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MESSAGE

I would like to begin with a hope and desire that all our healthcare providers are safe in this unexpected battle against COVID-19 pandemic which has gripped the world and has cost so much in life & resources.

First of all, I would like to congratulate the Chief and associated Editors, Advisory Board comprising of Professors from various distinguished institutions, other faculty members and contributors, patrons and our beloved stundets and researchers associated with the Journal of Oral and Dental Health. It gives me tremendous delight to see this journal bringing up yet another issue. I want to specially congretulate **Mithila Minority Dental College & Institution** for its brilliant effort and statesmanship for making the Journal of Oral and Dental Health the official publication of L.N. Mithila University, Darbhang.

It gives me immense pleasure to see the Journal in widespread circulation and benefitting numerous researchers and academicians in their quest for scientific temper and knowledge. This Journal and its issues are greatly benefitting Dental professionals and practitioners associated with the field of Dentistry and its allied post-graduate branches, thereby providing an overall enlightenment.

Today, Dentistry has evolved much since its inception and humble beginnings. The skeletal and aesthetic treatment & satisfaction of a patient often involves an inter-disciplinary approach. As such, the Journal of Oral Dental Health through its collection of brilliant researches from all across the country, Epidemiological studies and data presented in its various issues boost a lot of confidence in young surgeons and Dentists alike.

I would conclude by wishing lots of success to the Editorial and Advisory Board in its present and future endeavours.

Best wishes & regards,

Surendra Pratap Singh

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MESSAGE FROM THE MANAGING DIRECTOR

—It is the supreme art of the teacher to awaken joy in creative expression and knowledge.¦

Albert Einstein

I am extremely happy and proud that a new issue of our esteemed Journal is being published. Our editorial team is continuously working hard to upgrade the quality of the publications. I am sure that these articles will be of extreme help to upgrade the knowledge of dental education.

Our faculties and post graduate students are getting an opportunity to publish their work which I am very happy about. And I came to know that even authors from many other Dental Colleges are contributing their articles. This I believe will be an excellent platform for sharing scientific thoughts.

With more and more original articles pouring in, I am sure that Journal of Oral & Dental Health will be one of the premium Journals in the field of Dentistry.

Wishing success and best wishes to the Editorial team.

Imbesat Shaukat

Managing Director
Mithila Minority Dental College & Hospital,
Darbhanga, Bihar

MESSAGE FROM THE EDITOR IN CHIEF

Dear Readers,

Authors of various articles are appreciated to be chosen for publication in “Journal of oral & dental health". How ever our priority of publication always remains towards innovative research work. Till date no concrete work has been done on prevention of spread of viral infection from patient to dental surgeon or vice versa.

So, scope is available for research & innovation. Hope authors take interest to go ahead with research on this aspect and bring shield of Protection.

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Dr. Arunachalam Sudheer,
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Journal of Oral & Dental Health

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MESSAGE FROM THE ADVISORY BOARD

—Research is the creation of new knowledge
- Neil Armstrong
Greetings to one & all!

It gives me immense pleasure to welcome all avid readers to this inaugural edition of the Journal of Oral and Dental Health. This Journal is an official publication of the Mithila Minority Dental College & Hospital, Darbhanga (Bihar) affiliated to the State run Lalit Narayan Mithila University, Darbhanga, Bihar State (India) established and administered by the State Govt. of Bihar State and holds abundant potential to provide a platform for budding research professionals in Dental Sciences across the country and the South East Asian region.

In today's era of constant need of advanced technologies in every discipline, it has become imperative for young professionals and academicians alike to keep themselves updated with the latest scientific innovations & break through. This is only possible through a constant review of scientific literature and adopting a temperament of scientific research.

Every scientific breakthrough has been made possible only by inculcating a scientific temperament which promotes scientific curiosity & research in individuals. Research is a constant and dynamic pursuit of an idea and developing into a hypothesis, testing it through various methodologies which finally culminates into publishing it through various platforms.

A publication signifies the efforts of various individuals associated with an idea and the results and thus a scientific journal is a worthy platform which helps in showcasing these efforts. This journal, a culmination of efforts from stalwarts of various disciplines, will definitely prove to be wonderful opportunity for academicians as well budding professionals

My gratitude to the Founder Chairman of Mithila Minority Dental College & Hospital and the leadership of this journal, the Chief Patron – Acharya Shaukat Khail for his invaluable guidance. I thank the Patron of the Journal as well as Managing Director of MMDCH Mr. Imbesat Shaukat for getting me on board with this wonderful initiative. I thank the Editor in Chief, Dr. Rohit Miglani and the rest of the Editorial Board for their support.

I also take this opportunity to invite faculties in various dental institutes, clinicians, students, etc. to contribute to this journal by sending in their scientific studies and help enhance the scientific content of our discipline of dentistry.

Lastly, I congratulate the authors of the articles of this inaugural edition for successful publication of research.

Thank You
Regards

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ORIGINAL ARTICLE

CASE REPORTS

Original Article Journal of Oral and Dental Health

Evaluation of Soft Tissues characteristics among Average Growth Pattern Subject in Mithilanchal Population - A Cross Sectional Study

Abstract

Objective: This study aims to assess and compare the changes in soft tissue growth between the sexes in the Mithilanchal community between the ages of 18 and 30.

Materials and Methods: 128 cephalograms were separated into male and female groups, with ages ranging from 18 to 30. Four angular and eight linear parameters are examined in total.

Results: All of the parameters increase in magnitude as the angle of total face convexity, which includes the nose and the Nasolabial angle, decreases. Lip thickness at the B point, nose height, soft tissue chin thickness, lip thickness at laberale inferious, and lip measurements to E-plane were all found to be significant (p value < 0.05) for both groups. Although the other linear variables—nose depth, sagittal depth, upper lip height, and lower lip height—also increased, the increase was considered non-significant (p value > 0.05). It was discovered that the angular parameters of nose inclination, angle of face convexity excluding nose, and angle of total facial convexity including nose and Nasolabial angle were not significantly impacted by age.

Conclusion: In this study, we found that all parameters were higher in males than in females, and that all of the parameters—excluding the angle of total facial convexity and the nasolabial angle —increased with age.

Keywords: Lateral cephalogram, cross-sectional study, soft tissue growth changes.

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INTRODUCTION

One of the main objectives of orthodontic therapy is facial aesthetics. Since the soft tissue outline dictates the overall facial aesthetics, it has received more attention in recent years from both patients and orthodontics1. The face skeleton and the soft tissue that covers it determine facial balance and harmony. The aesthetics of the entire face are determined by the soft tissue layers and their relative positions2. It has long been acknowledged that the two main objectives of orthodontic therapy are harmonious face aesthetics and good functional occlusion. Understanding both the impact of orthodontic therapy on the soft tissue profile and normal craniofacial growth is crucial to achieving these goals3.

Both during growing and during orthodontic treatment, the relationship between the soft tissue components of the face changes. Orthodontists must therefore comprehend the typical growth patterns of both soft tissues like the nose, lip, and chin as well as skeletal tissues4. For this reason, a variety of factors, such as age, gender differences, ethnicity, and cultural background, influence the soft tissue profile. Numerous ethnic groups have had their facial features examined. Since soft tissue thickness varies by population, studying soft tissue analysis in addition to hard tissue analysis is essential for maximising therapy outcomes5.

It is possible to study the orientation of different anatomical structures using angular and linear measurement with standardised cephalometric radiographs. Assuming that the shape of the soft tissue outline primarily determines the aesthetics of the entire face, the soft tissue profile has been thoroughly examined in the orthodontic literature, primarily from lateral cephalometric radiographs6. The purpose of our investigation was to ascertain if the face bone and the soft tissue that covers it preserve facial harmony and balance7.

The Soft Tissue Paradigm: Current Treatment Objectives

A paradigm is defined as "a collection of common ideas and presumptions that serve as the conceptual underpinnings of a field of study or clinical practice." The soft tissue paradigm states that, the soft tissues of the face—rather than the teeth and bones—determine the objectives and constraints of contemporary orthodontic and orthognathic treatment. The easiest way to comprehend this shift in orthodontics away from the Angle paradigm that dominated the 20th century is to contrast the two paradigms' approaches to treatment, diagnostic focus, and treatment goals. (Table 1.1).1.1

TABLE 1.1 Angle Versus Soft Tissue Paradigms: A New Way of Looking at Treatment Goals

Parameter	Angle Paradigm	Soft Tissue Paradigm
Primary treatment goal	Ideal dental occlusion	Normal soft tissue proportions and adaptations
Secondary goal	Ideal jaw relationships	Functional occlusion
Hard and soft tissue relationships	Ideal hard tissue proportions produce ideal soft tissues	Ideal soft tissue proportions define ideal hard tissues
Diagnostic emphasis	Dental casts, cephalometric radiographs	Clinical examination of intraoral and facial soft tissues
Treatment approach	Obtain ideal dental and skeletal relationships, assume the soft tissues will be all right	Plan ideal soft tissue relationships and then place teeth and jaws as needed to achieve this
Function emphasis	TMJ in relation to dental occlusion	Soft tissue movement in relation to display of teeth
Stability of result	Related primarily to dental occlusion	Related primarily to soft tissue pressure and equilibrium effects

TMJ, Temporomandibular joint.

MATERIALS AND METHOD

Patients who were reported to the outpatient department (OPD) of Mithila Minority Dental College and Hospital in Ekmighat Laheriasari Darbhanga served as the study's subjects. Lateral cephalograms of individuals between the ages of 18 and 30 were included in the sample. The following inclusion and exclusion criteria were applied to this cross-sectional investigation, which included 128 skeletal Class I lateral head cephalograms of developing participants aged 8 to 30:

Inclusion criteria:

1.Bilateral Angle class I molar relation with normal overjet and overbite up to 0 – 2 mm.

2.Class I skeletal jaw bases.

3.Subjects with Average growth pattern according to (a) FMP (b) Sn- Go- Gn (c) Y axis.

Exclusion criteria:

1. Facial asymmetry or deformity.

2. History of previous orthodontic treatment.

3. Presence of any pathological conditions.

Acetate tracing sheets were used to trace the lateral head cephalograms. In the event that the left and

right structural outlines could not be superimposed on one another, the cephalometric points were identified using the arbitrary line that resulted from averaging the two. The angular measurements were obtained to the nearest 0.5° and the linear measurements to the closest 0.5 mm.

Cephalometric landmarks:

All of the hard and soft tissue landmarks utilised in this investigation were determined using the definitions provided by Nanda et al., Downs, Broadbent, Rakosi, Holdways, Burstone, and Steiner.Eight of the twelve features included in the study were linear, and four were angular.

The parameters are listed below:

Linear Parameters:

1.Nose height

(a)Upper nose height (N|-Prn|)

(b)Lower nose height (Prn|- ANS||)

2.Nose depth (Prn|-Prn|)

3.Sagital depth (Prn|-PMV plane)

4.Upper lip height (A|- Vermilion border of upper lip)

5.Lower lip height (B|- Vermilion border of lower lip)

6.Thickness of lip

(a)The thickness of the lips at point A (A- A|)

(b Tthickness of lips at Laberale Superius (Ls|-Ls)

(c)Thickness of the lips at Laberale Inferius (liLi|-Li)

(d)thickness of the lips at B point (B-B|)

7.Soft tissue chin thickness(Pgs - Pg|).

8.Measurement of lip to esthetic plane

(a) E plane to upper lip (E plane- Vermilion border of upper lip)

(b)E plane to lower lip (E plane- Vermilion border of lower lip)

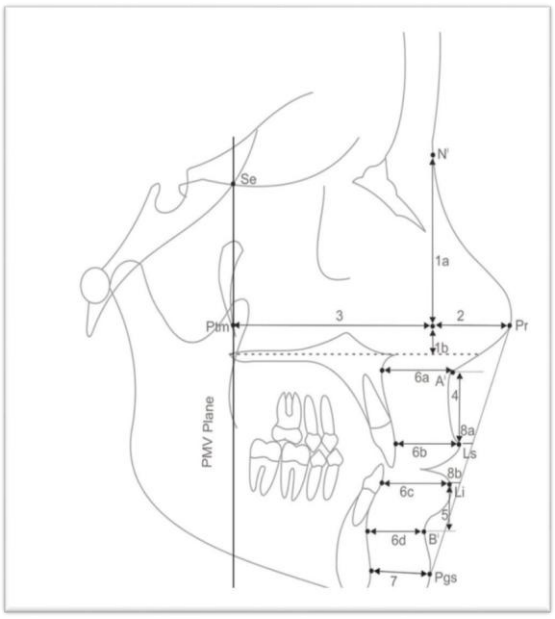

Figure 1- Linear Parameters

Angular parameters:

1. Angle of the nose and the overall convexity of the face(GI|-Prn- Pg|)

2. Convexity angle of the face without the nose (GI|-Sis- Pg|)

3. Nose inclination

a. Upper (PMV-N|-Prn)

b. b. Lower (PMV- Ans|-Prn)

c. 4.Nasolabial angle (columella tangent-upper lip tangent)

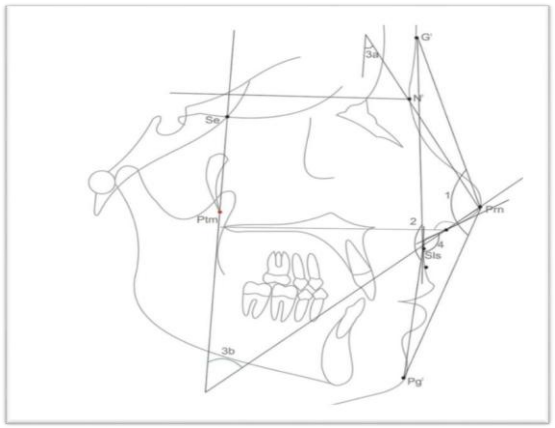

Figure 2 -Angular Parameters

Statistical Analysis:

The mean ± standard deviation was used to summarise the collected data. After the Shapiro-Wilk test showed normality and the Levene's test determined homogeneity of variances.A two-way ANOVA was used to compare the groups, and Tukey's post hoc test was used to determine whether the mean difference within and between the groups was significant.

A two-tailed (a=2) P < 0.05 was considered a statistically significant result. SPSS 17.0 was used to conduct the analyses.

RESULTS

TABLE 1.2: Male and female members of two groups were measured linearly and angularly (mean ± standard deviation).

Linear measurements (mm)	Group	MALE (n=15)	FEMALE (n=15)	P-Value
Upper nose height	I	15.44+2.04	17.21+1.66	0.451
	II	21.07±2.11	20.38±1.45	0.163
	p	<0.001	0.024	-
Lower nose height	I	7..04±0.98	6.25+1.42	0.007
	II	8.02+1.21	7.21+0.82	0.005
	p	0.141	0.140	-
Nose depth	I	12.45+2.45	12.16+2.15	0.451
	II	12.46+1.75	12.82+0.86	0.431
	p	0.365	0.315	-
Sagittal depth	I	24.41+1.75	22.12+1.5	0.331
	II	23.53+3.01	22.23+1.61	0.321
	p	0.043	0.045	-
Upper lip height	I	6.19+0.75	5.91+0.75	0.063
	II	6.52+1.05	6.12+0.85	0.027
	p	0.079	0.142	-
Lower lip height	I	7.02+0.87	6.95+1.35	0.002
Lower lip height	I	7.02+0.87	6.95+1.35	0.002
	II	7.98+1.02	7.13+0.61	0.004
	p	0.224	0.157	-
Lip thickness at the A point	I	6.98+1.01	6.05+0.98	0152
	II	7.54+1.12	7.12+1.12	0.111
	p	0.031	0.062	-
Lip thickness at labrale superius	I	6.04+1.21	5.53+0.78	0.063
	II	6.35+1.07	5.33+0.75	0.005
	p	0.241	0.485	-
The thickness of the lips at labrale inferior	I	6.15+0.99	6.45+0.97	0.241
	II	7.13+0.76	6.76+0.74	0.001
	p	0.001	0.256	-
Lip thickness at the B point	I	5.18+0.75	5.30+0.76	0.061
	II	6.28+0.78	5.98+0.77	0.121
	p	0.003	0.001	-
thickness of the chin's soft tissue	I	5.24+0.98	4.56+0.76	0.121
	II	5.78+1.08	5.67+1.01	0.491
	p	0.009	<0.001	-
Upper lip to the E-plane	I	0.10+1.02	-1.0+0.75	<0.001
	II	-0.83+1.01	-1.51+0.76	0.001
	p	<0.001	0.016	-
Lower lip to the Eplane	I	0.74+0.86	-o.09+0.76	0.001
	II	0.12+1.11	-0.98+0.96	<0.001
	p	0.011	<0.001	-
Angular measurements (°)				
angle of the nose included in the total face convexity	I	74.21+1.77	71.21+2.11	0.451
	II	70.13+1.75	71.52+1.62	0.33
	p	0.056	0.456	-
Facial convexity angle without the nose	I	82.12+2.23	83.32+2.54	0.491
	II	83.1+1.74	84.12+2.98	0.499
	p	0.241	0.271	-
inclination of the upper nose	I	16.12+2.12	15.12+2.75	0.476
	II	15.45+2.98	16.49+1.98	0.361
	p	0.500	0.311	-
lower inclination of the nose	I	17.21+2.65	18.09+3.65	0.421
	II	17.54+2.98	18.12+2.76	0.351
	p	0.451	0.241	-
Nasolabial angle	I	52.12+3.01	51.31+3.45	0.451
	II	51.15+2.32	51..12+1.01	0.442
	p	0.09	0.032	-

p≤0.05 is significant.Table 1.2 displays the linear measures of men and women in various age groups (18–30). Both the upper nose height, the lip thickness at the labrale inferius, the lip thickness at the B point, the soft tissue chin thickness, the upper lip to the E plane, and the lower lip to the E plane of the male subgroup, as well as the upper lip to the E plane, the upper lip to the B point, the soft tissue chin thickness, and the lower lip to the E plane, all exhibited significant increases from Group I to Group II.

There were significant differences in the lower nose height, lower lip height, upper lip to the E plane, and lower lip to the E plane between Group I males and Group I females. In contrast, there were no significant differences between Group II males and Group II females in regarding the height of the lower nose, lower lip, upper lip to the E plane, lower lip to the E plane, and lip thickness at labrale superius and inferius. Although these differences were not statistically significant, switching Group I and Group II affected the nasolabial angle, upper and lower nose inclinations, angle of face convexity excluding the nose, and angle of total facial convexity including the nose out of all the angular variables.

DISCUSSION

The pterygomaxillary vertical (PMV) plane served as the reference plane for this study. The palatal plane was used as a reference plane by researchers like Burstone7, Subtelny9, Sarnas12, and Vig and Cohen13 to orient vertical and sagittal measurements of the tissues. However, authors like Brodie10, Ricketts14, and Mamandras15 pointed out that while the palatal plane has been demonstrated to be reasonably stable,The plane's position may alter as a result of orthodontic treatment, and its angulation may fluctuate.

The thickness and length of soft tissues, particularly those at the chin and lips,

can be impacted by changes in posture and movement of the face muscles, while significant variations in soft tissue measurements were expected. Despite the relatively high variance at each age, these results are consistent, and the measurements' orientation—either vertically parallel to the PMV plane or perpendicular to it—provides stability. These criteria led to the choice of the PMV plane in this work, which also eliminates many of the stability and reproducibility issues that come with using additional soft tissue and bone planes.

Linear Parameters

Height of the Nose

There were two primary categories for nose height: lower and upper. We discovered that height of nose with age, and that males experienced a larger increase in upper nose height than females. Age-related increases in lower nose height were also seen, with a greater rise observed in the female sample.

These findings were supported by Subtelny9, Posen11, Bishara.16 and Genecov .17

Depth of Nose

Males and females had almost identical nose depth mean values, and this value decreased with age.

Sagittal Depth

Males were shown to have a larger sagittal depth than females. An increase in sagittal depth was observed as people aged. This is because the nasal bone and the soft tissue that covers it are growing both vertically and anteroposteriorly.

Height of Lip

According to this study, both sexes had a rise in both lower and upper lip height. Nanda et al.8 asserted that lip thickness and length were crucial components of facial profile.Lip position is influenced by the position and angle of the mandibular and maxillary incisors., which is why orthodontic therapy can change it.

Thickness of Lip

According to the evaluation, males' lips were thicker than those of females, and as both subgroups aged, lip thickness rose.. Additionally, we discovered that this growth exceeded vermilion borders at points A and B. Male lips may become longer and thicker as a result of these alterations. Males may get longer and thicker lips as a result of these changes. Nanda et al.8 provided support for these findings.

Thickness of the soft tissue Chin

Men's thickness of the soft tissue chin was greater than women's. The growing alterations in the hard tissue chin and the rise in the soft tissue covering's thickness
could be the cause of this observation. Both Subtelny9, Nanda et al.8, and Genecov et al.17 provided support for this conclusion.

Lip measures in relation to the aesthetic plane

As people age, their lips grow more retruded in position.

Angular Parameters

Angle of facial convexity excluding the nose

Age-related decreases in the angle of the overall facial convexity, including the nose, were observed for both male and female subgroups. As men aged, this decline was more pronounced.

Angle of facial convexity excluding the nose

Although it was not statistically significant, the angle of face convexity—aside from the nose—increases with age.

Nose Inclination

There are two categories for nose inclination: upper and lower. When comparing males and females, it was discovered that the inclination of the upper nose was almost the same, but the inclination of the lower nose rose with age.The angle of the nose's dorsum to the PMV plane is determined by the sagittal growth of the nose. Meng et al. supported these findings. 18

Angle of the Nasolabial

There was no discernible difference between the males in terms of nasolabial angle.

CONCLUSION

Males showed higher values for all the parameters than females, and all the parameters increased in dimension with growing, except for the angle of whole face convexity, which includes the nose, and the nasolabial angle, which decreased in measurement.

REFERENCES

1. Al– Sayagh NM, Saleem NR, Abdul– Qadir MY. Analysis of soft tissue facial profile in different vertical growth patterns. Al– Rafidain Dent J. 2011; 11(2): 346-356.

2. A.A.Bagwan et al. Evaluation of soft tissue parameters for adults with accepted occulusion using Legan and Burstone analysis. Tanata Dental Journal 2015;(12): 1-6.

3. Kumar A ,Parthiban P , Kumar S S, Divakar G, Sekar, Sharmila S, Silambu M.R.Evaluation of soft tissue measurements between various mandibular

divergences in south indian population. Journal of Pharmacy and Bioallied Science.July 2022;(14):715-721.

4. Saglam A M S, and Gazılerlı U. Analysis of Holdaway soft tissue measurements in children between 9 and 12 years of age. European Journal of Orthodontics 23 (2001) 287–294.

5. Bishara S E , Jakobsen J R, Hession TJ, and Treder E J. Soft tissue profile change from 5 to 45 years of age. AJOD December 1998;114(6): 698-706.

6. Kumar et al. Soft tissue growth change from 8 to 16 years of age. National Journal of Maxillofacial Surgery. July-December 2019 ;(10): 161-167.

7. Steiner CC. The use of cephalometrics as an aid to planning and assessing orthodontic treatment. Am J Orthod 1960;46:721-35.

8. Nanda RS, Meng HP, Kapila S, Goorhuis J. Growth changes in the soft tissue facial profile. AngleOrthod 1989;60:177-90.

9. Subtelny JD. A longitudinal study of soft tissue facial structures and their profile characteristics defined in relation to underlying skeletal structure. Am J Orthod 1959;45:481 507.

10. Brodie AG. Late growth changes in human face. Angle Orthod 1984;86:61-66.

11. Posen JM. A longitudinal study of the growth of the nose. Am J Orthod 1967;53:746 56.

12. Sarnas KV. Inter and Intra family variations in the facial profile. Odont Revy 1959;10:1-116.

13. Vig PS, Cohen AM. Vertical growth of the lips: A serial cephalometric study. Am. J Orthod 1979;75:405-15.

14. Ricketts RM. Planning treatment on the basis of facial pattern and an estimate of its growth. Angle Orthod 1957; 27:14-37.

15. Mamandras AH. Growth of lips in two dimensions: A serial cephalometric study. Am J Orthod 1984;86:61-6.

16. Bishara SE, Jakobsen JR. Longitudinal changes in three normal facial types. Am J Orthod 1985;88:466-502.

17. Genecov JS, Sinclair PM, Dechow PC. Development of the nose and soft tissue profile. AngleOrthod 1990;60:191-98.

18 . Meng HP, Goorhuis J, Kapila S, Nanda RS. Growth changes in the nasal profile from 7 to 18 years of age. Am J Orthod 1988;94:317-26.

Evaluation of facial asymmetry in different facial forms - A Photographic Study

Abstract

Introduction: Facial symmetry refers to a complete match in size, location, shape and arrangement of each facial components. Asymmetry refers to the bilateral difference between such components. A perfect bilateral symmetry almost never exists in the human body so is facial symmetry. Minor facial asymmetry can be observed even in the most normal appearing individuals, most of the cases left side of the face being larger than the right side. Facial asymmetry could result due to pathological, traumatic, functional or developmental factors.

Aim and Objective: Analysis and evaluation of facial asymmetry in different facial forms.

Materials and Methods: Thirty female Subjects within age group of fifteen to thirty-five years were selected among the patients visited to the department of orthodontics and dentofacial orthopaedics at Mithila minority dental college and hospital, Darbhanga,Bihar. Informed consent was taken from the patients. Digital photographs were selected and equally divided in each facial forms. The photographs were cropped by using Adobe photoshop and analysis was done by Digimizer software. The photographs were analysed for 5 horizontal and 3 midline parameters. ANOVA test was performed to analyse the significant difference (at $P \leq 0.05$).

Results: Horizontal parameters shows a statistically significant difference (p-value, $P \leq 0.05$), in different facial forms. Midline parameters shows a significant finding ($P \leq 0.05$) except Euryprosopic with Mesoprosopic (p-value 0.529), Mesoprosopic with Euryprosopic (p- value-0.529), Euryprosopic with Mesoprosopic(p-value1.000), Mesoprosopic with Euryprosopic (p-value 1.000).

Conclusion: In this study it was found that there was various facial asymmetries seen in different type of facial form. Right and left side of face was not symmetrical. There is asymmetry between lower, middle and upper face among Euryprosopic, Mesoprosopic, Leptoprosopic facial forms.

Keywords: Digimizer software, facial asymmetry, Adobe photoshop.

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INTRODUCTION

Facial symmetry refers to a complete match in size, location, shape and arrangement of each facial components. That is asymmetry refers to the bilateral difference between such components1. A perfect bilateral symmetry almost never exists in the human body so is Facial symmetry. Many human body parts undergo development with bilateral symmetry. This implies that the right and left sides can be divided into identical mirror images. However, due to biological factors inherent to processes of development as well as environmental disturbances, perfect bilateral symmetry is rarely found2. On other hand, slight asymmetry can give a more natural perception because minor asymmetry minimizes more severe asymmetry by compensation. Therefore, such level of asymmetry cannot be considered unattractive3. The phenomenon of facial asymmetry can be described as differences in size or relationship of two sides of the face. According to Severt and Proffit, frequencies of facial laterality are 5%,36% and 74% in the upper, middle, and lower thirds of face. Minor facial asymmetry can be observed even in the most normal appearing individuals, most of the cases left side of the face being larger than the right side4.
Peck et al. observed that orbital region exhibited the least asymmetry (0.87mm), mandibular region the most (3.54mm) and the zygomatic region exhibiting a moderate asymmetry of 2.25 mm5.Similar findings were seen by Maeda et al. who said that asymmetry most frequently in mandibular body only about 6.1% of the patients examined demonstrated a mild degree of maxillary asymmetry6. There are various etiologic factors which vary depending upon various authors Chia et al., stated that asymmetry could result due to pathological, traumatic, functional or developmental factors7.

Haraguchi et al. claimed that hereditary is also one of the causative factors for facial asymmetry8. Cheong and Lo, categorised the causative factor for facial asymmetry under three sub-divisions such as congenital, acquired and developmental9. Lundstrom et al., states that facial asymmetry could result due to genetic or nongenetic factors10.

Bishara et al. classified asymmetry as dental, skeletal, functional or muscular11. The present study uses an inexpensive and standardized digital photographic technique along with computer assisted analysis to measure the asymmetries of the human face.
According to **Martin & Saller** designation of the subjects' facial type was confirmed according to the following standards32:

Euryprosopic, ≤ 83.9
Mesoprosopic, 84.0-87.9
Leptoprosopic, ≥ 88.0

Purpose of the present study was to analyse the various facial asymmetries in different type of facial form and to identify the right and left differences of the facial soft tissue landmarks. Another aim was to determine asymmetry in lower, middle and upper face in between different facial forms.

MATERIALS AND METHOD

Subjects for this study were collected from the patients reported in the OPD of Mithila Minority Dental College and Hospital, Ekmighat, Laheriasarai, Darbhanga. This study included sample size of thirty subjects who live in Bihar, within the age group of 15-35 years. Consent was taken for sharing facial photographs for the purpose of research. To evaluate and compare the facial asymmetry and laterality of facial asymmetry in subjects inclusion criteria were frontal photographs with general frontal symmetry, age between 15 to 35 years, the lip should be in relax position and patients who had consented to the study. Those having gross asymmetrical face on clinical examination, history of previous orthodontic treatment, orofacial surgical intervention, and history of any systemic disease were not included in the study.

The digital photographs of the subjects were taken using digital SLR camera, the head of the subjects were positioned so that the Frankfort horizontal plane and the inter pupillary line were parallel to the surface of the floor. photographs were cropped using Adobe photoshop Cs. Cropped photographs were transferred to computer loaded with Digimizer software for the evaluation of facial asymmetry. The photographs from groups were analysed for five horizontal and three midline parameters using Digimizer software after identification of required landmarks.

LANDMARKS ON FRONTAL FACIAL PHOTOGRAPHS

(N')	Nasion
(P)	Pupil
(Enr)	Right endocanthusus
(Enl)	Left endocanthusus
(Enr)	Right endocanthus
(Exl)	Left exocanthus
(Exl)	Left exocanthus
(Prn)	Pronasale
(Alr)	Right Ala of the nose
(All)	Left Ala of the nose
(Ls)	Labiale superius
(Chr)	Right chelion
(Chl)	Left chelion
(Me)	Menton
(PP')	Interpupillary line
(Mfp)	Mid facial plane
(Gor)	Right gonion
(Gol)	Left gonion

Fig-1: Landmarks on frontal facial photographs

(1.Nasion 2.Right pupil 3.Left pupil 4.Right endocanthus 5.Left endocanthus 6.Right exocanthus 7.Left exocanthus 8.Pronasale 9.Right ala of the nose 10.left ala of the nose 11.Labiale superious 12.Right chelion 13.Left chelion 14.Right gonion 15.Left gonion 16.Menton)

HORIZONTAL PARAMETERS

1-Mfp-Enr
2 -Mfp-Enl
3-Mfp-Exr
4-Mfp-Exl
5-Mfp-Alr
6-Mfp-All
7-Mfp-Chr
8-Mfp-Chl
9-Mfp-Gor
10-Mfp-Gol

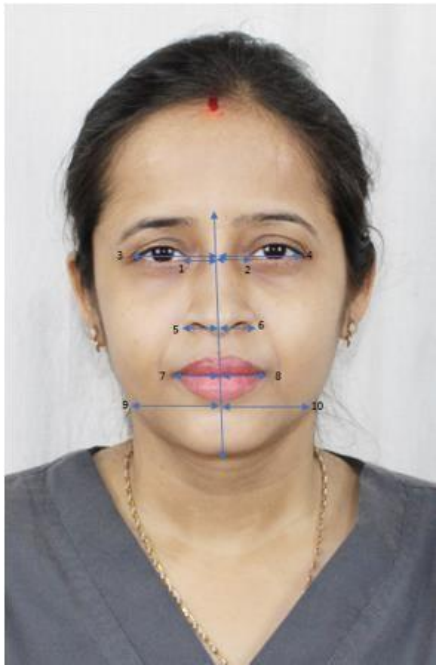

Fig-2: Horizontal parameters

(1.Mfp-Enr 2.Mfp-Enl 3.Mfp-Exr 4.Mfp- Exl 5.Mfp-Alr 6.Mfp- All 7.MfpChr 8. Mfp- Chl 9.Mfp-Gor 10. Mfp-Gol)10-Mfp-Gol)

Refrence plane

1-interpupillary line
2-mid facial plane

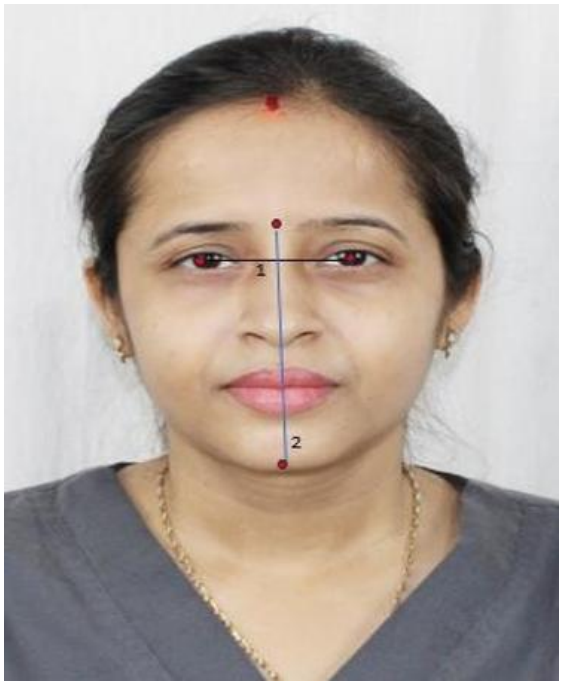

Fig-3: Refrence plane

(1. Interpupillary line, 2. Mid facial plane.)

Midline parameters

1-Mfp-Prn
2-Mfp-Ls
3-Mfp-Me'

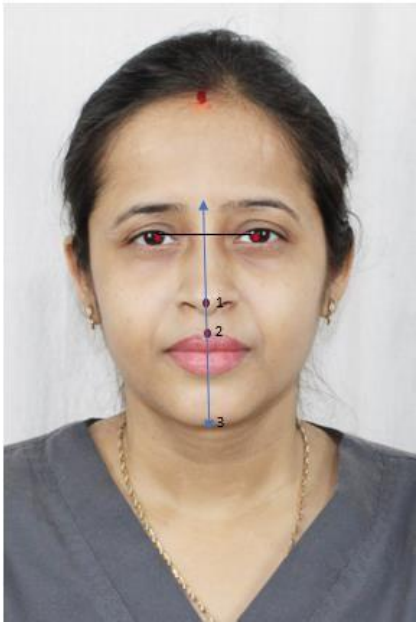

Fig-4: Midline Parameters

(1. Mfp-Prn, 2. Mfp-Ls, 3. Mfp- Me')

STATISTICAL STUDY

In present study data were summarized as Mean ± SE (standard error of mean). Groups of different facial forms were compared by one way analysis of variance (ANOVA) test. P value less than 0.05($p<0.05$) was considered statistically significant.

RESULT

Table 1: comparison of midline parameters from the mid facial plane.

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		F	p-value
					Lower Bound	Upper Bound		
Mfp-Me	Euryprosopic	10	101.20	.919	100.54	101.86	51.725	0.001
	Mesoprosopic	10	99.80	1.229	98.92	100.68		
	Leptoprosopic	10	109.30	3.592	106.73	111.87		
Mfp-Ls	Euryprosopic	10	60.90	2.998	58.76	63.04	764.246	0.001
	Mesoprosopic	10	59.90	.568	59.49	60.31		
	Leptoprosopic	10	103.00	3.801	100.28	105.72		
Mfp-Prn	Euryprosopic	10	60.20	1.932	58.82	61.58	1509.316	0.001
	Mesoprosopic	10	36.00	1.054	35.25	36.75		
	Leptoprosopic	10	87.70	2.908	85.62	89.78		

Table 2: Multiple comparison of midline parameters within different facial forms.

Multiple Comparisons

Bonferroni

Dependent Variable	(I) facial form	(J) facial form	Mean Difference (I-J)	Std. Error	p-value .	95% Confidence Interval	
						Lower Bound	Upper Bound
Mfp-Me	Euryprosopic	Mesoprosopic	1.400	1.008	.529	-1.17	3.97
		Leptoprosopic	-8.100*	1.008	.000	-10.67	-5.53
	Mesoprosopic	Euryprosopic	-1.400	1.008	.529	-3.97	1.17
		Leptoprosopic	-9.500*	1.008	.000	-12.07	-6.93
	Leptoprosopic	Euryprosopic	8.100*	1.008	.000	5.53	10.67
		Mesoprosopic	9.500*	1.008	.000	6.93	12.07
Mfp-Ls	Euryprosopic	Mesoprosopic	1.000	1.258	1.000	-2.21	4.21
		Leptoprosopic	-42.100*	1.258	.000	-45.31	-38.89
	Mesoprosopic	Euryprosopic	-1.000	1.258	1.000	-4.21	2.21
		Leptoprosopic	-43.100*	1.258	.000	-46.31	-39.89
	Leptoprosopic	Euryprosopic	42.100*	1.258	.000	38.89	45.31
		Mesoprosopic	43.100*	1.258	.000	39.89	46.31
Mfp-Prn	Euryprosopic	Mesoprosopic	24.200*	.942	.000	21.80	26.60
		Leptoprosopic	-27.500*	.942	.000	-29.90	-25.10
	Mesoprosopic	Euryprosopic	-24.200*	.942	.000	-26.60	-21.80
		Leptoprosopic	-51.700*	.942	.000	-54.10	-49.30
	Leptoprosopic	Euryprosopic	27.500*	.942	.000	25.10	29.90
		Mesoprosopic	51.700*	.942	.000	49.30	54.10

*. The mean difference is significant at the 0.05 level.

Table 3: Comparison of horizontal parameters in right and left side of face in different facial forms.

		Euryprosopic		Mesoprosopic		Leptoprosopic		F	p-Value
		Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation		
Mfp - En	Right	12.40	1.506	10.30	1.418	21.80	3.084	81.595	0.001
	Left	13.40	1.506	10.20	1.476	24.90	3.479	108.369	0.001
Mfp-Ex	Right	47.20	2.098	39.00	1.886	76.10	3.213	623.396	0.001
	Left	46.30	1.889	41.00	1.700	78.70	3.199	748.744	0.001
Mfp-Al	Right	16.50	2.273	18.90	.568	31.10	2.767	139.892	0.001
	Left	17.50	2.273	20.10	.316	18.50	1.900	5.812	0.008
Mfp-Ch	Right	23.00	2.261	26.70	.949	40.00	2.867	168.471	0.001
	Left	22.60	1.506	24.30	.483	43.80	2.616	445.495	0.001
Mfp-Go	Right	48.60	2.366	46.60	1.265	78.50	2.550	699.131	0.001
	Left	44.50	2.273	43.70	.823	79.80	3.084	830.299	0.001

In the present study data were compared between midline parameters from the mid facial plane, midline parameters within different facial forms, and horizontal parameters in right and left side of face in different facial forms.

Table 1

Comparison of midline parameters from the mid facial plane.

Mfp-Me shows significant result with p-value 0.001 and increased mean value in- Leptoprosopic facial form which is 109.30 followed by Euryprosopic facial form i.e 101.20 and Mesoprosopic facial form i.e 99.80 mean value.

Mfp-Ls shows significant result with p-value 0.001 and increased mean value in leptoprosopic facial form which is 103.00 followed by Euryprosopic facial form i.e 60.90 and Mesoprosopic facial form i.e 59.90 mean value.

.Mfp-Prn shows significant result with p-value 0.001 and increased mean value in Leptoprosopic facial form which is 87.70 followed by Euryprosopic facial form i.e 60.20 and Mesoprosopic facial form i.e 36.00 mean value.

Table 2

Multiple comparison of midline parameters within different facial forms.

On comparing we found that Mfp-Me with all multiple comparing of different facial form the non-significant finding was seen in Euryprosopic with Mesoprosopic with p-value 0.529. Mesoprosopic with Euryprosopic p-value 0.529, Euryprosopic with Mesoprosopic p-value 1.000, Mesoprosopic with Euryprosopic p-value 1.000 and rest of all are significant with p- value 0.000.

Table 3

Comparison of horizontal parameters in right and left side of face in different facial form Mfp- En, Mfp-Ex, Mfp-Al, Mfp-Ch, Mfp-Go all the parameters shows p-value 0.001 i.e significant.

Discussion

Laterality of facial asymmetry had been evaluated by assessing deviation of midline landmarks in different studies23. The reason for laterality in facial asymmetry had been attributed to various causes in different studies12. Most research suggested that the left side of the face is more expressive of emotions: an asymmetry that probably stems from the right hemisphere dominance for emotional expression, hence left side laterality had been observed in most of the studies.24,30,31.

Another possible source is habitual chewing on one side, which is responsible for increased skeletal development on the ipsilateral side24. Differential activity of the two hemifaces in relation to the contralateral hemispheres was thought to result in differential muscular development of the two hemifaces, hence, facial asymmetry was evident 16. Facial appearance and symmetry are the outer reflection of the inner structures, the skeleton, including teeth, muscles of mastication, muscles of expression, subdermal fat, and the Bichat fat pad.25 As we

observe from vertex caudally, we have more structures involved in contouring the outer shape26. At the zygoma point we have bone, muscle, and fat; and in the Gonion reference point, we add to the equation the teeth and the occlusion, which are more subject to dental changes, so it reflects more diversity in the measurement.28 Different results have been reported related to sex and age regarding the dominant part of the face13. Many studies showed the right side of the face was larger in females than the males, the left sides of the face is larger in males than the females.30 In another study where three different age groups were evaluated, maximum normal asymmetry was found slightly more often in females than in males 26. In their study, they indicated that the right side of the face was larger than the left side except for adolescent females. As the growth stage proceeds, right-sided dominance becomes less frequent, whereas left-side dominance becomes more frequent28. Many analyses conducted with young adults, the number of significantly asymmetric linear distances between the two halves of the face was greater in females than in males.

Present study were done on small sample size, further studies with large sample size can validate the results of present study. Also studies can be conducted to compare different population groups.
Within limitation of the present study, it can suggest that mild form of facial asymmetry is evident in normal subjects. So, Laterality of facial asymmetry being mild was not perceived by the individuals as a problem. In such cases no treatment is required but it has to be explained to the patients before starting Orthodontic treatment. In other cases where patients are conscious of their facial asymmetry, certain soft tissue surgeries like sliding genioplasty can be planned or Orthodontic mechanics can be employed to solve this disharmony by compensation.

Further studies with large sample size can validate the results of present study. Also various studies can be conducted to compare different population groups. The photogrammetric

method of assessment of soft tissue asymmetry can be compared with asymmetries of underlying hard tissues using Posteroanterior cephalogram in future.

CONCLUSION

There was various pattern of facial asymmetries seen in different types of facial forms. Asymmetry was found in both horizontal and vertical planes in three different facial forms.

REFERENCES

1. Chew MT. Spectrum and management of dentofacial deformities in a multi-ethnic Asian population. Angle 0rthod 2006; 76:806-9.

2. lindauer SJ. asymmetry: diagnosis and treatment (editorial). Semin orthod.1998;4(3:133).

3. LuSM, Bartlett SP. On facial asymmetry and self-perception. Plast Ronstr Surg 2014; 133:61:43-98.

4. Severt TR, Proffit. The prevalence of facial asymmetry in the dentofacial deformities population at the university of North Carolina. Int J Oadult Orthodon Orthognath surg 1997; 12:171-6.

5. Peck S, Peck L, Kataja Skeletal asymmetry in esthetically pleasing faces. Angle Orthod 1991; 61:43-8.

6. Maeda M, Katsumata A, Ariji Y. Muramatsu A. Yoshida K, Gota S, et al.3D-CT evaluation of facial asymmetry in patients with maxillofacial deformities. oral surg oral med oral pathol oral radiol endod 2006; 102:382-90.

7. Chia MS, Naini FB, Gill DS. Theaetiology, diagnosis and management of mandibular asymmetry. Ortho Update.2008;1(1):44-52.

8. Haraguchi S, Iguchi Y, Takada K. Asymmetry of the face in orthodontic patients. Angle Orthod.2008 May:421-6.

9. Cheong YW, Lo LJ. Facial asymmetry: etiology, evaluation, and management. Chang Gung Med J.2011 Jul-Aug;34(4):341-51.

10. Lundstrom A. Some asymmetries of the dental arches, jaws, and skull, and their etiological significance. Am J Orthod 1961;47(2):81-106.

11. Bishara SE, Burkey PS, Kharouf JG. Dental and facial asymmetries: a review. Angle Orthod.1994;64(2):89-98.

12. The influence of different facial components on facial aesthetics: European journal of orthodontics 2002. European orthodontic society.

13. facial asymmetry in young healthy subjects evaluated by statistical shape analysis: journal of anatomy 2008.

14. Asymmetry of the face in orthodontic patients: Angle orthodontists, vol 78, no 3,2008.

15. Assessing soft-tissue characteristics of facial asymmetry with photographs: Am J orthod Dentofacial Orthop 2010; 138:23-31:

16. Analysis of facial asymmetry: Archives of craniofacial surgery vol 16. department of plastic and reconstructive surgery2015.

17. Evaluation of Facial Asymmetry in subjects with class 1 and class 2 molar relation: research gate.2018.

18. Estimating the prevalence of facial asymmetry in the south Indian population: scholars journal of dental sciences.2021.

19. proffit WR. Contemporary Orthodontics.St Louis,Mo:Mosby Year Book:2007:176. 20-Stedman's Medical Dictionary,Baltimore,the Williams and Wilkins Company,1996.

21. SHAH SM,Joshi MR, An assessment of asymmetry in the normal craniofacial complex.The Angle Orthodontist.1978 Apr;48(2):141-8.

22. Peck S, Peck L, Kataja M. Skeletal asymmetry inesthetically pleasing faces. The Angle Orthodontist.1991 Mar;61(1):43-8.

23. Miller EL,Bodden WR, Jr,Jamison HC. A study ofthe relationship of the dental midline to the facialmidline. J. Prosthet Dent 1979 Jun; 41(6):657-66O.

24. Haraguchi S, Takada K, Yasuda Y. Facialasymmetry in subjects with skeletal Class III deformity. The Angle Orthodontist. 2002Feb;72(1):28-35.

25. Fong JH, Wu HT, Huang MC, Chou YW, Chi LY,Fong Y, Kao SY. Analysis of facial skeletal characteristics in patients with chin deviation.Journal of the Chinese Medical Association. 2010Jan 1;73(1):29-34.

26. Vukovic A, Jakupovic S, Zukic S, Secic S,Bajsman A. computer aided Photogrammetry forevaluation of facial and Dental symmetry. ActaInformatica Medica. 2010 Apr 1;18(2):88.

27. Ramirez-Yañez GO, Stewart A, Franken E,Campos K. Prevalence of mandibular asymmetriesin growing patients. Eur J Orthod. 2011Jun;33(3):236-42.

28. Kusayama M, Motohashi N, Kuroda T.Relationship between transverse dental anomalies

and skeletal asymmetry. Am J Orthod DentofacialOrthop. 2003 Mar;123(3):329-37.

29. Kim JY, Jung HD, Jung YS, Hwang CJ, Park HS.A simple classification of facial asymmetry byTML system. J Craniomaxillofac Surg. 2014Jun;42(4):313.

30. Borod JC, Koff E, Yecker S, Santschi C, Schmidt JM. Facial asymmetry during emotional expression: Gender, valence, and measurement technique. Neuropsychologia. 1998 Nov 1;36(11):1209-15.

31. Nicholls ME, Ellis BE, Clement JG, Yoshino M.Detecting hemifacial asymmetries in emotional expression with three-dimensional computerized image analysis. Proceedings of the Royal SocietyB: Biological Sciences. 2004 Apr 7;271(1540):663.

32. R. Martin, K. Saller, Lehrbuch der Anthropologie, Gustav Fischer Verlag, Stuttgart, 1957.

Effects of salivary thiocyanate levels on oral mucosa in young adult smokers: A Clinical Study

Abstract

Background: Because tobacco smoke contains harmful chemicals, smoking is a known risk factor for a number of oral health conditions. Saliva contains thiocyanate (SCN^-), a byproduct of tobacco metabolism that contributes to the oral defense mechanism. Smokers' increased salivary thiocyanate levels, however, could be harmful to the oral mucosa. The purpose of this research is to assess how salivary thiocyanate levels affect young adult smokers' oral mucosa.

Materials and Methods: This clinical trial included 80 patients in total, 40 of whom were smokers and 40 of whom were not, and they were all between the ages of 18 and 30. Using the unstimulated whole saliva approach, salivary samples were obtained, and spectrophotometric methods were used to determine the amounts of thiocyanates. To determine if lesions, inflammation, and other mucosal changes were present, a clinical examination of the oral mucosa was conducted. An independent t-test and chi-square test were used to statistically examine the data, with significance defined at $p < 0.05$.

Results: Smokers had a substantially higher mean salivary thiocyanate level (3.5 ± 0.8 mg/dL) than non-smokers (1.2 ± 0.5 mg/dL) ($p < 0.001$). Smokers had higher rates of oral mucosal abnormalities, such as leukoplakia (20%), smoker's palate (15%), and erythematous changes (25%), compared to non-smokers (5%, 3%, and 8%, respectively) ($p < 0.05$). The degree of mucosal alterations was positively correlated with salivary thiocyanate levels ($r = 0.68$).

Conclusion: Significant alterations in the health of the oral mucosa are linked to smokers' elevated salivary thiocyanate levels. Potential oral illnesses in smokers may be avoided by routine salivary thiocyanate monitoring and early identification of mucosal changes.

Keywords: Salivary thiocyanate, oral mucosa, smoking, tobacco, leukoplakia, smoker’s palate, young adults.

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INTRODUCTION

Smoking is proven to have a negative impact on systemic and oral health, making it a serious public health problem. It is a significant risk factor for periodontal disorders, oral cancer, and lesions of the oral mucosa (1,2). Nicotine, carbon monoxide, and thiocyanate (SCN^-) are among the many harmful substances found in tobacco smoke that affect the immune system and oral environment (3). Among them, smokers' saliva contains greater levels of thiocyanate, a metabolic consequence of cyanide detoxification, than non-smokers' saliva (4,5).

In terms of oral health, salivary thiocyanate has two functions. Excessive levels may lead to oxidative stress and mucosal changes, even though it is a substrate for the lactoperoxidase system, which aids in antimicrobial defense (6). Higher salivary thiocyanate levels have been linked in studies to a higher risk of oral mucosal lesions, such as smoker's palate, leukoplakia, and erythematous alterations (7,8). Nevertheless, nothing is known about the specific effects of thiocyanate on the health of the oral mucosa in young adults who smoke.

This research is to assess the impact of salivary thiocyanate levels on the oral mucosa in light of the growing incidence of smoking among young people and its possible effects on oral health. This study aims to shed light on the early oral signs of smoking-related harm by comparing the levels of thiocyanates in smokers and non-smokers and evaluating the corresponding mucosal alterations. Early detection of these changes might support targeted treatments and preventative measures for groups who are at risk (9,10).

Materials and Methods

Eighty people between the ages of 18 and 30 participated in this clinical trial. They were split into two groups: forty smokers, who had smoked five or more cigarettes a day for more than a year, and forty non-smokers, who had never smoked. Voluntary involvement was used to attract participants from a hospital and dentistry college. People with a history of alcohol use, systemic illnesses, or those receiving any medication that alters salivary composition were not included. Prior to enrollment, all individuals provided written informed consent.

In order to prevent diurnal fluctuations, individuals' unstimulated full saliva samples were taken in the morning. At least one hour before to sample collection, each subject was told not to eat, drink, or practice good dental hygiene. Over the course of five minutes, saliva was passively drooled into a sterile test tube. Prior to analysis, the samples were promptly kept at -20°C.

A spectrophotometric technique was used to measure the amounts of salivary thiocyanates. Briefly, 0.5 mL of saliva and an equivalent amount of ferric nitrate reagent were combined, and the mixture was allowed to sit at room temperature for five minutes. The UV-visible spectrophotometer was used to measure the reaction at 460 nm. A standard calibration curve was used to quantify the thiocyanate concentration, and the results were reported in milligrams per milliliter.

A professional examiner used a sterile mouth mirror and probe to conduct a comprehensive intraoral examination under uniform illumination. Changes in the oral mucosa, including smoker's palate, ulcerations, erythematous changes, and leukoplakia, were seen. The location, size, and severity of each lesion were evaluated.

Software called SPSS (version 23) was used to examine the data. Continuous variables were summarized using descriptive statistics, such as mean and standard deviation. Salivary thiocyanate levels between smokers and non-smokers were compared using an independent t-test, and the relationship between smoking and alterations in the oral mucosa was evaluated using the chi-square test. Statistical significance was defined as a p-value of less than 0.05.

Results

With a p-value of <0.001, smokers had considerably higher mean salivary thiocyanate levels (3.5 ± 0.8 mg/dL) than non-smokers (1.2 ± 0.5 mg/dL), suggesting a statistically significant difference (Table 1). This implies that smoking raises thiocyanate levels, which may have an effect on dental health.

Compared to non-smokers, smokers had a greater frequency of changes to their oral mucosa. Twenty percent of smokers had leukoplakia, compared to five percent of non-smokers ($p < 0.05$). Similarly, only 3% of non-smokers and 15% of smokers had smoker's palate ($p < 0.05$). 25% of smokers had erythematous changes, which is substantially more than the 8% of non-smokers who experienced the same condition ($p < 0.05$). 12.5% of smokers and 2.5% of non-smokers had ulceration, however this difference was not statistically significant ($p = 0.08$). Interestingly, only 27.5% of smokers had a lesion-free oral mucosa ($p < 0.001$), whereas 82.5% of non-smokers had no mucosal lesions (Table 2).

Table 1: Comparison of Salivary Thiocyanate Levels

Group	Sample Size (n)	Mean Thiocyanate Level (mg/dL)	Standard Deviation (SD)
Smokers	40	3.5	0.8
Non-Smokers	40	1.2	0.5

Table 2: Prevalence of Oral Mucosal Changes

Oral Mucosal Condition	Prevalence in Smokers (n, %)	Prevalence in Non-Smokers (n, %)	p-value
Leukoplakia	8 (20%)	2 (5%)	<0.05
Smoker's Palate	6 (15%)	1 (3%)	<0.05
Erythematous Changes	10 (25%)	3 (8%)	<0.05
Ulceration	5 (12.5%)	1 (2.5%)	0.08
No Lesion	11 (27.5%)	33 (82.5%)	<0.001

Discussion

The current research emphasizes how smoking significantly affects salivary thiocyanate levels and how it is linked to changes in young individuals' oral mucosa. In line with earlier research showing greater thiocyanate levels in frequent smokers as a result of the metabolism of cyanogenic chemicals found in tobacco, our results show that smokers have considerably higher salivary thiocyanate concentrations than non-smokers (1,2).

In relation to oral health, thiocyanate has two functions. Despite being an essential part of the salivary peroxidase system, high levels have been linked to mucosal injury and oxidative stress (3). Smokers' elevated thiocyanate levels may affect the salivary antioxidant defense, resulting in epithelial alterations and tissue inflammation (4). This might account for the increased frequency of oral mucosal lesions in our research sample, including erythematous alterations, smoker's palate, and leukoplakia. According to earlier studies, extended exposure to elevated thiocyanate levels may intensify nitrosation processes, raising the possibility of oral cancer development (5,6).

Twenty percent of smokers had leukoplakia, which is consistent with previous research showing comparable patterns among long-term tobacco users (7,8). Chronic irritation from tobacco ingredients is thought to be the cause of smokers' hyperkeratotic lesions, such as leukoplakia, which promote excessive epithelial growth (9). 15% of smokers had smoker's palate, another prevalent finding in our research that is consistent with other findings (10). Cigarette smoke thermal insult is associated with this disease, resulting in keratotic alterations and epithelial hyperplasia (11).

Compared to non-smokers, erythematous alterations were seen in 25% of smokers. These results are in line with research indicating that smoking increases the oral mucosa's vascularization and inflammatory responses (12). Furthermore, while the difference did not approach statistical significance, ulcerations were more common in smokers than non-smokers, suggesting that other variables may potentially contribute to ulcer development even if smoking may aggravate mucosal irritation (13).

Salivary thiocyanate may be a biomarker for tobacco exposure and its possible effects on oral health, according to the study's findings (14). Regular monitoring of salivary thiocyanate in smokers may help in the early diagnosis of smoking-related oral diseases because of the substantial association between high thiocyanate levels and the occurrence of mucosal lesions (15).

It is necessary to recognize some limitations in spite of these results. Other confounding variables, such food habits and dental hygiene routines, were not thoroughly examined, and the study's sample size was somewhat small. More thorough information on the long-term impacts of thiocyanate on oral health may be available in future research using bigger cohorts and longitudinal designs.

CONCLUSION

In conclusion, our study emphasizes the adverse effects of smoking on salivary thiocyanate levels and its association with oral mucosal changes. These findings highlight the need for targeted interventions, including smoking cessation programs and regular oral screenings, to mitigate the risks of smoking-related oral diseases.

REFERENCES

1. Scott DA, Stapleton JA. Salivary thiocyanate as an index of cigarette smoking: comparisons with cotinine. Biomarkers. 1996;1(2):137-43.

2. Zappacosta B, Persichilli S, Mordente A, Minucci A, Lazzaro D, Meucci E, et al. Salivary thiocyanate and cigarette smoking: effects of withdrawal. Clin Chem Lab Med. 1999;37(5):577-80.

3. Tenovuo J. The peroxidase systems in human saliva. In: Pruitt KM, Tenovuo J, editors. The lactoperoxidase system: Chemistry and biological significance. New York: Marcel Dekker; 1985. p. 101-21.

4. Hsu SC, Singh B, Wang CY, Lewis JP, Taubman MA, Smith DJ. Effects of cigarette smoking on

salivary antimicrobial proteins. Int J Oral Sci. 2013;5(1):13-8.

5. Petersen PE. Tobacco and oral health–the role of the World Health Organization. Oral Health Prev Dent. 2003;1(4):309-15.

6. Reibel J. Tobacco and oral diseases. Update on the evidence, with recommendations. Med Princ Pract. 2003;12(Suppl 1):22-32.

7. Lee CH, Ko AM, Warnakulasuriya S, Yin BL, Sunarjo S, Zain RB, et al. Intercountry prevalences and practices of betel quid use in South, Southeast and Eastern Asia regions and associated oral pre-cancer and cancer rates. Transl Res Oral Oncol. 2016;1:1-9.

8. Jayaprakash K, Ramesh V, Dutta B, Kiran Kumar K, Krishna AB, Kiran K. Immunohistochemical detection of epidermal growth factor receptor expression in oral squamous cell carcinoma and its correlation with smoking. J Oral Maxillofac Pathol. 2017;21(2):206-11.

9. Gupta PC, Ray CS. Tobacco and youth in the South East Asian region. Indian J Cancer. 2002;39(1):5-35.

10. Warnakulasuriya S, Dietrich T, Bornstein MM, Peidró EC, Preshaw PM, Walter C, et al. Oral health risks of tobacco use and effects of cessation. Int Dent J. 2010;60(1):7-30.

11. Monteiro LS, Amaral JB, Vizcaino JR, Lopes CA. Study of oral mucosa characteristics in tobacco smokers. Rev Port Estomatol Med Dent Cir Maxilofac. 2013;54(3):143-8.

12. Javed F, Warnakulasuriya S. Is there a relationship between periodontal disease and oral cancer? A systematic review of currently available evidence. Crit Rev Oncol Hematol. 2016;97:197-205.

13. Axelsson P, Paulander J, Lindhe J. Relationship between smoking and dental status in 35-, 50-, 65-, and 75-year-olds. J Clin Periodontol. 1998;25(4):297-305.

14. Tiwari A, Mohanty S, Mohanty S, Kumar A, Saxena S, Vij A, et al. Biomarkers in oral submucous fibrosis: A systematic review and meta-analysis. Arch Oral Biol. 2021;127:105156.

15. Johnson NW, Bain CA. Tobacco and oral disease. Br Dent J. 2000;189(4):200-6.

A Functional Solution for Epulis Fissuratum - Management using Neutral Zone Technique - A Clinical Report

Abstract

An alternative approach to fabricate lower complete dentures is the neutral zone technique. It operates well for dentures that have a history of instability and an extremely atrophic ridge. the use of a single surgical procedure comprising standard excision to treat epulis fissuratum that results from a prosthesis that is not well fitted. Together, they demonstrate how epulis fissuratum brought on by an improperly fitted prosthesis can be treated with a surgical approach that involves conventional excision and rehabilitation with a conventional complete denture using the neutral zone technique. In the present situation, An example of a man patient with epulis fissuratum. This case required treatment due to the masticatory problems. This technique can help improving someone's look, masticatory function and Speech.

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INTRODUCTION

The intra-oral space exhibits hyperplasia of fibrous connective tissue in Epulis fissuratum (EF), an inflammatory pseudo-tumor. Recurrent discomfort, especially from poorly fitted dentures, is the most prevalent reason.1

The neutral-zone method to full denture fabrication is not novel or unique; rather, it is the result of combining the theories and conceptions of numerous individuals into a workable and useful process. The neutral-zone philosophy is predicated on the idea that, for every patient, there is a particular region within the denture space where the forces produced by the tongue are offset by the forces produced by the lips and cheeks, and where the function of the musculature will not unseat the denture.2

Case Report

A 55-year-old male patient with no particular pathological history presented to the department of Prosthodontics and Crown & Bridge at Mithila Minority Dental College and Hospital, Darbhanga for the ill-fitting prostheses.

He had been wearing the current badly-adapted set of dentures from last one year. Extra-oral examination showed a reduction in the vertical dimension of occlusion, symmetrical face and no signs of swellings in head and neck region. [Fig 1]
Intra-oral examination revealed badly worn out complete denture, hyperplastic mandibular lesion of the anterior alveolar mucosa, extending to the labial vestibular sulcus, from 32 tooth region to 35 tooth region. On palpation, the lesion was firm in texture and non-hemorrhagic. The lesion was around 22 × 11 mm2 area and no tenderness was present. The alveolar ridge was highly resorbed in the mandible, with reddish traumatic lesion over mucosa. As the total removable prosthesis was badly adapted and the lesion was neither ulcerated nor indurated. No other differential diagnosis was made. The provisional diagnosis for the lesion was epulis fissuratum.

Figure 1: - Hyperplastic tissue folds in the mandibular labial vestibular region.

Figure 2: - Excision of the epulis.

Clinical visit 1: - The first consultation Surgical resection combined with prosthetic rehabilitation was therefore planned. Local anesthesia (Lignocaine with adrenaline 1: 80 000) was administered. A partial thickness incision using a scalpel holder and blade no.15 was performedThe incision followed the limits of the fibrous hyperplasia which was excised over a width of approximately 22–25 mm going from the canine region of mandibular left side to 2nd premolar region. [Fig 2] & [Fig 3].

The lower boundary of the incision was sutured in its new position with interrupted periosteal sutures, along the incision, using Vicryl 3-0 non-resorbable suture. [Fig 4]

Clinical visit 2: - Patient was asked to come after 7 days for suture removal and evaluation of wound healing.

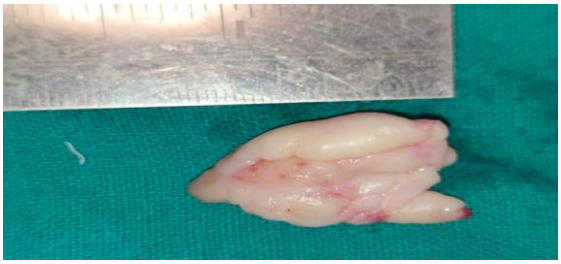

Figure 3: - Excised mass of epulis.

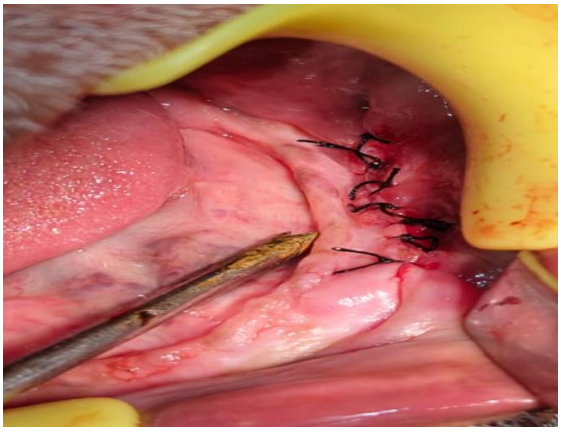

Figure 4: - Interrupted periosteal sutures.

Clinical visit 3: - Primary impression was made after the proper wound healing with impression compound. [Fig 5&6].

Primary cast was poured from this impression and an acrylic special tray was fabricated over it with 2 mm short margins and sharry's spacer.

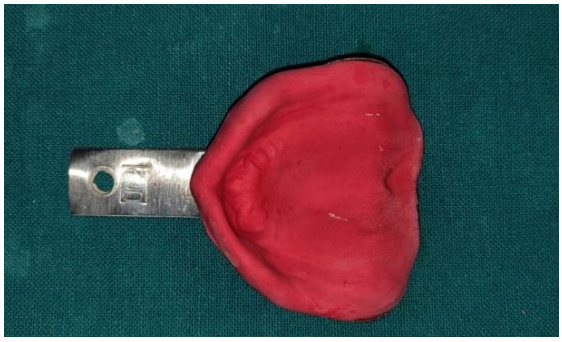

Figure 5: - Primary impression of maxilla.

Figure 6: - Primary impression of mandible.

Clinical visit 4: - The extension of the special tray were monitored intra-orally. The border moulding and seconday impression was made using green stick and ZOE paste. [Fig 7&8].
Master cast is poured using secondary impression. Self-cure acrylic is used to prepare the temporary record base over the master cast.

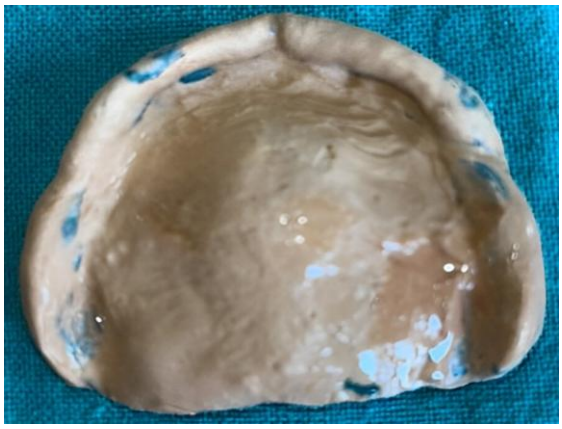

Figure 7: - Maxillary secondary impression.

Figure 8: - Mandibular secondary impression all green technique.

Clinical visit 5: - The temporary record base was assessed in the patient mouth. The stability and extensions were assessed. In mandibular base plate vertical wire loop is attached and then by using a green stick, the occlusal rim is created on which the moving of lip, cheek and tongue; swallowing; chewing; puffing of cheek and sucking in lips active and passive movement done by the patient is recorded and neutral zone gets demarked on the rim. [Fig 9] [Fig 10].

Alginate is used to prepare the index of the neutral zone impression. The green stick was then replaced by the modelling wax and occlusal rim was fabricated.

Figure 9: - Mandibular baseplate with vertical wire loops attached.

Clinical visit 6: - Niswonger's method is used to record the jaw relation in the patient using a freeway space of 3 mm. Nick & Notch method is used to seal the occlusal rim in centric relation. [Fig 11].

Articulation had been fabricated on mean value articulator and teeth arrangement was done. As the stability of the planned mandibular complete denture was a concern, shallow-angled cusped posterior prosthetic teeth were arranged on a mean value articulator. As this patient had a Class I Skeletal

Base, teeth arrangement was done in class I molar relation.

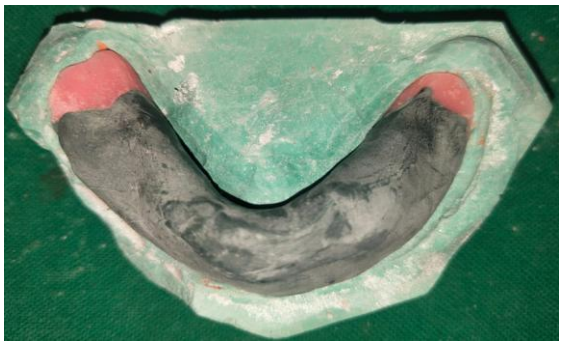

Figure 10: - Complete neutral zone impression.

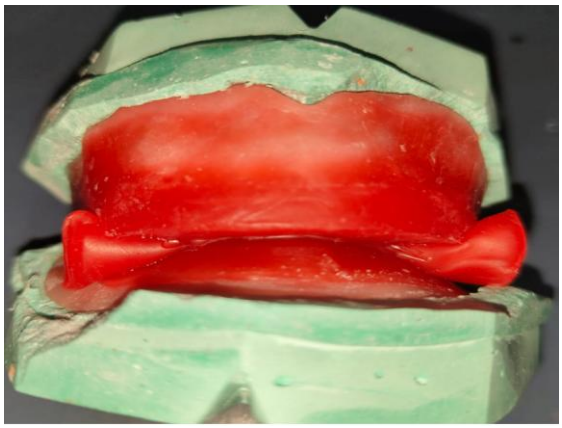

Figure 11: - Jaw Relation.

Clinical visit 8: - Try-in was done inside the patient oral cavity and evaluation of proper occlusion was done. After evaluation, the prosthesis' stability and retention had been found to be acceptable. The patient was satisfied with the appearance. [Fig 12].

Finishing and polishing was done. Denture was processed by conventional process.

Figure 12: - Try in done.

Clinical visit 9: - The mandibular complete denture was evaluated to the chair side and was found to be satisfactory in terms of retention, stability, support, aesthetics and occlusion (Fig 13).

At subsequent review appointments the patient reported satisfacted with the prosthesis.

Figure 13: - Final denture insertion done.

Discussion

On the vestibular oral mucosa, inflammatory fibrous hyperplasia, or epulis fissuratum, is a reactive tissue change brought on by improperly fitted dentures. The primary causes of the lesion are irritation and ongoing trauma. On the other hand, smoking, wearing dentures constantly, poor dental hygiene, ill-fitting dentures, age-related changes, and systemic illnesses are also thought to be contributing factors to epulis. Our patient does not have edentulous maxilla, which is where it most commonly happens. The lesion may show up in various sizes. It involves the entire vestibule and can vary in size from a few millimetres to several centimetres. Although it is usually asymptomatic, significant inflammation and ulceration can occasionally accompany it. It has a number of characteristics in a clinical setting. Near the borders of the prosthesis, it typically manifests as a smooth, soft lesion in the vestibular sulcus with normal or erythematous mucosa on top.1

The neutral-zone philosophy is predicated on the idea that, for every patient, there is a particular region within the denture space where the forces produced by the tongue are offset by the forces produced by the lips and cheeks, and where the function of the musculature will not unseat the denture. Tooth position and flange shape have an equal or higher impact on denture stability than any other component. We shouldn't be rigid and insist that teeth be positioned either lingual or buccal to the ridge, above its crest. The musculature should determine where teeth should be positioned, and each patient will have a distinct preference. Two goals are accomplished by placing artificial teeth in the neutral zone. Second, the forces that the musculature exerts against the dentures are more advantageous for stability and retention, and the teeth won't impede normal muscular activity.14

This is especially true in cases when there are strong lingual or buccal muscles, when the neutral zone has

been changed due to surgical resection, or when neuromuscular control is compromised. Although dental implants are a potential therapeutic option in this case, some patients are not a good fit for dental implant treatment for a number of clinical or medical reasons. Additionally, some individuals may not want to undergo surgically invasive procedures, such getting dental implants. The method outlined offers a practical solution to this problem. The doctor should refrain from trying to "re-line" the denture in an attempt to address this issue. The improper shape of the polished surfaces, not a bad fit, is what's causing the instability. It may also be understood that polished surfaces that are shaped to match the neutral zone will be used by the oral musculature and have a beneficial effect on the retention of the mandibular complete denture in patients with less-than-ideal denture-bearing areas (such as a noticeably resorbed ridge) or in patients with altered neutral zones due to surgical resection.3 The neutral zone's outlines are recorded using wire loops, the alginate index, the all-green imprint technique, and the nick-and-notch method for centric relation sealing of the occlusal rim.

A poorly constructed prior complete denture may be the cause of the transition issue to a "narrow" neutral zone denture. If this transition is properly considered, this issue can be avoided. To improve denture stability, mandibular dentures should be examined and modified as needed. Overdentures and neutral zone complete dentures are two of the many choices currently available to help with the meticulous planning of the transition to a new denture.4

CONCLUSION

Chronic irritation, ill-fitting prostheses, and tobacco use greatly increase the prevalence mucosal lesions, notably epulis fissuratum. Surgical excision as the definitive treatment may lead to shallow vestibule and insufficient keratinized mucosa. Vestibuloplasty combined with free gingival graft as a complementary treatment is therefore required. It is the best alternative to prevent loss of sulcus depth or keratinized mucosa.

Management of an unstable mandibular complete denture can often be difficult and frustrating for both clinician and patient. The neutral zone denture is a useful way of rehabilitating the patient function and esthetic.

REFERENCES

1. Chaima Khalifa, Adel Bouguezzi et al An innovative technique to treat epulis fissuratum: A case report SAGE Open Medical Case Reports 2021;9:1-5.

2. Victor E. Beresin, Frank J. Schiesser et al The neutral zone in complete dentures The J Prosthet Dent 2006; 95:93-101.

3. Christopher D Lynch et al Overcoming the Unstable Mandibular Complete Denture: The Neutral Zone Impression Technique Dent Update 2006; 33: 21-26.

4. Beresin VE, Schiesser FJ. The neutral zone in complete dentures. J Prosthet Dent 1976; 36: 356-367.

5. Miller WP, Moteith B, Heath MR. The effect of variation of the lingual shape of mandibular complete dentures on lingual resistance to lifting forces. Gerodontology 1998; 15:113-119.

6. Walsh JF, Walsh T. Muscle-formed complete mandibular dentures. J Prosthet Dent 1976; 35: 254-258.

7. McCord JF, Grant AA. Impression making. Br Dent J 2000; 188: 484-492.

8. Alfano SG, Leupold RJ. Using the neutral zone to obtain maxillomandibular relationship records for complete denture patients. J Prosthet Dent 2001; 85:621- 623.

9. Fahmy FM, Kharat DU. A study of the importance of the neutral zone in complete dentures. J Prosthet Dent 1990; 64:459-462.

10. Barrenas L, Odman P. Myodynamic and conventional construction of complete dentures: a comparative study of comfort and function. J Oral Rehab 1989; 16:457- 465.

11. Jagger D, Harrison A. Complete Dentures - Problem Solving. London: BDJ Books, 1999.

12. Fish EW. Principles of Full Denture Prosthesis 1st ed. London: John Bale, Sons & Danielsson, 1933.

13. Basker RM, Davenport JC. Prosthetic Treatment of the Edentulous Patient 4th ed. Oxford: Blackwell Munksgaard, 2002.

14. Victor E. Beresin. The neutral zone in complete dentures. 1976;36(4):356-67.

Dermis Fat Graft from Thigh as Interpositional Material in the Management of TMJ Ankylosis

Abstract

The purpose of this article is to report the use of dermis fat graft from thigh as an alternative site as interpositional material in the management of TMJ ankylosis. Advantages of this harvesting site compared with previous harvesting sites have been discussed here.

Keywords: Temporomandibular joint ankylosis; Dermis fat; Interpositional arthroplasty, Thigh

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INTRODUCTION

Temporomandibular joint ankylosis refers to bony or fibrous adhesion of the anatomic joint components, which results in loss of function.1 Surgical management of TMJ ankylosis includes gap arthroplasty or interpositional grafting.2 Various interpositional grafts have been used over the years like indigenous pterygomasseteric slings, temporomandibular meniscus, temporalis muscle/fascia, skin, auricular cartilage, fat and dermis-fat.2 However, there is no ideal interpositional graft. Yolovine originally described flaps of the temporalis muscle and/or fascia in 1898, and Murphy utilised them for the first time to operate on the temporomandibular joint in 1914.2 But it has disadvantages like limited mouth opening and scar contracture.2

Recently, dermal fat has shown promising research in various studies.2,3,4The most common site for harvesting dermal fat includes periumbilical and lateral abdomen. In 2004, Dimitroulis first described the use of abdominal dermis-fat grafts as interpositional material in TMJ ankylosis. However, substantial amount of dermal fat can also be harvested from the thigh with the added advantage of a hidden donor site scar. This is particularly important when considering operating on female patients in this part of the globe when a scar on abdomen becomes often visible because of the dress culture.

In this article, we report a case of unilateral temporomandibular joint re-ankylosis in a 16 year old female patient which was operated by interpositional arthroplasty using dermis fat graft from thigh which has been reported very rarely in the literature.

Case Report

A 16 year old female patient with left temporomandibular joint re-ankylosis reported to the Department of Oral and Maxillofacial Surgery with a chief complaint of reduced mouth opening for the last four years. The patient was apparently well 12 years back when she fell from terrace and sustained injuries to her face. She was taken to a local practitioner where primary management was done. But gradually she developed restricted mouth opening as she grew up. She was diagnosed with right temporomandibular joint ankylosis for which she was operated 4 years back in our department. She was hospitalized for a period of 12 days during that time. But due to non-compliance with the mouth opening exercises regime, her mouth opening reduced which ultimately became nil. The patient did not have any significant personal and family history.

On extraoral examination, chin was deviated to left side and underdeveloped in nature. Facial asymmetry was present. There was fullness of left side and flattening on the right side of face. There was also presence of scar mark with respect to the left pre-auricular and chin region. (Fig.1) There was no movement of temporomandibular joint on left side whereas slight movement was present with respect to right side. Prominent antegonial notch was present on the right side. Bony prominence could also be palpated on that side. On intraoral examination, interincisal mouth opening was 13 mm. Class I molar relation was present bilaterally with imbrication present in the lower anterior teeth region. The provisional diagnosis of left temporomandibular joint re-ankylosis was made and the patient was advised contrast enhanced computed tomography of face with 3D reconstruction. The CT report revealed reduced left temporomandibular joint space with deformed, expanded and flattened left condylar joint space fused with expanded glenoid fossa with marked adjacent sclerosis. (Fig.2) On the basis of radiological and clinical data, the diagnosis of left temporomandibular re-ankylosis was confirmed.

Treatment plan was made for interpositional arthroplasty with dermal graft. The patient was taken up for surgery under general anaesthesia with nasoendotracheal intubation. Through the pre-existing scar mark with respect to the right pre-auricular area , skin, subcutaneous tissue and fascia was incised and the temporomandibular joint was exposed. A gap arthroplasty was performed by removing the ankylosed mass by creating a gap of 22 mm between the proximal and distal segments. (Fig. 3) A mouth opening of about 42 mm was achieved using Heister jaw opener. Then dermis fat graft was harvested using an elliptical incision over the right thigh at the vastus lateralis site. (Figure 4) Skin, subcutaneous tissue upto fat layer was dissected. The epidermis was then finely dissected and discarded. The required volume of dermis-fat graft was harvested and stored in saline. The gap that was created in the ankylosed area was filled with the help of the dermis-fat graft. The wound margins at the donor site were undermined and layerwise closure was done. The pre-auricular incision was finally closed in layers and pressure bandage was applied over the surgical site. Post-operatively, all surgical wounds healed uneventfully. Physiotherapy to help mobilize the joint was initiated 7 days postoperatively. Small wooden spatulas (each 1 mm thick) were given to the patient to be used incrementally to increase the mouth opening at the rate of 1 mm per day. The patient came to the hospital for periodical follow ups and orthopantomogram was done to evaluate the left side of mandible. The postoperative scar with respect to

the thigh was also healing well. She was encouraged to continue with the vigorous mouth opening exercise using wooden spatulas and mouth opening is 42 mm (Fig. 5) and is still under review.

Discussion

Numerous interpositional materials have been used as a means to prevent re-ankylosis of TMJ. These include alloplastic materials like silastic, silicone, proplast, Teflon, acrylic, metals etc. , autogenous materials like muscle, fascia, cartilage, fat, costochondral grafts, metatarsals, metacarpophalangeal joint transfer, full thickness skin graft, temporalis myofascia flap and dermis fat, each having its own advantages and disadvantages.3,5 However, Dimitroulis et. al. stated that there is no ideal interpositional graft. 6
Though silastic and Teflon-proplast implants were quite famous but they were associated with numerous complications including a foreign body reaction with the implant surrounded by giant cell infiltrates, gross destruction of surrounding structures including severe bone erosions around TMJ causing cerebrospinal fluid leakage, implant fragmentation and perforation, and increase in peripheral osseous proliferation leading to fibrous or fibro-osseous ankylosis.7,8

Auricular cartilage has the advantages of being biologically inert and viable, as well as having a form that fits the glenoid fossa well. 9,10 However, recent investigations have shown that auricular grafts may fragment, proliferate, and result in fibrous ankylosis of the TMJ with gradual limiting of jaw opening, aside from the donor site morbidity that may follow. 11,12

In TMJ ankylosis, the temporalis myofascial flap continues to be the most widely used interpositional graft. However, issues including limited jaw movement and aesthetic concerns like scar contracture must be taken into consideration. Dimitroulis et. al mentioned the advantages of dermis-fat graft such as it can be easily customised, can take any shape, offers adequate quantity, and is impact resistant. Dermis keeps the fat in one piece and inhibites fragmentation. Additionally, it reduces heterotrophic calcification and joint fibrosis, which in turn prevents reankylosis. Dermis fat allows smoother movement of the condylar stump owing to the flexible nature of the graft.6

Dermis-fat graft may be derived from iliac crest and abdomen. The above mentioned patient is a young female. Considering that the dermis-fat graft is an excellent graft as discussed in various literature, we just changed the harvesting site to thigh which was also found to be equally good in our case in terms of an hidden scar mark and no postoperative complications.

After the surgical excision of TMJ ankylosis, huge voids left by gap arthroplasties were originally filled with abdominal dermis-fat grafts.5 In a radiologic research, Dimitroulis et al.13 discovered MRI evidence of substantial fat deposits, mostly outside the joint cavity, with grey matter primarily positioned between the condyle and glenoid fossa's articular surfaces.

In another study by Dimitroulis et al., it was shown that the dermis-fat graft adapts to completely fill the joint space while significantly lowering the proportion of fat to fibrous/dermal tissue.10
The main site for harvesting dermis fat graft for management of TMJ ankylosis has been abdomen and iliac crest. However, harvesting dermis fat from both sites have certain disadvantages. First, when dermis fat is harvested from iliac crest, it is known to cause belt trauma. Second, when dermis fat is derived from abdomen especially for female patients, the following disadvantages could be found. According to Indian culture, women wear saree so the abdomen is exposed and having a scar in that region is highly unaesthetic. Secondly, having a scar over abdomen has made many Indian poorly educated families to consider the girl to have obstetrical and gyanecological problems which has hampered their marriage in many cases. This is the reason we suggest harvesting dermal fat graft from thigh. It has the added advantages. Fat grafts formed from the thigh demonstrated greater structural integrity, less cyst formation, less necrosis, and reduced fibrosis, This increased structural integrity could be due to greater adipose stem cell viability from the inner thigh.14

A study in the available literature highlights the use of a dermis-fat graft from the thigh as a viable alternative to grafts from other donor sites. It emphasizes several advantages, including greater graft availability, improved stability, better scar concealment, and reduced morbidity at the donor site.15 These findings align with and support the approach used in our case.

CONCLUSION

In the present case of re-ankylosis of left temporomandibular joint, we harvested the dermis fat from a different location i.e. thigh. The results we got for the patient were pretty good with minimal disadvantages. The scar is mostly hidden so esthetically acceptable and also there is no ugly bulging in the temporal region. The fat graft derived from thigh has been able to resolve few of the misconceptions and stigma present in the Indian society for females affected with TMJ ankylosis.The

dermis-fat graft due to its excellent characteristics has superiority over other grafts and provides a viable option to become an alternate material of choice for interpositional arthroplasty in TMJ ankylosis. However more research is required to use this site of harvest as a common means instead of the most commonly used temporalis myofascial flap. Use of any technique ultimately depends on the individual surgeon's expertise and his knowledge of the technique.

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

REFERENCES

1. Erol B, Tanrikulu R, Gorgun B. A clinical study on ankylosis of the temporomandibular joint. J Craniomaxillofac Surg. 2006;34(2):100–6.

2. Dimitroulis G (2004) The interpositional dermis-fat graft in the management of temporomandibular joint ankylosis. Int J Oral Maxillofac Surg 33:755–760

3. Younis M, Shah AA, Hassan S, Kapoor M, Rashid A. Abdominal Dermis-Fat Graft Versus Conventional Temporalis Myofascial Flap Interposition in Temporomandibular Joint Ankylosis: A Prospective Clinical Comparative Study. J Maxillofac Oral Surg. 2021 Mar;20(1):54-62. doi: 10.1007/s12663-020-01455-3. Epub 2020 Oct 9. PMID: 33584043; PMCID: PMC7855128.

4. Rahman SA, Rahman T, Hashmi GS, Ahmed SS, Ansari MK, Sami A. A Clinical and Radiological Investigation of the Use of Dermal Fat Graft as an Interpositional Material in Temporomandibular Joint Ankylosis Surgery. Craniomaxillofac Trauma Reconstr. 2020 Mar;13(1):53-58. doi: 10.1177/1943387520903876. Epub 2020 Apr 2. PMID: 32642033; PMCID: PMC7311854.

5. Mehrotra D, Pradhan R, Mohammad S, Jaiswara C (2008) Random control trial of dermis-fat graft and interposition of temporalis fascia in the management of temporomandibular ankylosis in children. Br J Oral Maxillofac Surg 46:521–526

6. Dimitroulis G, Trost N, Morrison W: The radiological fate of dermis-fat grafts in the human temporomandibular joint using magnetic resonance imaging. Int J Oral Maxillofac Surg 37:249, 2008

7. Dolwick MF, Aufdemorte TB. Silicone induced foreign body reaction and lymphadenopathy after temporomandibular joint arthroplasty. Oral Surg Oral Med Oral Pathol. 1985;59(5): 449-452.

8. Ioannides C, Freihofer HPM. Replacement of the damaged inter-articular disc of the TMJ. J Craniomandib Pract. 1988;16(6):273-278.
9. Matukas VJ, Lachner J.The use of autologous auricular cartilage for temporomandibular joint disc replacement: a preliminary report. J Oral Maxillofac Surg. 1990;48(4):348-353.]

10. Sandler NA, MacMillan C, Buckley MJ, Barnes L. Histological and histochemical changes in failed auricular cartilage grafts used for a temporomandibular joint disc replacement. J Oral Maxillofac Surg. 1997;55(9):1014-1019.

11. Takatsuka S, Narinobou M, Nakagawa K, Yamamoto E. Histological evaluation of auricular cartilage grafts after discectomy in the rabbit craniomandibular joint. J Oral Maxillofac Surg. 1996;54(10):1216-1225.

12. Yih W-Y, Zysset M, Merrill RG. Histopathological study of fate of autogenous auricular cartilage grafts in the human temporomandibular joint. J Oral Maxillofac Surg 1992;50:
964-967.

13. Dimitroulis G. Macroscopic and histologic analysis of abdominal dermis-fat grafts retrieved from human temporomandibular joints. J Oral Maxillofac Surg. 2011 Sep;69(9):2329-33. doi: 10.1016/j.joms.2011.01.048. Epub 2011 Apr 21. PMID: 21514026.

14. Ullmann Y, Shoshani O, Fodor A, et al. Searching for the favorable donor site for fat injection: In vivo study using the nude mice model. Dermatol Surg. 2005;31:1304–1307.

15. Mohd Kalim A, Mohammad D, Abdus S, Tabishur R, Akash G, Mohd Aswad K. Lateral Thigh Dermis Fat As Interpositional Graft In The Management Of Temporomandibular Joint Ankylosis. African Journal of Biological Sciences. 2024.

Mesiodens: A Case Report

Abstract

Supernumerary teeth are most significant dental abnormalities affecting the deciduous and early mixed dentition and may lead to a variety of pathological disturbances to the developing secondary dentition and also resulting in poor facial esthetics. Mesiodens are the erupted or unerupted extra tooth in the centre of maxilla, along with normal teeth (between the central incisors).

This is a case report of 9 year old male patient came with a chief complaint of an extra tooth in upper front teeth region. Patient complaints of irritation from the extra tooth. There was no a history of trauma and pain. Medical and family history was non relevant. There were no signs of any syndrome. While intra oral examination, it was observed mesiodens was present palatally between 11 and 21.

Keywords: Supernumerary Teeth; Mesiodens; Prevalence.

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INTRODUCTION

A supernumerary tooth is a developmental anomalies characterized by extra number of teeth than normal teeth. The etiology of these teeth is still unknown although several studies have been suggested such as genetics, hyperactivity of the dental lamina, dichotomy of the tooth bud, proliferation of odontogenic cell rests, combination of genetic and environmental factors, continued activity of the dental lamina after the normal number of tooth buds are formed, atavism.

Mesiodens classified by different types. According to the morphology the classification are eumorphic (resembles a natural tooth) or dysmorphic, (may be conical, tuberculate or molariform).

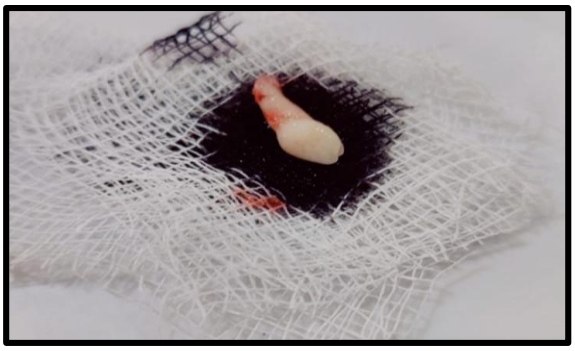
CASE REPORT

A 9 year aged male patient came to the department of pediatric and preventive dentistry with a chief complaint of an extra tooth present in upper front teeth region. Patient complaints of discomfort from this tooth. There was no relevant history of trauma and pain. Medical and family history was non-relevant. There were no signs of any syndrome. On intra oral examination it was seen that a extra tooth was present palatally between 11 and 21.

Intraoral picture showing mesiodens between 11 and 21.

IOPAR showing mesiodens between 11 and 21.

Intra oral photograph showing socket after extraction



Extracted mesiodens.

Discussion

Mesiodens is mostly common but interesting developmental dental anomalies that may hamper the aesthetic and function value. Mesiodens aka rudimentary when seen in secondary dentition and called supplementary when seen in primary dentition. As supernumerary teeth can affect the normal position and eruption of adjacent teeth, they often require clinical intervention. Management of mesiodens depends upon its type, position, eruptive pattern, and stage of dentition. It can be managed either by extraction or by the conservative method of retention and observation.

CONCLUSION

Supernumerary teeth are most common developmental anomalies, which require intervention so as to avoid the development of further future complication. Each case may require different treatment modalities depending on the age of the patient, site, number of supernumerary tooth, and the involvement of surrounding structure. The clinician should be aware of the warning signs and

should be able to diagnose the anomalies as early as possible to reduce further complication, and proper treatment plan should be done.

REFERENCES

1. Sheikh Z, Manzoor A, Amir N (2014) Mesiodens: A common supernumerary tooth: Report of management of a case with two mesiodens. Int Dent J Stud Reason 2: 41-46.

2. Russell KA, Folwarczna MA (2003) Mesiodens-Diagnosis and management of a common supernumerary tooth. J Can Dent Assoc 69: 362-366.

3. Brook AH (1974) Dental anomalies of number, form, and size: Their prevalencein British Schoolchildren. J Int Assoc Dent Child 5: 37-53.

4. Davis PJ (1987) Hypodontia and hyperdontia of permanent teeth in Hong Kong school children. Commun. Dent Oral Epidemiol 15: 218-220.

5. Brabant H (1967) Comparison of the characteristics and anomalies of the deciduous and the permanent dentitions. J Dent Res 46: 897-902.

6. Ravn JJ (1971) Aplasia, supernumerary teeth and fused teeth in the primary dentition. An epidemiologic study. Scand J Dent Res 79: 1-6.

Mucocele on Lower Lip: A Case Report

Abstract

Mucocele is a most common salivary gland disorder that can be appear in the lacrimal sac, paranasal sinuses, oral cavity, gall bladder or appendix. The lesions occur due to mucous accumulation resulting from the alteration in the minor salivary glands. Lower lip is the most common site of occurrence of these lesions in the oral cavity and most probable cause is trauma or habit of lip biting (Morsicatio buccarum). A 9 year old girl reported to the Department of Pediatric and Preventive Dentistry with chief complaint of painless swelling on inner aspect of the lower lip since 1 month. There was no significant medical history. Patient had a positive history of lip biting habit (Morsicatio buccarum).

On intraoral examination a round sessile swelling with ill defined border was seen in the area of 72 & 73

The swelling was approximately 6 mm in diameter. It was located approximately 4 mm medial to the left lower buccal frenum, extending from approximately 5mm superior to the buccal vestibular sulcus and terminating approximately 3 mm short of the vermilion border of the lip.Color and texture of the swelling was similar to healthy adjoining tissue.

Lesion was diagnosed as a mucocele based on the clinical features and history of lip biting habit (Morsicatio buccarum). It was treated under local anaesthesia using scalpel by placing an incision circumferentially on the site. Lesion was resected from base. Sutures were placed on the site and recalled after 1 week for further follow up and management of lip biting habit (Morsicatio buccarum).

Keywords: Lower lip, mucous, minor salivary glands, mucocele.

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INTRODUCTION

Mucocele is a mucus-filled cyst that may appear in the oral cavity, gall bladder, appendix, paranasal sinuses, or lacrimal sac.[1,2,3,4] The term was derived from a Latin word, mucus, or mucus and coele or cavity.[1,5] It is most common salivary gland lesion in the oral mucous membrane.[4] It results from accumulation of mucus due to altered minor salivary glands.[3,6]

Two types of mucocele can appear in the oral cavity i.e., extravasation and retention type. In children most common mucocele are extravasation type and retention type of mucoceles are very rarely seen.[7] Extravasation mucocele results from a ruptured salivary gland duct causing spillage of mucin into the connective tissues around the salivary gland. These extravasation mucoceles undergoes three evolutionary phases i.e.,

• In the first phase, mucus spills diffusely from the excretory duct into the connective tissues, appearing soft and purplish-gray.

• In the next phase, i.e., resorption phase, because of foreign body reaction, formation of granuloma occurs (showing erythematous features).

• In the final phase, there is formation of pseudo-capsule (without epithelial lining) around the mucosa with dome-shaped lesion and sharp borders.[6]

Salivary gland ducts blockage causing decrease or absence of glandular secretion causes retention type mucocele.[3,6,8,9].

Clinical appearance of both extravasation type and retention type of mucoceles is similar. Mucoceles present as soft, bluish, and transparent cystic swelling that frequently resolve spontaneously. Blue colour is due to vascular congestion, cyanosis of the tissue above, and below accumulation of fluid occure. However, colour may vary depending on the lesion size, proximity to the surface and elasticity of overlying tissue.

Extravasation mucoceles appear frequently on the lower lip followed by the buccal mucosa, tongue and palate and are rarely found in the retromolar areas and posterior dorsal area of tongue; in contrast, retention mucoceles appear at anywhere in the oral cavity.[6] When located on the floor of the mouth, these lesion are called ranula because the inflammation resembles the cheek of a frog.[3,6,8,9] Usually mucoceles are asymptomatic but sometimes can cause discomfort by interfering with speech, swallowing, or chewing. Treatment options include surgical excision, marsupialization, cryosurgery, micro-marsupialization, and laser excision, laser vaporization.[4,5].

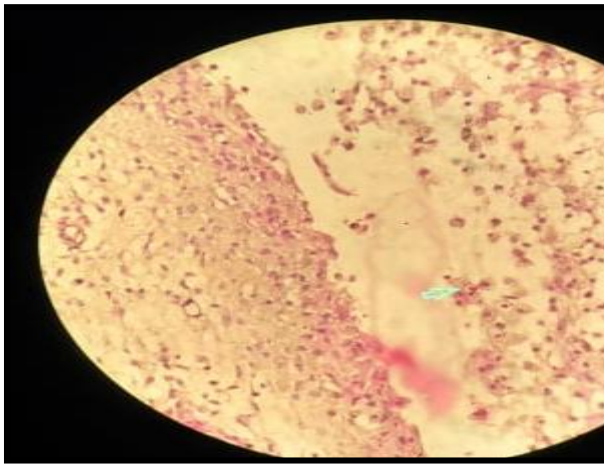
This article reported a case of mucocele on lower lip treated by surgical excision method using scalpel blade.

A Case Report

A 9-year-old girl reported with the chief complaint of painless swelling on the inner aspect of the lower lip for the past 1 months. Patient was apparently normal 1 months back after which she noticed a small swelling in the lower lip which was small initially and then was increasing gradually to attain the present size. There was no significant medical history.

Figure 1: Dome shaped translucent swelling seen on the lower lip

On intraoral examination, a round, solitary, fluctuant swelling was seen on the inner aspect of the lower lip at the left lateral incisor region. The swelling was approximately 6 mm in diameter. It was located approximately 4 mm medial to the left lower buccal frenum, extending from approximately 5mm superior to the buccal vestibular sulcus and terminating approximately 3 mm short of the vermilion border of the lip. Colour and texture of the swelling was similar to healthy adjoining tissue. No other oral anomalies were detected. Patient had a positive history of lip biting habit (Morsicatio buccarum). There was no difficulty in speaking, chewing or swallowing.



Hematoxylin and eosin section showing mucin pooled regions incentral luminal area surrounded by granulation tissue. Salivary gland acini shows in the periphery area of lesion(indicated by arrow).

Discussion

Mucoceles, originated from the minor salivary gland, is one of the common mucosal lesion affecting the general population. The two main etiological factors responsible for the lesion are trauma and obstruction of the salivary gland ducts. There are two types of mucocele which has different etiological factors, that are painless, asymptomatic swellings having a relatively rapid onset of enlargement and then appear to involute because of the rupture of the contents into the oral cavity or resorption of the extravasated mucus (extravasation type) or retention of the mucin (retention type).

The patient may relate a history of recent or remote trauma to the mouth or face, or the patient may have a habit of Lip biting aka Morsicatio buccarum. The duration of the lesion is usually 3-6 weeks; however, it may vary from a few days to several years in some exceptional cases. (6,11) Often, an individual may rupture or unroof the vesicles by creating a suction pressure. A chronic and recurrent history is frequently observed in such situations. (6,10) There are few strong contributing factors that aids in the diagnosis of mucocele such as the appearance, clinical findings; consistency. Literatures suggest that biting of lip is one of the most common factor responsible that lead to mucocele. The radiographic role is of minimal contribution, ruling out for calcified structure such as sialolith would definitely contribute to the pathogenesis for the type of mucocele especially for the Retention type (12,13). Histopathologically the extravasated type is not lined by epithelium (pseudo cyst) and in case of retention type (true cyst) it is lined by epithelium. In our case report correlation of the clinical findings, history of lip biting (Morsicatio buccarum) and based on the histopathology the final diagnosis was in favour of Mucous extravasation phenomenon. Moreover positive findings of history of lip biting (Morsicatio buccarum) and histopathologically absence of epithelium line and with the presence of spilled mucin and granulation tissue it was diagnosed as Mucocele of extravasation type.

CONCLUSION

The nature of Mucocele are mostly benign and self-limiting, diagnosed based on clinical findings followed by definitive diagnosis based on histopathological investigation. Trauma and habitual lip biting (Morsicatio buccarum) is proposed to be one of etiological factors. Hence the importance of the lesion may be underestimate as a part of awareness as the lesion is most common in general population.

REFERENCES

1. Baurmash HD. Mucoceles and ranulas. J Oral Maxillofac Surg. 2003;61:369–78.

2. Ozturk K, Yaman H, Arbag H, Koroglu D, Toy H. Submandibular gland mucocele: Report of two cases. Oral Surg Med Oral Pathol Oral Radiol Endod. 2005;100:732–5.

3. Rao PK, Hegde D, Shetty SR, Chatra L, Shenai P. Oral Mucocele – Diagnosis and Management. J Dent Med Sci. 2012 Nov;2:26–30.

4. Laller S, Saini RS, Malik M, Jain R. An Appraisal of Oral Mucous Extravasation cyst case with Mini Review. J Adv Med Dent Sci Res. 2014;2:166–70.

5. Sukhtankar LV, Mahajan B, Agarwal P. Treatment of lower lip Mucocele with Diode Laser – A Novel Approach. Ann Dent Res. 2013;2(Suppl 1):102–8.

6. Ata-Ali J, Carrillo C, Bonet C, Balaguer J, Peñarrocha M, Peñarrocha M. Oral mucocele: Review of literature. J Clin Exp Dent. 2010;2:e18–21.

7. Bodner L, Manor E, Joshua BZ, Shaco-Levy R. Oral Mucoceles in Children – Analysis of 56 New Cases. Pediatr Dermatol. 2015;32:647–50.

8. Singh RK, Singh A, Vivek R, Tripathi AA. Mucocele: Review and a case report. Healthtalk. 2012;4:38–9.

9. Madan N, Rathnam A. Excision of Mucocele: A surgical Case Report. Bio Biomed Rep. 2012;2:115–8.

10. Shafer's Textbook of Oral Pathology. 2009. Sixth edition: 541- 542.

11. Neville, Damm, Allen, Bouquot. Oral and Maxillofacial pathology. 3rd edition. Page nos- 454-456.

12. Nallasivam KU, Sudha BR. Oral mucocele: Review of literature and a case report.J Pharm Bioall Sci 2015;7:S731-3.

13. Yamasoba T, Tayama N, Syoji M, Fukuta M. Clinicostatistical study of lower lip mucoceles. Head Neck. 1990;12:316–20.

Crown Lengthening – A Case Report

Abstract

Objective: The present case report shows a crown lengthening in a surgical way as a procedure on 35 years old man as a treatment.

Methods: A 35 years old man come to periodontics department as referred by conservative dentistry department with a tooth fracture on the lateral incisor. Intraoral examination shows a crown fracture reaches until under the cementoenamel junction area. Periapical radiograph shows non-hermetic obturation. No extra oral anomaly was found. The retreatment of the tooth was done by the conservative dentistry then the surgical crown lengthening was done after the retreatment and final restoration was completed 3 months post-operative.

Results: To have a satisfactory result, the problem must be properly identified and analysed. The determining criterion for determining the issue is the clinical crown length, alveolar bone height, and gingival tissue position.

Conclusion: There is a significant relationship between restorative dentistry and periodontal health. Predictable long-term successful restoration requires a good combination between the restorative principles and the correct management of the periodontal tissue.

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INTRODUCTION

Tooth repair and periodontal health are closely related and have a critical interaction. Many restorations place the margins within the gingival sulcus, which frequently causes irreversible tissue damage, even though it is generally acknowledged that the ideal restorative margin should be positioned coronal to the marginal tissue.
Gottlieb was the first to explain that the "epithelial attachment" around a natural tooth extends beyond a single point or level to include particular regions of the cementum's enamel surface. **Orban and Muller** later corroborated these findings.

In order to reveal more of the tooth anatomy, this operation usually combines tissue reduction with osseous surgery. Crown lengthening's main objective is to guarantee that the tooth crown is long enough for a secure dentogingival complex and the insertion of a restorative margin, both of which support a robust marginal seal and a final restoration that looks good.

As initially investigated by Gargiulo et al., biologic breadth (BW) is the physiologic dimension of the junctional epithelium and connective tissue attachment. According to their research, people typically have a junctional epithelium 0.97 mm below the base of the gingival sulcus and a connective tissue connection 1.07 mm above the alveolar bone crest. The average biologic width, derived from these two measures, is 2.04 mm.

An additional 1mm may be added coronally to the 2mm dentogingival junction, establishing an optimal distance between the bone crest and the margin of a restoration. This allows for proper healing and restoration of the tooth. Other studies suggest that approximately 4-5 mm of exposed tooth structure above the osseous crest is ideal to ensure a stable dentogingival complex and sufficient biological width for effective tooth preparation. This distance also helps achieve a good marginal seal and retention for both provisional and final restorations. Consequently, the present case report highlights a surgical crown lengthening procedure used to treat a vertical crown fracture in a 35-year-old man.

Case Report

Because of a fracture on tooth 12, the Conservative Dentistry Department recommended a 35-year-old male to the Periodontics Department. Upon intraoral examination, tooth 12 had a vertical crown fracture that extended beneath the cementoenamel junction. No extraoral abnormalities were seen in the patient, and the periapical radiograph showed non-hermetic obturation.

A thorough evaluation of the patient's periodontal health was carried out on the initial visit. In addition to providing guidance on oral hygiene, scaling and root planing were carried out. A healthy periodontal state was attained following multiple periodontal therapy visits. A crown lengthening procedure was then planned for the patient.

Crown Lengthening Surgical Procedure

Before the surgery patient was given an aseptic procedure extra and intraoral with a 2% povidone-iodine. The procedure was carried out under local anesthesia. The bone sounding was performed to reconfirm the location of the biological width. Intra sulcular incision was given on the buccal and palatal aspect and the periosteal releasing incision was given with the help of periosteal elevator to procedure a tension-free flap.

The root surfaces and surrounding epithelial tissue were mechanically treated using curettes, and bone sounding was performed once again to reconfirm the position of the cementoenamel junction (CEJ) relative to the crest of the alveolar bone. The appropriate osseous procedure was carried out, combining osteotomy and osteoplasty on both the buccal and palatal aspects of the tooth. Bone sounding was repeated to confirm the new bone position. Finally, an interrupted suture with 5-0 nylon was used to secure the flap in place, and a temporary crown was placed.

Osteoplasty

Internal bevel incision

Increase in crown length

Prosthesis placed

Post - operative
(2 weeks)

Discussion

Clinical crown lengthening surgery has two main indications. The first is an aesthetic indication that aims to make the clinical crowns longer. To avoid detrimental effects on the biological width brought on by dental restorations, the second—and most popular—method is to place the tooth preparation margin either supragingivally or subgingivally. As a result, the periodontium surrounding the applied prosthetic restoration is less likely to experience chronic inflammation.

The two fundamental tenets of crown lengthening treatment are determining the biological width (BW) and preserving an adequate amount of keratinized gingiva (KG) surrounding the tooth. The soft tissue dimension that is connected to the part of the tooth that is above the alveolar bone crest is referred to as BW. According to research, periodontal health requires a minimum of 3 mm between restorative margins and the alveolar bone, which includes 2 mm for BW and 1 mm for sulcus depth. To support gingival health, a sufficient KG (≥2 mm) width should also be maintained around the tooth.

When subgingival margins are required, the restorative dentist must be careful not to damage the connective tissue or junctional epithelium while obtaining an impression, according to Nevins and Skurow.

The upper lateral incisor in the case study was endodontically treated, however it needs a crown restoration because it lacks enough clinical crown structure. In this case, the zirconia crown's prognosis was improved by performing clinical crown lengthening. In order to avoid any disturbance of the biological width, which can have a detrimental

effect on the periodontium and result in gingival irritation, attachment loss, and alveolar bone resorption, the surgical crown lengthening treatment was also performed. Therefore, a successful conclusion depends on precisely recognizing and understanding the problem. Important elements in the diagnosis of the issue include the clinical length of the crown, the height of the alveolar bone, and the position of the gingival tissue.

CONCLUSION

The health of the periodontal tissues and restorative dentistry are closely related. Effective maintenance of the periodontal tissue and restorative principles must be balanced for restorations to have predictable long-term success.

Acknowledgment

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Conflict of Interest

The authors report no conflict of interest.

REFERENCES

1. Shenoy A, Shenoy N,Babannavar R. Periodontal considerations determining the design and location of margins in restorative dentistry. JID 2012;2: 3-5.

2. Oliveira PS, Chiarelli F, et al. Aesthetic surgical crown lengthening procedure: a case report. J Hindawi 2015: 1-5.

3. Cohen ES. Atlas of cosmetic and reconstructive periodontal surgery. 3rd ed. Ontario: BC Decker; 2007: 245-50.

4. Gupta G, Gupta R, Gupta N, et al. Crown lengthening procedures-a review article. IOSR-JDMS 2015;14: 28-30.

5. Fletcher P. Biologic rationale of esthetic crown lengthening using innovative propotion gauges. IJPRD 2011;31: 523-25.

6. Lipska W, Lipski M. Clinical crown lengthening-a case report. Folia medica cracoviensia 2015;3: 25-27.

7. Sato N. Crown Lengthening in Periodontal Surgery In Periodontal surgery a clinical atlas. Japan: Quintessence Publishing; 2000: 33-6.

8. Anoop S. Crown lengthening surgery: a periodontal makeup for anterior esthetic restoration: a case report. JID 2018;8: 132-4.

9. Nevins M, Skurow HM. The intracrevicular restorative margin, the biologic width, and the maintenance of the gingival margin. Int J Periodontics Restorative Dent 1984;4: 30-49.

10. Patel RM, Baker P. Functional crown lengthening surgery in the aesthetic zone; periodontic and prosthodontic considerations. Dent Update 2015;42: 36-40.

A Conservative Approach to Tooth Replacement: A Case Report on Maryland Bridge Restoration

Abstract

Resin-bonded bridges are a minimally intrusive method of restoring lost teeth. These lead to a significant level of patient satisfaction and are very successful in restoring oral health and appearance. The most popular interim restoration for replacing a single anterior tooth in young children until their growth completes for permanent tooth replacement choices are resin-retained bridges. This case study demonstrates the way to use a Maryland bridge to treat a single lost tooth in the upper jaw's anterior area.

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INTRODUCTION

An adhesive-retained fixed dental prosthesis is a tooth replacement that is conservative.1 The pontic of a Maryland bridge is made of porcelain fused to metal and is joined to two metal wings that are affixed to the lingual or palatal surfaces of the abutment teeth. It is the most conservative method of replacing teeth since it greatly minimizes the requirement to prepare the teeth2.The three parts of the unique attachment mechanism are the cohesive bond of composite resin, the enamel to resin bond, and the resin to framework bond 3. It is a very acceptable substitute for traditional permanent prostheses that restore function. For young patients who are unable to have an implant immediately, a Maryland bridge acts as an interim substitute.4,5,6

Case Report

A 25 Years old female patient was referred from Department of Orthodontics to Department of Prosthodontics and crown & Bridge in Mithila Minority Dental College, Darbhanga after the Completion of her Orthodontic Treatment with chief complaint of congenitally missing teeth in the upper anterior left teeth region and unesthetic appearance. On intra-oral examination, upper left lateral incisor was missing (Figure 1). All remaining teeth were well aligned in the arch and there was presence of posterior occlusal support. Mandibular excursive movements were favorable for pontic. An intra-oral periapical radiograph of the missing tooth region was advised, which revealed complete root formation and favorable pulpal morphology of 21 and 23, no root stumps of 22 and complete bone formation in socket of 22. After considering the patient's as well as parent's wish and the clinical situation, the options of removable partial denture, conventional fixed partial denture and implant were eliminated. Finally, the missing tooth was decided to be replaced with Maryland Bridge as an interim solution. Diagnostic impression was made using alginate impression material and poured in dental stone to obtain the diagnostic cast. (Figure 2). Tooth preparation was done according to the guidelines for fabrication of wings of resin bonded bridge on abutment tooth. (Figure 3) Final impression was made with polyvinyl siloxane impression material (Figure 4) and was sent to the laboratory for the fabrication of Maryland bridge. Shade selection was also done. Subsequently, trial fitting of the prosthesis was carried out in patient's mouth and then, aesthetics and speech were evaluated. The fitting surfaces of the 'wings' were sandblasted. The prepared tooth surfaces and the sandblasted wing surfaces were etched followed by rinsing with water and drying. Both surfaces – enamel and metal wings were coated with bonding agent followed by light curing. Resin cement was applied only to the etched, fitting surfaces of the Maryland bridge which was then securely seated onto the palatal aspect of the abutment tooth (Figure 8). Removal of gross excess cement was done without jeopardizing the seating of the bridges. Then, the resin cement was light cured following the manufacturer's instructions. The result was satisfactory the pontic re-established the aesthetics and speech concerns of the patient (Figure 8). Post cementation instructions were given and regular follow-up was advised.

Figure 1: Intraoral photograph showing missing 22.

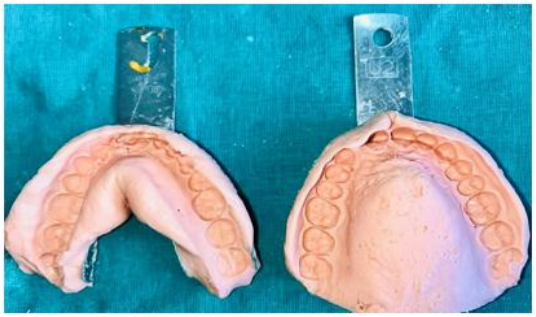

Figure 2: Diagnostic Impression

Figure 3: Final tooth preparation

Figure 4: Final impression

Figure 5: Final prosthesis on master cast.

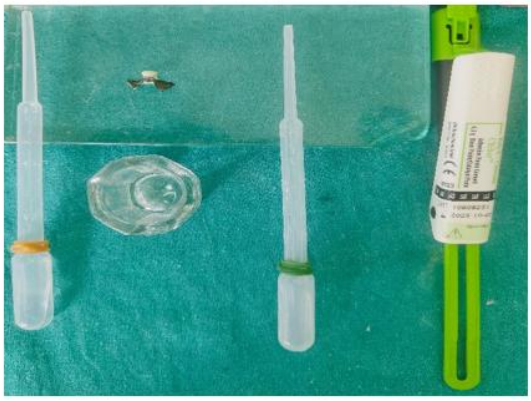

Figure 6: Material used for Luting.

Figure 7: Micro etched Prosthesis

Figure 8: Final prosthesis in situ

Discussion

When a child undergoes trauma-related tooth loss in the anterior region of their jaw, it can cause both psychological and functional stress.

In our particular case, the Maryland bridge offered a number of benefits, including reduced pulpal trauma risk, little tooth preparation, supragingival preparation, thinner retainers that nevertheless resist bending, and micromechanical retention. However, the main drawback is a shorter repair lifespan. Debonding is the most frequent cause of failure; the patient was informed of this danger and instructed to report right away if they felt the bridge weaken.7

CONCLUSION

Young patients with lost anterior teeth can benefit greatly from Maryland bridges since they are minimally invasive fixed prostheses made of resin.This improves the patient's confidence and sense of self in addition to restoring the form, function, and aesthetics. Nonetheless, a major determinant of clinical effectiveness is meticulous patient selection.

REFERENCES

1. Livaditis GJ. Cast metal resin-bonded retainers for posterior teeth. J Am Dent Assoc. 1980;101(6):926-9.

2. Holt LR, Drake B. The procera Maryland Bridge: A case report. J Esthet Restor Dent. 2008;20(3):165-71.

3. Livaditis GJ, Thompson VP. Etched castings: An improved retentive mechanism for resin-bonded retainers. J Prosthet Dent.

4. Kravitz ND. The Maryland bridge retainer: A modification of a Maryland bridge. Am J Orthod Dentofacial Orthop. 2020;157(1):128 31.

5. Mishra P, Singh L. A simplified method for fabrication of interim prosthesis for Maryland bridge. J Dent Med Sci. 2019;18(3):81-3.

6. Rosensteil SF, Land MF, Fujimoto J. Contemporary fixed prosthodontics. 5th ed. St. Louis:Mosby Elsevier; 2015.

7. Durey KA, Nixon PJ, Robinson S, et al. Resin bonded bridges: Techniques for success. Br Dent J. 2011;211(3):113-8.

Management of Separated Instrument with File Bypass Method - A Case Report

Abstract

This case report discusses the successful management of a separated endodontic file during root canal treatment, highlighting the challenges posed by such incidents, including hindered access to apical regions and compromised disinfection. The separation of instruments can obstruct proper debridement and jeopardize treatment outcomes. However, advancements in techniques and armamentarium now enable effective retrieval or bypass of separated instruments (SI). The presented case demonstrates a favorable outcome through successful file bypass, achieving patient satisfaction. Key factors contributing to this success included thorough case evaluation, appropriate tools, clinical expertise, and experience, ensuring minimal damage to radicular dentin and preserving tooth integrity. This report underscores the importance of skill and precision in overcoming procedural complications in endodontics.

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INTRODUCTION

Instrument separation during root canal therapy remains a significant clinical challenge in endodontics. The occurrence of a fractured file can compromise treatment outcomes by obstructing apical access, interfering with proper debridement, and reducing the efficacy of disinfection protocols1. Studies indicate that this complication affects approximately 1-5% of cases, with risk factors including excessive force, improper file usage, and complex root canal anatomy2.

While various techniques exist for managing separated instruments, including retrieval and bypass methods, the latter approach has gained recognition for its ability to preserve tooth structure while ensuring effective canal preparation3. The file bypass technique involves negotiating around the fractured fragment to complete cleaning and shaping procedures, minimizing unnecessary dentin removal. This method is particularly valuable when retrieval attempts may compromise root strength or when the fragment is deeply lodged4.

This case report illustrates the successful application of the file bypass method in managing a separated instrument, highlighting its clinical advantages and procedural considerations. The discussion emphasizes the importance of careful case assessment, appropriate instrumentation, and operator skill in achieving predictable outcomes while maintaining tooth integrity.

Case Report

A 35-year-old female patient presented to the OPD of Department of Conservative Dentistry & Endodontics of our Hospital with a chief complaint of persistent pain in the lower right posterior tooth region for the past three months. Clinical and radiographic examination revealed occlusal caries in tooth #46, with radiolucency extending into enamel, dentin, and pulp, along with tenderness on percussion. A diagnosis of irreversible pulpitis was made, and root canal treatment followed by prosthetic rehabilitation was planned.

During root canal instrumentation, a #10 K-file separated iatrogenically in the distobuccal canal. The patient was informed about the complication, and consent was obtained for further management. A bypass technique was performed using #06 – #08 K-files to negotiate around the fractured fragment carefully. The working length was confirmed radiographically, followed by successful bypass. Canal shaping was completed using rotary instruments up to #30/04 in all canals (mesiobuccal, middle-mesial, mesiolingual, distolingual, and distobuccal), with intermittent irrigation using 2.5% sodium hypochlorite. Patency was maintained using #06 – #08 K-files between instrumentation.

Following thorough cleaning and shaping, obturation was performed using #30/04 gutta-percha cones with cold lateral condensation to achieve a dense seal. The procedure was completed without further complications, and the patient reported relief from symptoms. This case highlights the successful management of a separated instrument through careful bypass, emphasizing the importance of precision, patient communication, and adherence to standardized protocols in endodontic therapy.

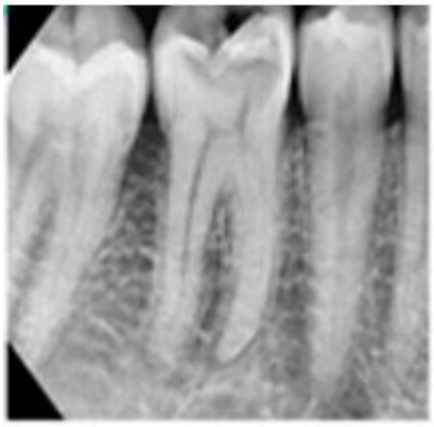

Fig 1: Pre-operative radiograph.

Fig 2: Separated file in distobuccal canal.

Fig 3: Placement of mastercone.

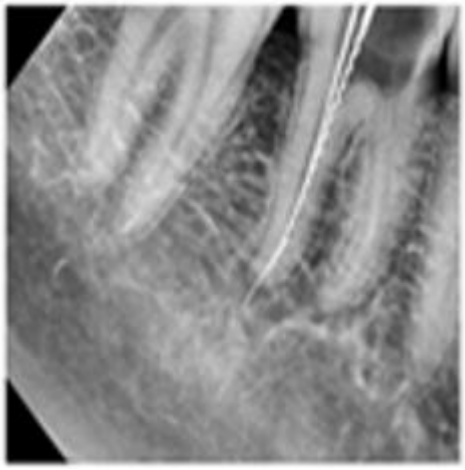

Fig 4: Bypass the fragments.

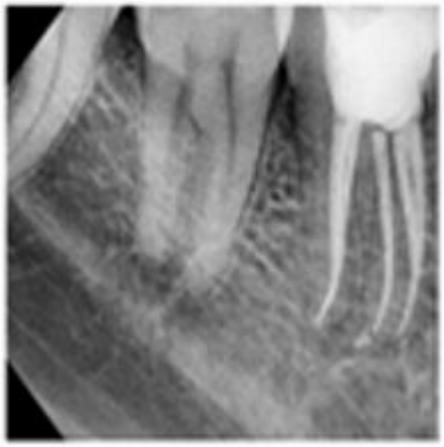

Fig 5: Obturation of canal done.

Discussion

Instrument fracture during root canal treatment is a well-documented complication, particularly in molars, with a higher incidence in mesiobuccal roots due to their complex anatomy5. The successful management of separated instruments (SIs) depends on careful assessment and effective bypass techniques, ensuring that the canal is completely prepared up to the coronal level of the fragment6. While modern retrieval methods—such as the Masserann kit, Endo Extractor, wire loop technique, and ultrasonics—have improved predictability, their success is dependent on factors such as fragment visibility, position, and instrument type7.

Microscopic guidance significantly enhances retrieval outcomes, reducing dentinal damage. Studies suggest that the success rate increases to 85.5% when fragments are visible under magnification, compared to only 47.7% when they are not8. Stainless steel files are typically easier to remove than nickel-titanium (NiTi) files, as the latter are prone to secondary fractures due to heat accumulation during retrieval9. Ultrasonics, first introduced in endodontics in 1957, now use low-frequency piezoelectric units (e.g., Satelec P5) that reduce shear stress and thermal damage10.

The prognosis of teeth with retained versus retrieved fragments shows minimal differences, provided that preoperative infection is adequately controlled1. In this case, the bypass technique with copious irrigation was effective, avoiding apical displacement of the fragment. While some studies highlight risks of periapical irritation from fragment extrusion2, our approach ensured minimal tissue damage, consistent with the principles of conservative endodontics.

CONCLUSION

Separated instruments during shaping of root canals can be a significant source of frustration. Therefore, it is crucial to take all precautions to avoid such occurrences and be prepared with appropriate management strategies when they happen. Prevention remains the best corrective measure for separated instruments. The decision for conservative management to bypass or completely remove the fractured instrument should be made after careful evaluation of various factors, such as root canal anatomy, morphology, the exact location of the fragment, the presence or absence of periapical pathology, available armamentarium, and the case's prognosis. For a successful outcome, each case must be evaluated and planned individually, with care taken throughout the bypass attempt to minimize further canal damage. Patients should always be informed of the fracture and the treatment plan.

REFERENCES

1. McGuigan MB, Louca C, Duncan HF. Endodontic instrument fracture: causes and prevention. Br Dent J. 2013;214:341-8.

2. Parashos P, Messer HH. Rotary NiTi instrument fracture and its consequences. J Endod. 2006;32:1031-43.

3. Madarati AA, Hunter MJ, Dummer PMH. Management of intracanal separated instruments. J Endod. 2013;39:569-81.

4. Nevares G, Cunha RS, Zuolo ML, et al. Success rates for removing or bypassing fractured instruments: a prospective clinical study. J Endod. 2012;38:442-4.

5. Suter B, Lussi A, Sequeira P. Probability of removing fractured instruments from root canals. Int Endod J. 2005;38:112-23.

6. Ruddle CJ. Nonsurgical retreatment. J Endod. 2004;30:827-45.

7. Fu M, Zhang Z, Hou B. Removal of broken files using ultrasonics under microscopy. J Endod. 2011;37:619-22.

8. Ward JR, Parashos P, Messer HH. Ultrasonic retrieval of fractured instruments. Int Endod J. 2003;36:643-7.

9. Spili P, Parashos P, Messer HH. Impact of retained fragments on treatment outcome. J Endod. 2005;31:819-22.

10. Hülsmann M, Schinkel I. Influence of fractured instruments on treatment outcome. Endod Dent Traumatol. 1999;15:84-8.

Case Report Journal of Oral and Dental Health

TMJ Ankylosis in Elderly Patients: A Rarity with Peculiarity

Abstract

Temporomandibular joint (TMJ) ankylosis is a debilitating condition characterized by the fusion of the mandibular condyle to the glenoid fossa, leading to restricted jaw movement and impaired oral function. While commonly reported in pediatric and young adult populations, TMJ ankylosis in elderly patients is an exceedingly rare occurrence. This article presents two unique cases of TMJ ankylosis in patients aged 67 and 69 years, highlighting the diagnostic challenges, surgical management, and post-operative outcomes. Both patients exhibited prolonged ankylosis spanning over 25 years, with minimal facial asymmetry and zero mouth opening at presentation. It also highlights the increased complexity of surgical management in elderly patients due to denser ankylotic bone and potential comorbidities. The findings emphasize the need for early diagnosis, timely intervention, and enhanced awareness of TMJ ankylosis across all age groups to improve patient outcomes and quality of life.

Keywords: TMJ Ankylosis; Geriatric; Interpositional Arthroplasty.

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INTRODUCTION

Ankylosis is a Greek word for "Stiff Joint". This condition causes hypo mobility of the TM joint due to fibrous or bony fusion of glenoid fossa and mandibular condyle which in turn causes decreased mouth opening with or without varying degrees of facial disharmony. It is a punitive disease which usually affects children from rural backgrounds. It is often a long-term consequence of mandibular trauma from falls or accidents and middle ear infections, exacerbated by delays or negligence in seeking appropriate treatment, a scenario frequently encountered in children from rural areas. [1-3] However, this case report highlights the occurrence and treatment of TMJ ankylosis in elderly patients which is a rarity in today's scenario. There are case reports in literature of TMJ ankylosis in adult patients till 4th decade of life but none are found which show patients being of elderly age group (6th decade of life.) [4].

The treatment of TMJ ankylosis presents difficulty due to restricted mouth opening which necessitates the use of fibre optic method of nasal intubation for the anaesthetist. A variety of treatment options remain for the ankylosis patients depending upon the financial affordability and infrastructure. [5-7].

Case Presentation

Case 1:

A 67 year old female patient reported to the OPD of our department with the chief complaint of inability to open her mouth since 27 years. She had a history of trauma (road traffic accident) 35 years back for which she was treated conservatively. Due to lack of medical facilities and awareness in rural region from where she belonged, not much importance was given to her injury as she didn't have any external laceration or to the fact that her mouth opening was gradually reducing. Over the years her mouth opening reduced to one finger width but the patient didn't seek any treatment. Later, after attaining the present age, the patient started feeling discomfort in her abdomen which was not being able to be managed by medication and she was ordered an endoscopy, hence she sought treatment to open her mouth for the endoscopic procedure. So, the peculiarity in this case was that the patient didn't seek the treatment to open her mouth for her own quality of life but rather only to undergo an endoscopic procedure for the fear of having a life-threatening disease (Fig.1.)

Fig. 1: Preoperative photographs

Investigation

A routine Orthopantomogram was done which revealed a deformed ankylotic mass and normal coronoid processes (Fig.2.) The patient was made to undergo CT scan for evaluation of her ankylosis chunk (Fig. 2.) Routine laboratory blood work was done and Pre-Anesthetic Clearence was done for her surgery. She didn't have any significant facial asymmetry and her mouth opening was zero (Fig. 2.)

Fig. 2: Preoperative orthopantomogram and CT images of different sections & 3D reconstruction.

Surgical Procedure

The patient was laid in supine position on OT table and nasotracheal intubation was done with the help of flexible nasal fibre optic bronchoscope. After aseptic painting and draping of patient, the incision was marked on the affected side of the face and scalp (Fig.3a.) An Alkayat Bramley incision was used to expose the ankylotic mass taking care of the temporozygomatic branch of the facial nerve which is encountered during this approach (Fig. 3b.) Superior and inferior ostectomy of the ankylotic mass was done using carbide burs and chisel mallet (Fig. 3c.)The bone density of the ankylosis mass was discerned to be a lot greater than what is encountered during children and adolescent age group due to the amount of effort and run out of number of carbide burs it took. A gap of 2.5 cm was created between the ramus and glenoid fossa (Fig. 3c) following which mouth opening of 3.8 cm was achieved. Interposition was done using partial thickness temporalis myofascial flap (Fig. 3d.) Drain was placed followed by layer wise suturing. The patient was extubated uneventfully and subsequent mouth opening exercises was started from post operative day 2.

Follow Up

The drain and suture removal was done subsequently and uneventfully. The facial nerve was intact and the swelling on the post operative side was minimal. The patient was kept on a close follow up of 1 week, 4 weeks, 3 months and 6 months. Initial mouth opening was measured at 3.6 cm after 1 week of post op exercises, however it reduced to 3.4 and 3.2 cm subsequently over a period of 6 months (Fig. 3e.)

Fig. 3: a. Marking of incision line. b. Ankylotic mass exposed via Alkayat Bramley incision. c. A gap of approximately 2cm created after removal of ankylotic chunk. d. Interpositioned with temporalis fascia. e. Intraoperative mouth opening.

Case 2:

A 69 year old patient reported to the OPD of Oral and Maxillofacial Surgery department with the chief complaint of reduced mouth opening since 25 years. She had a history of trauma due to a construction accident where a wall fell over her resulting in facial injuries. She was managed surgically at the hospital she had reported to then where the angle fracture was fixed by ORIF. However, we assumed that the patient had bilateral condylar fractures too which were ignored at that point of time.

The patient started developing restricted mouth opening after a few months of her surgical procedure. At the time of reporting her mouth opening has reduced to zero (Fig.4.)

Fig. 4: Preoperative pictures depicting zero mouth opening.

Investigation

Orthopantomogram & CT scan was also adviced for this patient (Fig 5.)

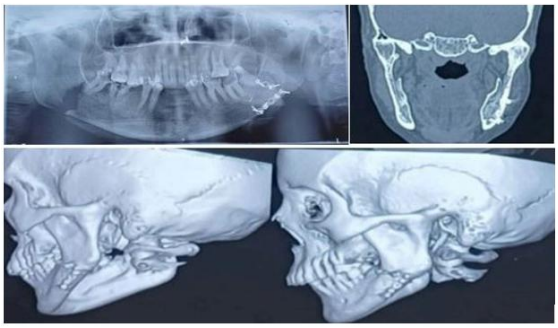

Fig. 5: Preoperative Orthopantomogram showing mini plates over left angle region and obliteration of joint space bilaterally. Preoperative CT images of different sections along with 3D reconstruction.

Surgical Procedure

Similarly, in this patient also an Alkayat & Bramley incision was given where a gap of app. 2cm was created after superior & inferior Ostectomy & a mouth opening of 3.6 cm was achieved. Interposition was done with temporalis myofascia (Fig. 6.)

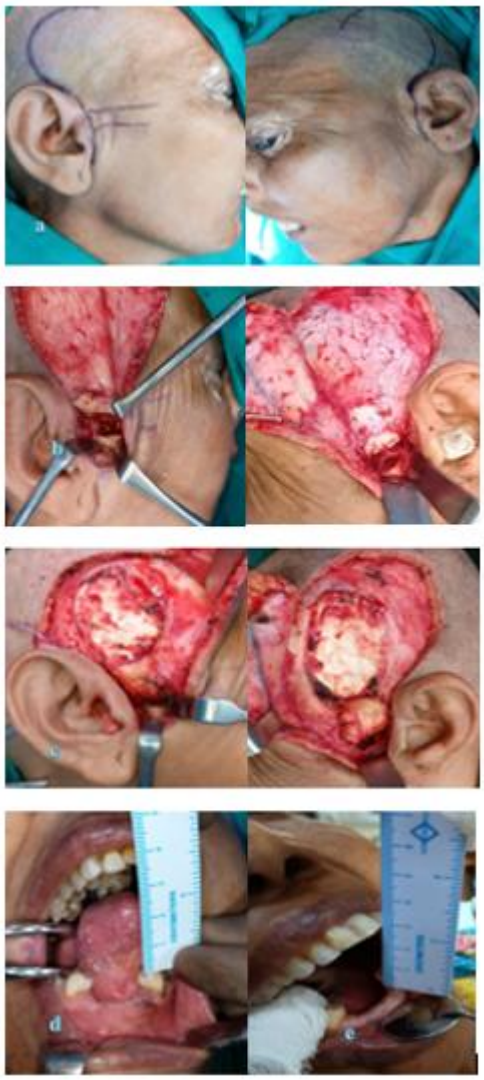

Fig. 6: a. Marking of incision lines bilaterally. b. A gap of approximately 1.5 cm was created bilaterally after removal of the ankylotic chunk. c. Temporalis fascia was used as interpositional material bilaterally. d. Intraoperative mouth opening. e. 4 weeks postoperative photograph.

Discussion

This case report discusses about the TMJ ankylosis in patients of age 67 and 69 years old whose chief complaint was not the ankylosis itself. Studies have stated that prevalence of TMJ ankylosis is common among children and young adults. [10,11] Among the hospital-based studies the most prevalent age group with TMJ ankylosis is 6-10 years [12] & 11-35 years. [13, 14] There are a number of re-ankylosis cases reported in literature with an incidence rate of 9–12 % in children and 2–7 % in adults. [15] Our patients were asymptomatic of TMJ ankylosis with a reduced mouth opening for more than 25 years.

TMJ ankylosis presents a complex set of challenges, from history taking, requiring accurate diagnosis followed by formulation of suitable surgical intervention. [8] The usual chief complaint of TMJ ankylosis in the paediatric patient are inability to open the mouth, facial deformity, difficulty in chewing and swallowing, and poor oral hygiene. [9] In this case report the patient's primary complaint was not regarding the TMJ ankylosis. The chief complaint of 1st patient was that she had to undergo oral endoscopic procedure for diagnosis of pancreatic tumor and the 2nd patient had a severe pain due to dental caries in her lower posterior teeth and wants extraction of teeth.

The following systemic considerations should be looked for while treating a case of TMJ ankylosis in adults- 1. Presence of comorbidities like Diabetes, Hypertension, Cardio vascular disease, 2. Nutritional deficiency since these could impede the healing and post op recovery. Both of our patients were free of chronic diseases.

The dental parameters to be evaluated are the presence of carious/missing tooth and periodontal condition. One of our patients had carious lower molars which had to be extracted immediately after releasing of ankylosis.

Although early recognition and intervention is the key in treating TMJ ankylosis, through our experience treating delayed ankylosis was not very difficult since patient compliance post operatively was better compared to young individuals. However, the surgical procedure was challenging as the bone was dense due to aging. They both presented with Sawhney Type IV ankylosis and the potential risk during surgery for Sawhney Types IV are damage to vital structures on the medial aspect of the ramus of mandible and injury to middle meningeal artery.[16] In one patient injury to middle meningeal artery was encountered but with immediate hemostatic measures had stopped the progression of bleeding.
In children, treating ankylosis is not only challenging from a technical perspective but also consideration of the fourth dimension (i.e., the potential effects of time and growth on the outcome) is also necessary. [9] Whereas this concept of fourth dimension is not applicable for adult patients. Thus, reconstruction of the ramal condylar unit can be done with DO, costochondral graft, sternoclavicular joint, fibular, iliac bone, metatarsal bone, metatarsal-phalangeal joint, and coronoid process of mandible. [17].

However, reconstruction of joint [9] for old adults requires surgical procedures that are more invasive and time consuming. Our patients were not willing for joint reconstruction due to the second surgery site, extensive surgical procedure and for economic

reasons. Hence, release of ankylosis was done by which the functional component and the major concern of the patient were addressed.

The quality of life of these patients were severely affected due to limited jaw movements impacting nutrition, social interactions and self-esteem.

More awareness about TMJ ankylosis is necessary to reduce misdiagnosis or delayed diagnosis, to encourage early treatment and prevention, improve the quality of life of the TMJ ankylosis patients.

More funding is required for further research and to make the treatment feasible for all groups of people. The key is to spread a lot of awareness about TMJ ankylosis condition that early diagnosis and treatment can rehabilitate not only the functional component of the jaw but also the overall quality of life of the patient.

CONCLUSION

This article presents two unique cases of TMJ ankylosis in patients aged 67 and 69 years, highlighting the diagnostic challenges, surgical management, and post-operative outcomes. Based on our experience, we would emphasize consideration of this lesion in the differential diagnosis by the clinicians.

Patient consent
Written patient consent was obtained.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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REFERENCES

1. El-Sheikh MM,,Medra AM.,Management of unilateral temporomandibular ankylosis associated with facial asymmetry. J Craniomaxillofac Surg 1997;25:109-15.

2. Bhatt KV, Roychoudhury A, Bhutia O. Pathogenesis of temporomandibular joint Ankylosis: a perspective.Natl J Maxillofac Surg 2020;11:154-5.doi:10.4103/njms.NJMS_91_18pmid:http://www.ncbi.nlm.nih.gov/pubmed/33041598PubMedGoogle Scholar.

3. Kaban LB, Bouchard C,Troulis MJ.A protocol for management of temporomandibular joint ankylosis in children. J Oral Maxillofac Surg2009;67:1966–78.doi:10.1016/j.joms.2009.03.071pmid:http://www.ncbi.nlm.nih.gov/pubmed/19686936PubMedGoogle Scholar.

4. Kothari K, Jayakumar N, Razzaque A Multidisciplinary management of temporomandibular joint ankylosis in an adult: journey from arthroplasty to oral rehabilitation BMJ Case Reports CP 2021;14:e245120.

5. . Roychoudhury A, Parkash H, Trikha A. Functional restoration by gap arthroplasty in temporomandibular joint ankylosis: A report of 50 cases. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1999;87:166-69.

6. Su-Gwan K. Treatment of temporomandibular joint ankylosis with temporalis muscle and fascia flap. Int J Oral Maxillofac Surg 2001;30:189-93.

7. Gliven O. Treatment of temporomandibular joint ankylosis by a modified fossa prosthesis. J Craniomaxillofac Surg 2004;32(4):236-42.

8. K. Zhi, W. Ren, H. Zhou, L. Gao, L. Zhao, C. Hou, Y. Zhang. Management of temporomandibular joint ankylosis: 11 years' clinical experience. Oral Surg. Oral Med. Oral Pathol. Oral Radiol. Endod., 108 (5) (2009), pp. 687-692.

9. L.B. Kaban, C. Bouchard, M.J. Troulis. A protocol for management of temporomandibular joint ankylosis in children. J. Oral Maxillofac. Surg., 67 (9) (2009), pp. 1966-1978.

10. Abbas I, Jamil M, Jehanzeb M, Ghous SM. Temporomandibular joint ankylosis: Experience with interpositional gap arthroplasty at Ayub Medical College Abbottabad. J Ayub Med Coll Abbottabad. 2005;17:67–9.

11. 24.Belmiro C, Ricardo V, Rafeal V. Treatment of TMJ ankylosis. Oral Med Oral Pathol Oral Radiol. 2005;11:66–9.

12. Vasconcelos BC, Bessa-Nogueira RV, Cypriano RV. Treatment of temporomandibular joint ankylosis by gap arthroplasty. Med Oral Patol Oral Cir Bucal. 2006;11:E66–9.

13. Qudah MA, Qudeimat MA, Al-Maaita J. Treatment of TMJ ankylosis in Jordanian children-a comparison of two surgical techniques. J

Craniomaxillofac Surg. 2005;33:30–6. doi: 10.1016/j.jcms.2004.07.005.

14. S. Chen, Y. He, J.G. An, Y. Zhang. Recurrence-related factors of temporomandibular joint ankylosis: a 10-year experience. J. Oral Maxillofac. Surg., 77 (12) (2019), pp. 2512-2521.

15. Sobhan Mishra, RamanupamTripathy, Samrat Sabhlok, Ritesh Roy. Management of Adult Unilateral TMJ Ankylosis with Temporalis Muscle and Fascia Flap: Review of 51 Cases. International Journal of Head and Neck Surgery, September-December 2012;3(3):133-136.

16. Upadya VH, Bhat HK, Rao BHS, Reddy SG. Classification and surgical management of temporomandibular joint ankylosis: a review. J Korean Assoc Oral Maxillofac Surg. 2021 Aug 31;47(4):239-248.

17. Sharma H, Chowdhury S, Navaneetham A, Upadhyay S, Alam S. Costochondral Graft as Interpositional material for TMJ Ankylosis in Children: A Clinical Study. J Maxillofac Oral Surg. 2015 Sep;14(3):565-72.

Gingivectomy – A Review Article

Abstract

The Gingivectomy is the primitive surgery in periodontal therapy. During the centuries, the technique has been modified. Just at the middle of our century, Gingivectomy was the most important surgical method in periodontal treatment. Many patients visit dental clinics seeking a beautiful, harmonious smile to enhance their self-esteem. Currently, there is a growing focus on oral aesthetics, where the balance of a smile is not only determined by the shape, position, and color of the teeth but also by the appearance of the gingival tissue. This study aims to explore the causes and diagnosis of the "gingival smile" and to offer a safe surgical solution, such as gingivectomy, for correction. Gingivectomy involves the removal of gingival deformities to improve the contour of the gums. Typically, removing 1 to 2 millimeters of gingival tissue addresses most cases of a gingival smile. The procedure can be performed using a conventional scalpel, electrosurgery (electric scalpel), or high-frequency lasers, with the choice of technique being made based on the treatment plan and in collaboration with the patient. A thorough literature review was conducted, focusing on the etiology, diagnosis of the gingival smile, and periodontal surgery related to gingivectomy. The findings conclude that gingivectomy, supported by technical and scientific expertise, provides essential visibility and access to effectively remove superficial irritants and achieve smooth root surfaces.

Keywords: Gingivectomy, Gingival hyperplasia, Periodontics, Periodontal health.

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INTRODUCTION

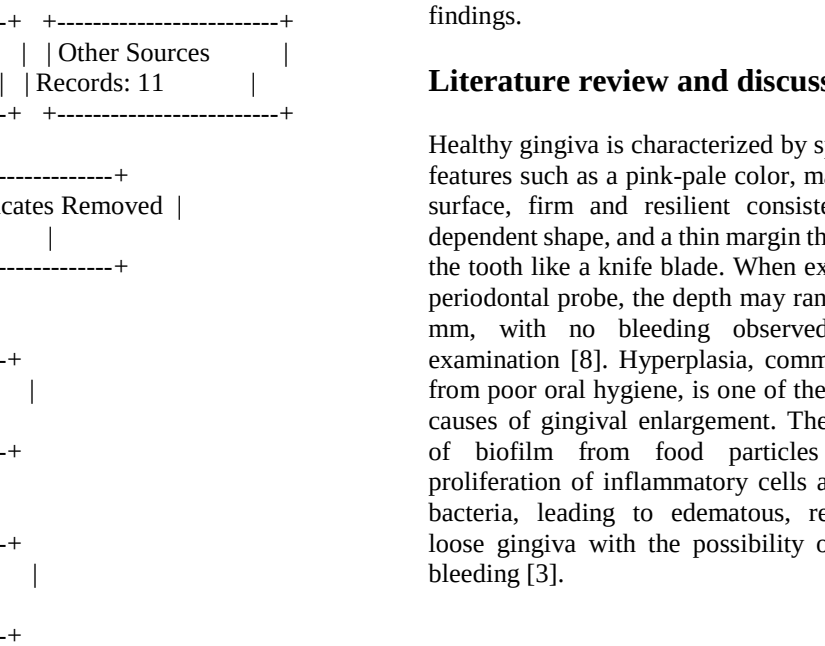
Many patients visit dental offices in search of a beautiful, harmonious smile to improve their self-esteem [1,2]. Currently, there is a strong emphasis on oral aesthetics, where the harmony of a smile is influenced not only by the shape, position, and color of the teeth but also by the gingival tissue, which can be corrected using surgical techniques like gingivectomy.

Gingivectomy is a straightforward procedure that is generally well-received by patients, who, when performed under appropriate indications, can achieve satisfactory results in dentogingival aesthetics and harmony [3]. The technique involves removing gingival deformities to improve the gingival contour. It can be applied to remove the inserted, papillary, and marginal gingiva in the absence of periodontal disease [4]. Additionally, it may be recommended for clinical crown lengthening, remodeling of thick margins, removal of hyperplasias caused by various factors, or even the elimination of supra-bony periodontal pockets [5-7]. This study aims to explore the etiology and diagnosis of a gingival smile, offering gingivectomy as a safe surgical solution for correction.

METHODS

Study Design

Using the search criteria and Mesh Terms outlined in the "Search Strategies" section below, a total of 35 papers were initially reviewed for eligibility. After the analysis, 24 studies were selected for inclusion.



Search Strategy and Sources of Information

For example, the search strategy in MEDLINE/PubMed, Web of Science, ScienceDirect (Elsevier), Scopus (Elsevier), and OneFile (Gale) followed these steps: searching using Mesh terms such as Gingivectomy, Gingival Hyperplasia, Periodontics, Periodontal Health, and applying the Boolean operator "AND" between the Mesh terms and "OR" to combine historical findings.

Literature review and discussion

Healthy gingiva is characterized by specific clinical features such as a pink-pale color, matte and dotted surface, firm and resilient consistency, volume-dependent shape, and a thin margin that ends against the tooth like a knife blade. When examined with a periodontal probe, the depth may range from 1 to 3 mm, with no bleeding observed during this examination [8]. Hyperplasia, commonly resulting from poor oral hygiene, is one of the most frequent causes of gingival enlargement. The accumulation of biofilm from food particles triggers the proliferation of inflammatory cells and pathogenic bacteria, leading to edematous, reddish-colored, loose gingiva with the possibility of spontaneous bleeding [3].

Risk factors for gingival hyperplasia include the use of orthodontic appliances or medications, though their development is primarily associated with poor oral hygiene, which creates space for dental biofilm, the main etiological agent behind most periodontal issues [4]. The presence of dental appliances can increase gingival inflammation and significantly affect the oral microbiota, though these conditions are reversible with proper oral hygiene [5].

Periodontal pockets are detected through probing depth measurements, considering the clinical insertion level to analyze the periodontal biological space. This includes the gingival sulcus (0.69 mm), junctional epithelium (0.97 mm), with a healthy structure typically extending from 2 to 3 millimeters between the alveolar bone crest and the gingival margin [6].

Once gingival hyperplasia is identified, surgery is generally recommended for treatment, ideally combined with basic periodontal therapy. Scaling and root planning should be performed to eliminate infection and improve the oral environment. Patient education on oral hygiene is essential during this phase to ensure long-term oral health [9].

In most cases, surgical removal of 1 to 2 millimeters of gingival tissue resolves the gingival smile. However, if the gingiva is excessively elevated, more complex surgical procedures may be necessary [7]. During surgery, the incision can be made using a conventional scalpel or electrosurgery (electrosurgical scalpel). Although the conventional scalpel is more commonly used, both methods yield satisfactory aesthetic results. The choice of technique depends on the treatment plan and patient-professional collaboration [9].

Following the preparation of the surgical field and antisepsis, local infiltrative anesthesia is applied, and bleeding points are marked on both the buccal and lingual sides. The depth of probing is used to mark the area to be removed, and these points are connected with a Kirkland gingival scalpel. Other instruments, such as a 15c blade or an electric scalpel, can be used for precision, especially in interproximal areas. Occasionally, a McCall 13/14 curette is employed to remove gingival tissues, dental calculus, or biofilm [8, 10, 11]. After the gingival collar is removed, gingivoplasty is performed using a Kirkland gingivectomy tool and cuticle pliers to enhance aesthetics, promote tissue repair, and restore a functional gingival shape, which is then covered with surgical cement to support healing [12-15].

High-frequency lasers, such as the carbon dioxide laser, may also be used during the procedure. This laser, with its long wavelengths, is well absorbed by tissues with high water content, allowing for easy evaporation and precise gingival removal without causing deep burns. It is especially useful in highly vascular areas or in patients with infection control concerns. The carbon dioxide laser promotes blood clotting in small blood vessels and helps create a sterile wound, minimizing abnormal cell formation and promoting lymphatic vessel lining. It also causes minimal scarring and requires no surgical cementation or suturing. Pain after the procedure is brief, and recovery is typically quick, with patients often resuming normal activities soon after surgery [19, 20, 21, 22].

The first step in a proper diagnosis is to classify the gingival level accurately, considering factors like gender, age, and periodontal health [3, 12, 13]. Gingival growth can be triggered by various factors, including orthodontic treatment, maxillary growth, drug-induced causes, and certain pathologies, with exacerbation depending on age, gender, oral hygiene, and the patient's overall health condition [14].

CONCLUSION

After the literature review in this study, it can be concluded that gingivectomy promotes essential visi bility and access to a complete removal of irritating su perficial deposits and perfect root straightening. One of the great advantages that gingivectomy provides is the transformation of a periodontal pocket of difficult hy giene into an easily hygienizable gingival sulcus. Contra indications for gingivectomy are based on existing local conditions and the patient's physical health. Laser ther apy has been used successfully for gingivectomy treat ments. The main disadvantages are the high cost of the apparatus for use in dental clinics.

Conflict of Interests

There is no conflict of interest between authors.

REFERENCES

1. Kohale BR, Agrawal AA, Raut CP (2018) Effect of low-level laser therapy on wound healing and patient's response af ter scalpel gingivectomy: A randomized clinical split-mouth study. J Indian Soc Periodontol 22: 419-426.

2. Astuti LA, Hatta M, Oktawati S, Natzir R, Dwiyanti R (2018) Change of TGF-β1 gene expression and TGF-β1 protein level in gingival crevicular fluid and identification of plaque bacteria in a patient with recurrent localized gingival

enlargement before and after gingivectomy. Case Rep Dent.

3. Pedron Irineu G, Utumi Estevam R, Silva Leopoldo PN, Moretto Lucília EML, LIMA Thereza CF, et al. (2010) Cirurgia gengival ressectiva no tratamento da desarmonia do sorriso. Revista Odontológica do Brasil Central 19: 48.

4. Tomasi AM, Moterle C, Benemann MP, Cavalheiro S, Dirschnabel AJ, et al. (2016) Crescimento gengival.

5. Maia LP, Novaes JR, Arthur B, De Souza SLS, Palioto DB, et al. (2011) Alterações periodontais após a instalação de aparelho ortodôntico. Braz J Periodontol 21: 40-45.

6. Ferreira JPR, Araújo PC, Saliba MTA, Garbin CAS (2011) A relevância do periodontista na prevenção da doença periodontal em pacientes ortodônticos: Relato de caso clinic. Revista Odontológica de Araçatuba 32: 67-72.

7. Da Rosa, Karol Loureiro Cuzzuol (2014) Conhecimento sobre espaço biológico periodontal no âmbito acadêmico: Um estudo com graduandos de odontologia no Espírito Santo. Universidade Federal do Espírito Santo.

8. Genco RJ, Cohen DW, Goldman HM (1997) Periodontia contemporánea. (2nd edn), São Paulo, 117-134.

9. Oliveira AC, Rocha BG (2015) Correção do sorriso gengival.

10. Sousa CP, Garzon AC da M, Sampaio JEC (2003) Estética periodontal: Relato de um caso. Rev Bras Cir Periodontia 1: 262-267.

11. Pedron IG, Utumi ER, Tancredi ARC, Perrella A, Perez FEG (2010) Sorriso gengival: Cirurgia ressectiva coadjuvante à estética dental. Odonto 18: 87-95.

12. Morais Alexandre (2010) Cirurgia plástica periodontal para otimização de resultados estéticos na região anterior. Rev Assoc Paul Cir Dent 64: 104-111.

13. Araújo Gláucia de Ávila Oliveira, Castro Adriano (2012) Sorriso gengival: Diagnóstico e tratamento. Revista Clínica de Ortodontia Dental Press 11.

14. Reis Letícia Galvão Santos (2017) Sorriso gengival-tratamento baseado na etiologia: Uma revisão de literatura.

15. Decurcio RA, Cardoso PC, Rodrigues DC, Corrêa EJB, Borges GJ (2012) O uso do mock-up na otimização e pre cisão do resultado da cirurgia plástica periodontal. Clíni ca-international journal of brazilian dentistry 8: 74-85.

16. Freitas RS, Pessoa TJL, Tolazzi Ardo, Postai G (2006) Liberação do músculo depressor do septo nasal para trat amento do sorriso gengival. Rev Soc Bras Cir Craniomax ilofac 9: 1-5.

17. Carranza Junior FA (1992) Periodontia clínica, Rio de janeiro: Guanabara koogan SA 10: 99-106.

18. Georgi SM, Lotufo RFM, Lascala NT (1999) Gengivecto mia-gengivoplastia, apud Lascala, N.T.; Moussalli, NH Compêndio terapêutico periodontal. (3rd edn), São Paulo: Artes Médicias, 322-340.

19. Goldman HM (1951) Gingivectomia. Oral Surgery 4: 1136 1157.

20. Rosetti Elizabeth Pimental, Sampaio Luiz Macellaro, Zuza Elizangela Partata (2006) Correção de assimetria dento gengival com finalidade estética: Relato de caso 54: 384 387.

21. Stoll LB, Novaes AB (1997) Importância, indicações e técnicas do aumento de coroa clínica. Rev Assoc Paul Cir Dent 51: 269-273.

22. Danielle BS, Gabriela TZ, Paola FLC, José EB, Carolina SO, et al. (2010) Cirurgia plástica periodontal para otimização da harmonia dentogengival-relato de caso clínico. Braz J Health 1: 31-36.

Review Article Journal of Oral and Dental Health

Immediate Loading of Implants: A Paradigm Shift in Implantology

Abstract

Immediate loading of dental implants has gained significant attention in recent years as an alternative to traditional delayed loading protocols. This review aims to comprehensively examine the current evidence regarding the benefits, challenges, and clinical outcomes associated with immediate implant loading. Immediate loading involves the placement of a restoration on a dental implant within a short period (typically within 24 to 48 hours) after implantation, offering advantages such as reduced treatment time, enhanced patient satisfaction, and improved aesthetic outcomes. However, a number of variables, including as the type of restoration utilized, implant stability, and bone quality, affect how well immediate loading works.This review critically evaluates the impact of these factors on the long-term survival and success rates of immediate loading implants.

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INTRODUCTION

Dental implants have emerged as a new treatment modality for the majority of partially or completely edentulous patients and are expected to play an important role in oral rehabilitation in the future. The concept of Implants was developed in the year 1982. Branemark gave a new concept of osseointegration related to dental implants after the success of his experiment. The use of titanium-based dental implants in humans began in 1965.1 So, Branemark initially defined osseointegration as "a direct structural and functional connection between ordered living bone and the light-microscopic surface of an endosseous implant that bears weight. Later, it was described as "the apparent direct attachment or connection of osseous tissue to an inert, alloplastic material without intervening connective tissue" in the Glossary of Prosthodontic Terms-8 (GPT-8).

".2 Branemark in 1990 proposed the conventional clinical protocol for the placement of dental implants which involved two phases. In the first phase, the placement of the implant is done surgically in the bone. Then a period of 3 to 4 months is taken for bone healing and tissue reorganization. The waiting time for healing to occur depends on bone quality and the region in which the implant is placed. Placing the prosthesis on the implant site is the second stage of treatment.
Other than the conventional protocol many other protocols were suggested as follows:

Conventional Loading: The prosthetic restoration and functional loading of an osseointegrated implant following a three to six month healing period is known as conventional loading. This procedure was initially developed for implants with machined surfaces, as previously stated. Implants are frequently, though not always, implanted in accordance with the standard loading technique, after which the surgical site is closed, necessitating a second stage of surgery to "uncover" the implant. This is referred to as delayed loading at times.

Immediate Loading: Immediate implant loading is at the opposite extreme. Restoring the implant to occlusal contact within 48 hours of implant placement is known as immediate loading. At its most extreme, the instantly loaded implant may be positioned and permanently repaired in less than 48 hours. The time between implant implantation and repair has been decreased due to immediate loading. The patient benefits from shorter treatment duration overall, fewer clinic visits, comfort throughout the healing phase, and enhanced phonetic and aesthetic features.
Early Loading: This type of loading occurs in between immediate loading and traditional loading. The use of an implant or prosthetic loading at any point between immediate and conventional loading is known as "early loading."3

INDICATION	CONTRAINDICATION
Adequate oral hygiene standards	Local acute infection
Good bone quality Adequate primary stability (insertion torque ≥35 Ncm)	Uncontrolled bruxism
Traumatic tooth dislocation/fracture in the esthetic area	Immunocompromised status

ADVANTAGES	DISADVANTAGES
Elimination of the second stage surgery	Micromovement of the implant that can cause crestal bone loss or implant failure is greater than with the two-stage approach
Increased rate of healing with early daily periods of cyclic micromotion	Increased number of implants increased fees and decreased patient acceptance
Countersinking the implant below the crestal bone is eliminated reducing the early crestal bone loss	The risk of complications to the neurovascular bundle is higher.

Rationale of immediate loading of Implants:

In order to lower the possibility of fibrous tissue production and encourage the growth of lamellar bone to support an ongoing occlusal load, the implant is loaded immediately. Therefore, the early loading response and implant repair are separated by 3–6 months in comparison to the two-stage approach. Around the implant interface, a localized acceleratory phenomena of bone repair is brought on by the osteotomy preparation and implant placement procedures. As a result, the prepared site's organized lamellar bone becomes tangled and disorganized near to the implant, and after four months, the bone still only contains 60% mineralized lamellar bone, which is adequate for implant loading in the majority of bone types and circumstances.

Sufficient osseointegration is achievable with a thoroughly established primary implant stability. 4

Prosthetic Requirement in immediate loading of implants:

Prosthetic considerations that might affect the success of immediate loading have been classified into five sections:

(1) Cross-arch stability and micromovements.

(2) Interim prostheses.

(3) Definitive restorations inserted immediately after implant placement.

(4) Screwed or cemented prostheses.

(5) Occlusion in immediate functional loading (IFL) and in immediate non-functional loading (INFL).

(6) Implant design, Number and distribution of implants

1. Cross-arch stability: is a critical need for a stiff bilaterally splinted interim prosthetic. By reducing the bending impact of lateral forces, splinting helps to distribute the masticatory forces evenly across a larger surface and reduce unfavourable stresses. Furthermore, a passive fit enough for a cross-arch restoration offers stability required for osseointegration to occur as well as protection against excessive micromotion. When excessive micromovement takes place, stem cells in the osseous wound develop and create scar tissue around the implant, preventing osseointegration. In this regard, the bone tolerates micromotion of less than 150 μm well since it can promote bone development and BIC by controlled mechanical stimulation. 4

2. Interim Prosthesis: Most often, immediate loading involves the delivery of an intermediate prosthesis. This prosthetic is then replaced with a permanent prosthesis once all hard and soft tissues have healed. Interim prostheses are usually made of softer materials, which lessen the strain on the bone while it recovers. Fractures are a disadvantage, nevertheless, especially when full arch restoration is used. Nonetheless, it is possible that a permanent prosthesis will be immediately available and fully helpful in these situations.

3. Definitive Prosthesis: Final restoration to enable instant loading.
The 1999 introduction of the Branemark Novum. Three implants were loaded into the edentulous mandible's interforamina region right away as part of the system. The 2006 introduction of the Speed Master technique (Conexao, Brazil). It made it possible to use surgical guides to insert four implants in the edentulous mandible. In 2017, Nobel Biocare (Zurich, Switzerland) unveiled the Trefoil system, which is an advancement of the Branemark Novum idea. Using drilling templates, three specially made fixtures are inserted into the mandible's anterior region. A prefabricated titanium bar is then used to splint the teeth right away. It has adjustable joints that allow for passive fit of the implant and correct for angular, vertical, and horizontal deviations from the ideal implant position.

Intra oral welding for immediate loading with definitve prosthesis
Intraoral welding can join and support the Implants by the use of a titanium wire or bar (grade 2) that is permanently connected to the implants. An Electric current for 2-5 milliseconds is used to fuse the titanium wire to the abutments with temperature rising upto 1660°C.

The welded wire is removed and retentive wire are added extraorally, excess metal parts are removed and the framework is opaqued checked for fit in the premanufactured hollow restoration and intraorally attached on to the abutments
The hollow restoration is relined intraorally on the framework and after final packing, finishing and polishing the restoration is inserted in the patient

4. Screw and Cement retained Prosthesis: Every two weeks, the temporary prosthesis would need to be removed for clinical procedures such as suture removal, evaluation of implant stability, assessment of soft tissue healing, and embrasure modification. For the soft tissues to be molded, contoured, and healed with the best possible aesthetic result, these procedures are essential. Typically, a screw-retained

The following factors make a temporary prosthesis preferable than one that is cement-retained:

1. Because the removal force may compromise the osseointegration process, a temporary cemented prosthesis should not be removed during the three-to-four-month healing period.

2. Both soft and hard tissues may not recover properly if cement residue is present.
3. The inability to regularly remove the cemented prosthesis prevents soft tissue contouring.5.

5. Occlusion: In immediate implants, there are essentially two forms of occlusion:

1. When the temporary prosthesis are fully occluded in people who are completely edentulous, immediate functional loading is applied.

2. instantaneous non-functional loading combines the advantages of instantaneous loading and a single-stage method. Here, the temporary repairs are not in occlusion. They are mostly utilized for aesthetic reasons and to guide the soft tissues throughout the healing process in patients who are partially edentulous. This has the advantage of reducing the possibility of biomechanical stress in the presence of parafunctional behaviors.

Regardless of the occlusal concept type selected, there are fundamental guidelines for instantaneous loading to adhere to:

Reduction in size of occlusal table and Reduction in cuspal inclination (Figure 1A and 1B). 2. Occlusal anatomy should be modified to provide a true horizontal fossa. (Figure 2) 3. The occlusal line

angles & grooves should be reshaped to contain a 1.5mm horizontal fossa. (Figure 3)

4. Reduction in the number of Occlusal contacts • Number of occlusal contacts in implant restorations should not be more than 2. • Primary- right over the head of the implant (central fossa). Secondary- within 1mm of the periphery of implant (Figure 4)
5. To avoid non-axial pressures, there shouldn't be any cantilever projections. During the first few weeks of healing, patients should alter their diets by eliminating hard foods (about 4 weeks).5

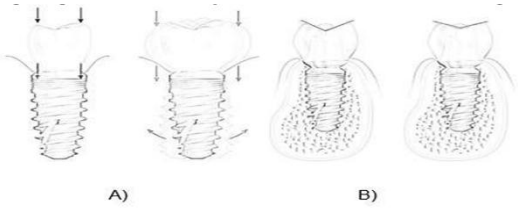
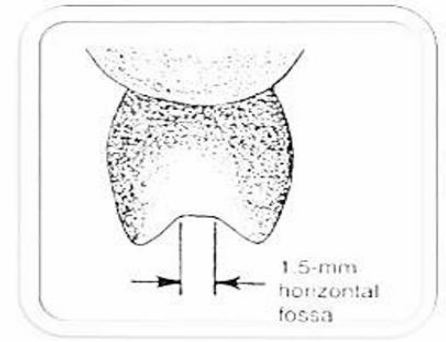


Figure 1:-



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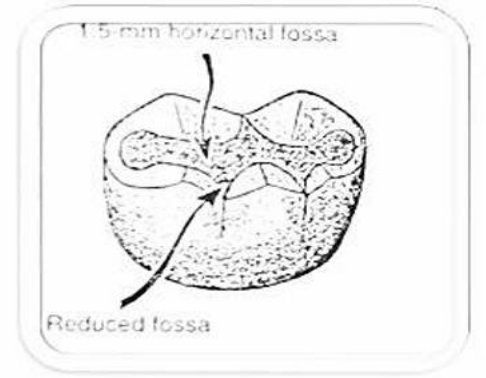
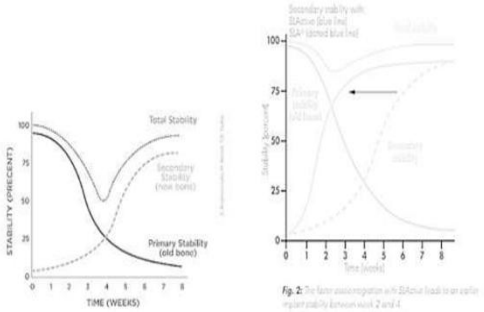


6. Implant design characteristics, surface and number: The active thread screw implant design can transmit compressive pressures more effectively and has a greater mechanical retention rate. The screw implant design not only improves primary stability but also lessens dental implant micromotion, which is essential for effective immediate loading5.

2. Longer implants have higher primary stability. To improve primary stability in cases where bone quality is low, attempt bicortical fixation.

3. Bone-implant interaction (BIC) is enhanced by implant surface roughness. Compared to a non-surface treated implant, an implant with surface roughness will have faster overall stability and avoid the stability dip during the healing phase.7



REFERENCES

1. Branemark P.-I. The Osseointegration Book: From Calvarium to Calcaneus. Berlin: Quinte ssence; 2005.

2. Hickey J. C. The glossary of prosthodontic terms. The Journal of ProstheticDentistry.1968;94(1):10-92.doi:10.1016/j.prosdent.2005.03.013.

3. Dr. Nikhil N Pawar, Dr. Payal A Karkar. Loading protocol in implant dentistry: A review. Int J Appl Dent Sci.

4. Ghoul WE, Chidiac JJ. Prosthetic requirements for immediate implant loading: a review. J Prosthodont. 2012 Feb;21:141-54.

5. Misch CE. Bone Density: A Key Determinant for Treatment Planning, In Contemporary Implant Dentistry, (Misch CE) 3rd ed. Mosby Elsevier, St. Louis, Missouri;2008. pp. 130-146.202.

6. Y Chen, C L Kuan, Y B Wang, Implant occlusion: biomechanical considerations for implant supported prostheses, J Dent Sci, 2008, 65 -74.

7. Lum LB, Beirne OR, Curtis DA. Histologic evaluation of Hydroxylapatite coated versus uncoated titanium blade implants in delayed and immediately loaded applications. Int J Oral Maxillofac Implants. 1991; 6:456-462. 8) Pawar, Dr &Karkar, Dr. (2020). Loading protocol in implant dentistry: A review. International Journal of Applied Dental Sciences. 6. 578-587.

Review Article Journal of Oral and Dental Health

Restoration of Tooth Using Cast Post Restoration – A Review Article

Abstract

Effective endodontic therapy is essential for the effective treatment of teeth with significant structural damage, but so is timely restoration of the tooth following the completion of the same. The mechanical and physical characteristics of endodontically treated teeth differ greatly from those of healthy teeth. Because of desiccation or the early loss of moisture provided by a vital pulp, endodontically treated teeth are thought to be weaker and more likely to fracture When much of the tooth's structure is no longer able to support the tooth's crown or itself, post and core restorations are done (usually after the root canals have been treated). For dental surgeons, choosing the best post method and material to fix fractured teeth that have received endodontic treatment is a major difficulty. The use of custom cast post and core systems is advised when there is significant tooth structure loss or insufficient ferrule remaining. Following root canal therapy, cast post system enhance fracture resistance in addition to aiding in core retention. Core restorations can be retained with custom cast post and core systems, which replace lost coronal anatomy. This technique has been successful in repairing severely damaged anterior teeth. Permanent anterior teeth fractures brought on by trauma are frequent, affecting patients' discomfort and aesthetic issues. In order to enhance coronal restorations, post and core systems may be necessary when managing such situations endodontically. Even though there are many different post systems available, custom cast post and core is still a common option which has become popular. In this review article, we will go through how the custom-made cast post and their coronal restorations is effective in restoring the endodontically treated tooth which positively affects the long-term prognosis of endodontically treated tooth.

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INTRODUCTION

Endodontic treatment becomes necessary when dental caries affects the pulp, fractures occur, or prior restorations fail; this frequently results in a major loss of the tooth's coronal structure.1, 2 The deficient tooth structure is restored using a variety of post and core build-up processes and materials; careful selection is essential to preserving the ability

of the remaining tooth structure to support the restoration.3, 4, 5

This thorough review analysis attempts to explore the definition, function, and crucial significance of cast post retention in restorative dentistry, delving into its many subtleties. 6. Cast post retention is the process of improving the structural integrity of teeth after root canal therapy by using specially made metal posts, usually cast in alloys like base metal. A foundation for base metal is also provided by incorporating cast posts into restorative treatments. These posts add to the restoration's overall stability by firmly anchoring within the root canal region, guaranteeing its life and functionality 7.

Currently, a variety of post-system materials and techniques are employed to preserve final restorations and increase strength of endodontically treated tooth in cases of moderate to severe loss of coronal tooth structure. 8, 9.

The conventional repair of choice after root filling was a specially manufactured cast metal post and core with metal-ceramic crowns. 8, 10
The primary goal of the post and core is to adequately replace the missing coronal tooth structure so that the crown can be retained and resistant, thereby restoring the tooth's function and appearance [11,12].
A metal post, which gives the core the required retention, is most frequently utilized. Unlike some readymade systems, cast posts and cores do not need an auxiliary retention, such pins, to hold the core in place [13].
Crown retention should ideally be aided by a post and core.21 It should have high tensile strength, strong fatigue resistance to an occlusal and shear stress, and be biocompatible and innocuous.22
A post should extend apically to at least crown height or two-thirds the length of the root, and it should distribute stresses uniformly to the surrounding root surface.23,24
This provides resistance to occlusal load and aids in the equitable distribution of stress.24. Furthermore, particularly when anterior teeth are being restored, the color of the post and core should resemble that of the original dentin.25.

CRITERIA FOR SELECTION

The development of an exact treatment plan is predicated on taking into account the variations between teeth that have undergone endodontic therapy and healthy, intact teeth. Due to the significant loss of tooth structure, endodontically treated teeth typically require special restoration treatments. The modifications that come with root canal therapy have an impact on the choice of particular materials and restoration methods for endodontically treated teeth. [14]

The quantity of surviving tooth structure and the shape of the canal are two parameters that affect the decision between a cast post and a prefabricated post. 15.

It has been suggested that a properly fitting cast post and core provide better retention for a canal that needs a lot of preparation than a prefabricated post that is out of alignment with the canal design. 16,17

If canal requires very extensive preparation, then custom made post is preferred as it will match the shape of the canal that prefabricated post will not match. Custom made post is used in canals that have non circular cross section or extreme taper.
When a tooth is misaligned and the core needs to be tilted with respect to the post in order to properly align with the neighboring teeth, a cast post and core may be advised. In small teeth, such mandibular incisors, where there is little coronal tooth structure available for antirotation features or bonding, cast posts and cores may also be recommended. 20

When tooth is malaligned, cast post is indicated: post must be placed in proper angulation to correct the alignment of tooth with the adjacent ones.
Also, when multiple teeth require post then cast post is the choice of post.

CUSTOM MADE CAST POST

It is manufactured with precious, semi-precious, or other alloys (mostly chromium - cobaltium) and is the ideal method for a strong and long-lasting restoration. recommended for teeth that have experienced significant tooth loss. For the dental imprint to be sent to the dental laboratory, an appointment is required. A post and core must be cast separately from the crown in order to complete this process. Almost always, only a small amount of tooth structure needs to be removed. [18]
Gold type III or IV can be used to make the casting. possess a high modulus of elasticity (not screwed) and high tensile strength, compression, and deformation. Because they need two appointments, temporization, and a lab charge, they have become less popular. However, some research indicates that cast posts and cores have a high success rate and provide benefits in some clinical settings [19].

ADVANTAGES

1. Conservation of the root structure
2. Possible to incorporate anti rotation features in the prepration.

3. Core is a part of the assembly and thus the cast post has no weak interface in between.

4. Closely adapted to the root dentin.

5. Possess high strength and have good post retention.

6. Used in malaligned tooth.

DISADVANTAGES

1. They have modulus of elasticity greater than dentin leading to root fracture.

2. Long chair side time.

3. Multiple appointments.

4. Technique sensitive.

5. Lab dependent.

CAST POST PREPRATION TECHNIQUE

After the coronal preparation has been done then post and core fabrication is completed. Tooth structure should be preserved as much as possible. All the undercuts has to be removed for proper pattern making for the cast post.

Establish the proper ferrule line by preparing the finish line at lest 2mm gingival to the core.

PREPRATION OF CANAL SPACE AND TOOTH

1. Removal of endodontic filling material to the required length using chemical. thermal or mechanical method.

2. Canal enlargement using peeso reamer and gates glidden drills.

3. Prepration of coronal part of tooth.

4. Fabrication of post.

5. Core placement.

FOR CUSTOM MADE CAST POST FABRICATION OF POST IS DONE BY TWO TECHNIQUES

1. DIRECT TECHNIQUE – patient’s mouth

2. INDIRECT TECHNIQUE – laboratory procedure

DIRECT WAX PATTERN TECHNIQUE

The core reinforcement, around which the resin or wax design is produced, is a
hard plastic post or a thin metal needle.

A carborandum disc is used to roughen the chosen pin. Another option is to utilize an old file or reamer. After the pin is ready, a small coating of sticky wax is applied. In the root canal, an instrument is tried.

Blue inlay wax is applied to the instrument after it has been tried. Insert it into the root canal after slightly warming it up. After 60 seconds, carefully remove the device.

The post-impression is prepared. Following the post, blue inlay wax is used to create the core in the patient's mouth. After that, casting is made and the impression is invested. Put on some blue inlay wax and put it back in. Then take out the pattern fabrication for core.

DISADVANTAGES

- Excellent practice and skill
- More chairside time;
- Indirect vision impairs stereoscopic judgment;
- Recalling the patient is necessary if the casting fails.

INDIRECT PATTERN TECHNIQUE

Every margin can be completed in plain sight.
Wax patterns can be created in inaccessible areas with little strain. Direct visibility of the lingual region.

There is less chance of tooth fracture because all modifications may be made before insertion.
Another pattern can be created if casting doesn't work.

DISADVANTAGES

- Many steps result in numerous inconsistencies.
- More time spent in the lab

METHOD

By injecting impression material into the canal, an impression can be created in order to prepare the cast. (lentulospirals) that are used to reinforce impressions.

The prepared canal can also be used to create a custom acrylic post.

The imprint of the canal is created by the acrylic and then transferred to a cast. A post design can be drawn with a precision manufactured plastic pin. The impression is created using blue inlay wax and a metal pin, as explained for direct methods, in a cast that has been prepared for post.

CONCLUSION

The quantity and quality of the tooth structure that is kept, cosmetic requirements, as well as the indications, benefits, and drawbacks of each system, must all be taken into account when choosing the best post and core systems. Comparing the uses and efficacy of various post kinds and the materials used in their production has been the subject of extensive investigation. The technique described in the case report is simple, effective, and presents a viable substitute for restoring severely decayed or broken teeth, although more research is required to confirm its validity. The development of a unique post and core has shown favourable outcomes.

REFERENCES

1. Burke FJ. Tooth fracture In vivo and in vitro. J Dent. 1992;20(3):131-139.

2. Franklin S. Weine Endodontic Therapy. 6th ed. 553-561.

3. Naumann N, Kiessling S, Seemann R. Treatment concepts for restoration of endodontically treated teeth: A nation-
wide survey of dentists in Germany. J Prosthet Dent. 2006;96(5):332-338.

4. Heydecke G, Butz F, Strub JR. Fracture strength and survival of endodontically treated maxillary incisors with ap-
proximal cavities after restoration with different post and core systems: an in-vitro study. J Dent. 2001;29(6):427-433.

5. Pontius O, Hutter JW. Survival rate and fracture strength of incisors restored with different post and core systems. and endodontically treated incisors without coronoradicular reinforcement. J Endod. 2002;28(10):710-715.

6. Current options concerning the endodontically-treated teeth restoration with the adhesive approach. Carvalho MA, Lazari PC, Gresnigt M, Del Bel Cury AA, Magne P. Braz Oral Res. 2018;32:0. doi: 10.1590/1807-3107bor-2018.vol32.0074. [DOI] [PubMed] [Google Scholar].

7. Customized post and cores fabricated with CAD/CAM technology: a literature review. Al-Qarni FD. Int J Gen Med. 2022; 15:4771–4779. doi: 10.2147/IJGM.S365296. [DOI] [PMC free article] [PubMed] [Google Scholar].

8. Morgano SM, Brackett SE. Foundation restorations in fixedprosthodontics: Current knowledge and future needs. JProsthet Dent, 1999; 82:643657.

9. Bateman G, Ricketts DNJ, Saunders WP. Fibre-based postsystems: a review. Br Dent J, 2003; 195:43-48.

10.Aquilino SA, Caplan DJ. Relationship between crownplacement and the survival of endodontically treated teeth. JProsthet Dent, 2002; 87:256-263.

11. Naumann M, Kiessling S, Seemann R. Treatment concepts for restoration of endodontically treated teeth: A nationwide survey of dentists in Germany. J Prosthet Dent. 2006;96(5):332-8. Indexed at, Google Scholar, Cross Ref.

12. Fernandes AS, Dessai GS. Factors affecting the fracture resistance of post-core reconstructed teeth: a review. Int J Prosthodont. 2001;14(4).Indexed at, Google Scholar.

13. Brandal JL, Nicholls JI, Harrington GW. A comparison of three restorative techniques for endodontically treated anterior teeth. J Prosthet Dent. 1987;58(2):161-5. Indexed at, Google Scholar, Cross Ref.

14. Hargreaves, Cohen. Cohen's Pathways of the Pulp. 10th Edition. Elsevier:786-821.

15. AS Fernandes GS Dessai Factors affecting the fracture resistance of post-core reconstructed teeth: a reviewInt J Prosthodont200114435563.

16. NH Creugers AG Mentink WA Fokkinga CM Kreulen 5-year follow-up of a prospective clinical study on various types of cores restorationsInt J Prosthodont2005181349.

17. JR Pereira AL Valle FK Shiratori JS Ghizoni MP Melo Influence of intraradicular post and crown ferrule on the fracture strength of endodontically treated teethBraz Dent J2009204297302.

18. Morgano SM. Restoration of pulpless teeth: application of traditional prin-ciples in present and future contexts. J Prosthet Dent. 1996 Apr;75(4):375-80. Pubmed PMID:8642522.

19. Morgano SM, Milot P. Clinical success of cast metal posts and cores. J Pros- thet Dent. 1993 Jul 1;70(1):11-6.

20. Fontana PE, Bohrer TC, Wandscher VF, Valandro LF, Limberger IF, Kaizer OB. Efect of ferrule thickness on fracture resistance of teeth restored with a glass fber post or cast post. Oper Dent. 2019;44(6):E299-308.

21. Theodosopoulou JN, Chochlidakis KM. A systematic review of dowel (post) and core materials and systems. J Prosthodont. 2009;18(6):464–472. doi: 10.1111/j.1532-849X.2009. 00472.x [DOI] [PubMed] [Google Scholar].

22. Faria AC, Rodrigues RCS, de Almeida Antunes RP, et al. Endodontically treated teeth: characteristics and considerations to restore them. J Prosthodont Res. 2011;55(2):69–74. doi: 10.1016/j.jpor.2010.07.003 [DOI] [PubMed] [Google Scholar].

23. Goracci C, Ferrari M. Current perspectives on post systems: a literature review. Aust Dent J. 2011;56(Suppl 1):77–83. doi: 10.1111/j.1834-7819.2010. 01298.x [DOI] [PubMed] [Google Scholar].

24. Machado J, Almeida P, Fernandes S, et al. Currently used systems of dental posts for endodontic treatment. Proced Struct Integr. 2017; 5:27–33. doi: 10.1016/j.prostr.2017.07.056 [DOI] [Google Scholar].

25. Farrugia CP. Custom ceramic posts and cores: an overview of rationale and a new use for a proven technology. Gen Dent. 2008;56(1):42–50. [PubMed] [Google Scholar].