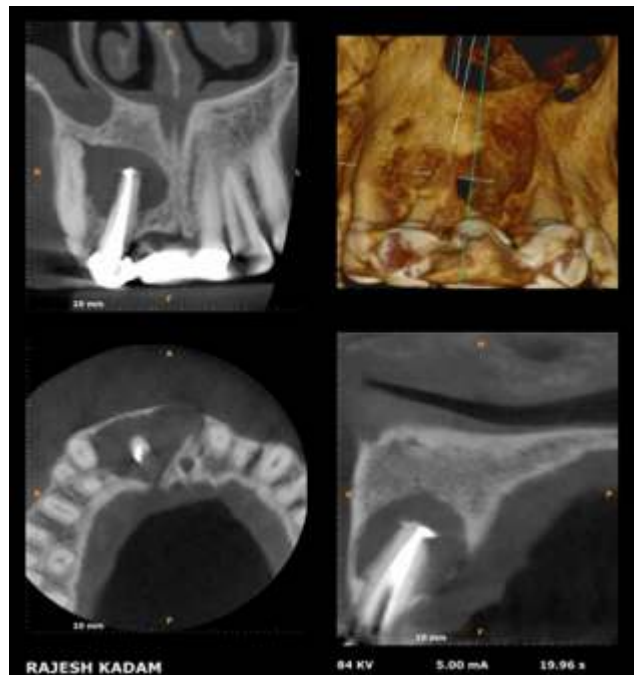


FIG. C: cone beam computed tomography for right maxilla

CBCT was considered as imaging modality choice as the clinical, radiographic, histological diagnosis of periapical lesions has been a challenge, and differentiating between the varied periapical lesions remains an open research problem. Attempt to diagnose, the lesion before surgery with intraoral periapical (IOPA) radiographs, contrast media, Papanicolaou smears, and albumin tests have proven to be inaccurate. Thus, there is a requirement for a non-invasive method to diagnose lesions involving the periapical area. Recently with the arrival of imaging modalities like CBCT.

The patient was advised for surgical excision under local anaesthesia after obtaining an informed consent from the patient. Crevicular incision was made from 21 to 14 with Vertical releasing incision and the trapezoidal mucoperiosteal flap was raised. The overlying thinned bone was removed with bur under copious irrigation to expose the cystic mass. Careful enucleation of cyst was performed along with apicectomy of root canal treated tooth 12 and curettage was done. (Fig.D) Flaps were repositioned and sutures were taken with 3-0 vicryl. (Fig.F) Excised tissue was sent for histopathological investigation. (Fig.E) Necessary prescriptions and postoperative instructions were given.



FIG. D: Enucleation with Apicectomy

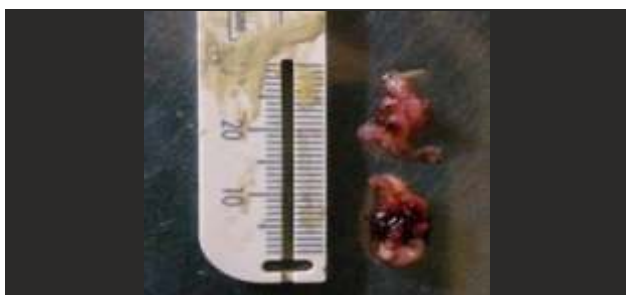


FIG. E: Excised Lesion



FIG. F: Sutures placed

Differential diagnosis includes dentigerous cyst, pindborg tumour, periapical cementoma, traumatic bone cyst, ameloblastoma, odontogenic keratocyst and odontogenic fibroma. Confirmatory final diagnosis of the radicular cyst is established only after surgical biopsy and histopathological examination of the lesion.

Histopathological examination revealed a cystic cavity lined by nonkeratinized stratified squamous epithelium arranged in an arcading pattern, interspersed with intense inflammatory cell infiltration consisting chiefly of lymphocytes and plasma cells. Russel's bodies were also noted at places. The histopathological findings confirmed the diagnosis of radicular cyst. (Fig. G) Based on clinical radiographic and histopathological findings the provisional diagnosis radicular cysts with 12 was made.

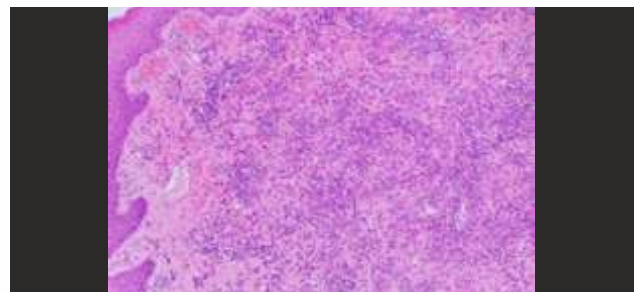


FIG. G: Photomicrograph

CASE REPORT 2:

A 45-year-old male patient reported with the chief complaint of pus discharge from destructed teeth in the upper front region of the jaw since 1 month. He had a history of grossly carious teeth in upper anterior region since 12 years.

The clinical examination revealed grossly carious

teeth with 11 and Pus discharge was seen from the canal with 11 and 21. No intraoral swelling was noted. The teeth were tender on percussion. Buccal vestibule of upper anterior region was painful on palpation. Teeth 11 and 21 had grade 1 mobility (fig.H).



Fig.H: Intraoral Image



Fig.I: OPG

Patient was advised for an OPG. Radiographic examination revealed a nonhomogeneous large radiolucency involving 11, 12, 21, and 22 with ill-defined radiopaque corticated borders. An external root resorption was seen along with displacement in relation to 11 and 21 suggestive of infected radicular cyst (fig.I).

After obtaining an informed consent from the patient; he was advised for surgical excision under local anaesthesia. After giving the local anaesthesia all the four teeth that is 11, 12, 21, 22 were extracted and then the mucoperiosteal flap was raised. To expose the cystic mass the overlying thinned bone was removed with bur under copious irrigation. Careful enucleation of cyst was performed (Fig.J). Flaps were repositioned and sutures were taken with 3-0 vicryl (Fig.K). Necessary prescriptions and postoperative instructions were given and patient was recalled after 10 days (Fig.L).



Fig.J: Surgical enucleation and excised lesion along with extracted teeth



Fig.K: Sutures placed



Fig.L: After suture removal

CASE REPORT 3:

A 15 Yrs old male patient came with the chief complaint of pain in right upper tooth since 7 days. He had given history of pain since 7 days, which was mild, dull aching, aggravated on chewing food, relieved on taking painkiller. Past dental history revealed root canal treatment with right lateral incisor. Clinical examination revealed mild expansion of buccal

cortical plate in relation to 12. Teeth were tender on percussion. Vestibular tenderness in the region of 12 and 11 was noted. On radiographic examination, Radiopacity was noted in pulp canal of 12 suggestive of root canal filling material. A well-defined radiolucency with corticated margin in relation to apical region of 12 suggestive of radicular cyst. (Fig M) The patient was advised for surgical excision under local anaesthesia after obtaining an informed consent from the patient. After giving the local anaesthesia, the mucoperiosteal flap was raised. Careful enucleation of cyst was performed (Fig N). Flaps were repositioned and sutures were taken with 3-0 vicryl (Fig.O) Necessary prescriptions and postoperative instructions were given and patient was recalled after 10 days.



Fig.M: IOOPA of 12 region



Fig.N: Surgical enucleation



Fig.O: Sutures placed

DISCUSSION:

Periapical cysts are inflammatory jaw cysts that appear at the apices of infected teeth with necrotic pulps. Periapical cysts were classified as bay cysts or apical cysts based on the opening or connection of the root canal to the epithelium walled cavity. Bay cyst, which is now termed as "periapical pocket cysts" due to its similarities with the marginal periodontal pocket is the cystic cavity with epithelial linings that are open to the root canal whereas a cystic cavity with complete epithelialization but no opening into the apical foramen and root canal is considered as apical cyst.⁸ At present, it is mentioned as radicular cyst/ true cyst. Study done by Ricucci D et al had suggested that except for morphologic relationship of the cyst cavity with root canal space, true and bay cysts exhibited no other significant differences.⁹ These findings are concurrent with our study. Sometimes, the cyst may appear on the lateral aspect of the root when the lesion is related to lateral accessory root canals. Among all the jaw cysts, radicular cysts count about 52%-68%.¹⁰

Prevalence of the radicular cysts within the maxilla is 60% as compared with mandible, and is related with buccal or palatal enlargement. The present cases was associated with a buccal swelling.

With a range of 0.5 percent to 3.3 percent, it affects both the primary and permanent dentition. They are more common in males compared to females with a ratio of 1.6:1. Females are more conscious about their teeth, which could explain why females have a lower incidence of the lesion.⁸

The anterior maxilla is more common as compared to the mandible. The involvement of anterior maxilla could also be due to trauma, caries, and old silicate restorations within the anterior teeth. In this case, there is no history, which was contributory. There are various opinions suggests for explaining the formation of this cyst. The pathogenesis of radicular cyst was described by Torabinejad (1983) in terms of "breakdown/nutritional deficit hypothesis" and "abscess cavity theory." However, the foremost accepted theory is that the epithelial breakdown

theory as also supported by previous articles.^{8,11}

Radicular cystic lesions undergo asymptomatic evolution with crepitations followed by erosion and fluctuation of the overlying soft tissue. The bone within the surrounding area will be thinned out with springiness and egg shell crackling, resulting in cortical plate expansion. The alveolar ridge exhibits a paper-like texture on palpation.¹²

Radiographically, the radicular cyst appears as round or pear-shaped unilocular radiolucency at the apex of a non-vital tooth. A radicular cyst's margin is radiopaque, with hyperostotic borders which continues with the lamina dura.. However, in infected or rapidly enlarging cysts, the radiopaque margin might not be present. The resorption of offending tooth roots may occur as a result of a chronic radicular cyst. In our case there is no root resorption. Other odontogenic cysts like dentigerous cysts, odontogenic keratocysts and odontogenic tumours like ameloblastoma, Pindborg tumour, odontogenic fibroma and cementoma may share and equivalent radiological features as radicular cysts. Hence histopathological evaluation is important most of the time to diagnose these sorts of giant lesions. In extensive cases, radiographs alone might not be sufficient to point out the complete extent of the lesions, and advanced imaging could also be needed. Hence, in this case we advise CBCT to the patient.

Histopathologically, radicular cysts are lined completely or partially by stratified squamous epithelium. These linings could also be discontinuous partially and range in thickness from 1 to 50 cell layers. A cyst's lumen contains a low-protein fluid and a collection of cholesterol clefts (Rushton bodies) with multinucleated giant cells. Acute and chronic inflammatory infiltrates of various intensities are present subepithelially. Few cases are reported with hyaline bodies which represent a secretory product of the odontogenic epithelium in radicular cyst. The disintegration of red blood cells, lymphocytes, plasma cells, and macrophages results in the formation of cholesterol crystals. In this case, histopathological examination revealed a cystic cavity lined by

nonkeratinized stratified squamous epithelium arranged in an arcading pattern, interspersed with intense inflammatory cell infiltration consisting chiefly of lymphocytes and plasma cells. Russel's bodies were also noted at places.¹²

The treatment of the radicular cyst depends on the dimensions and localization of the lesion. Endodontic therapy, extraction, surgical procedures such as enucleation, and marsupialization are all alternatives for its treatment.⁵ In our first case, the treatment of choice was surgical enucleation and curettage along with apicectomy of root canal treated tooth 12. In our second case, the treatment of choice was surgical enucleation along with extraction of 11, 12, 21, 22. In third case, the treatment of choice was surgical enucleation.

A few well-documented cases indicate that squamous carcinoma occasionally arises from the metaplastic changes within the epithelial lining of the radicular cysts. Histopathological evidence of transition from a cystic lining to epithelial dysplasia and further progression as infiltrating squamous cell carcinoma has been seen in long-standing cases of radicular cysts.¹³ One report in the literature describes the formation of squamous odontogenic tumor like proliferations within the lining of radicular cysts. Around 3.5% of the time, these situations occur. The most prevalent site for such change was a radicular cyst in the maxillary area.¹⁴ Therefore, the treatment of radicular cysts should be prompt to avoid any potential complications and clinicians should remember of the remote chances of radicular cyst converting into squamous carcinoma.

If untreated, the radicular cyst slowly increases in size at the expense of the surrounding bone. The bone undergoes resorption, but seldom is there a remarkable expansion of cortical plates, as in frequently seen in the case of dentigerous cyst.

CONCLUSION:

The present case series reported first and third case after the final diagnosis; treatment was planned as enucleation with curettage along with apicectomy with root canal treated teeth 12. And in the second



case after the final diagnosis of infected radicular cyst we have done the surgical enucleation along with extraction of 11, 12, 21, and 22. Cyst formation pathogenesis is a complex process involving a wide spectrum of physiologically active chemicals and their interactions. Therefore, the clinicians should be knowledgeable enough to differentiate types of radicular cyst and available treatment options.

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