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Chattagram International Dental College (CIDC) started its historical and memorable journey in the 2003 year. CIDC is the only Private Dental College in Chattogram which is smoothly running under the guidance of Chittagong Medical University.

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A structured abstract should not be of more than 250 words. It should be a factual description of the study performed organized with the heading of Background (Includes aim or objectives) Methods (Includes patient population, procedures and data analysis) Result and Conclusion. The abstract should contain the data to support the key findings or conclusions of the study and this should be self explanatory without references to the text. the first time an abbreviated term is used it should be spelled out in full form and follow with the abbreviation in parentheses for example :- CKD (Chronic Kidney Disease). Please do not cite any references in the abstract.

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Editorial

Chattagram International Dental College Journal

Volume 09 Issue 01 January 2026; 1-2

Stem Cell Therapy in Dentistry, Oral and Maxillofacial Malformations

Shahiqul Jabbar[1*]

Stem Cell : Stem Cells are biological cells that can be differentiate into other types of cell and can divide to produce more same type of cell. It is found in multicellular organism.

Stem Cell Therapy : Stem Cell therapy is also called as 'Regenerative Medicine'. It is a unique medical treatment that can helps to repair dysfunction, disease and injured tissue by using stem cell.

Stem Cell therapy is an emerging field in dentistry that aims to regenerate damaged or lost oral tissues, such as dentin, pulp and bone. Unlike traditional dental procedures that replace tissue with synthetic materials.

This approach uses the body's own regenerative potential. This field is now entering an exciting new phase, with innovative research expanding beyond traditional treatments. Stem cell technology has the power to transform clinical practices and greatly improve patient outcomes in dentistry and oral and maxillofacial surgery. However, there are still several challenges to overcome. It is important to understand these challenges and compare the effectiveness of stem cell–based treatments with conventional ones. Over the past few decades, the combination of stem cell research and tissue engineering has opened new possibilities in regenerative medicine and dentistry. Scientists are exploring various stem cell sources, particularly those derived from oral tissues and developing advanced scaffolds using methods like bio-printing. By combining these innovations, researchers aim to create more effective treatments for patients. This research focuses on recent advancements in stem cell applications for dental and maxillofacial reconstruction.

The influence of the immune system on tissue repair is still an understudied area of regenerative medicine. Soudi A et al. performed a review of the interactions between immune cells and stem cells, exploring their interaction and their involvement in jaw development, maintenance of homeostasis and pathological circumstances.[1] The primary goal of the study was to ultimately explore the relationship between periodontal ligament stem cells, dental pulp mesenchymal stem cells, jawbone mesenchymal stem cells and Schwann cells in the immune microenvironment of the jaw.

A primary concern in the field of regenerative dentistry is the enhancement of odontogenesis by improving differentiation and proliferation of specific stem cells. In this regard, Golchin A et al. suggested enhancing dentin production in odontoblasts by utilizing a distinctive chlorinated oxidant known as Matching Transformation System® (MA-T). They found that via activating the canonical Wnt signaling pathway, MA-T treatment in odontoblasts decreased the sulfation of HSPG and increased the levels of Dentin sialophosphoprotein (Dm) and Dentin Matrix Protein 1 (Dmp1).[2] Furthermore, the use of MA-T treatments outside of the living organism enhanced the formation of dentin matrix in developing tooth samples. However, a comprehensive investigation is necessary to precisely determine the function of the intricate Wnt signaling network in dentin formation. Moreover, in vitro investigation shown that LiCl treatment increased the mRNA expression of Wnt10a and Wnt6 in odontoblasts, but had no effect on Wnt5a. Similarly, MA-T treatment at concentrations of 0.2 ppm and 1.0 ppm also had no effect on Wnt5a expression. The study utilized primary mouse Dental Papilla mesenchymal cells (mDP cells) to further examine the growth into odontoblasts, chondrocytes and adipocytes. The study proposes a novel approach to stimulate dentin formation by modifying HSPG. It also elucidates the therapeutic processes of MA-T in promoting the differentiation of odontoblasts.[3] These findings suggest a promising potential for using pharmaceutical methods to regenerate dental tissues.

In another study, discovered that disabling the C5a-Like receptor 2 (C5L2) CRISPR gene significantly improves the process of mineralization in TNFa-stimulated Dental Pulp Stem Cells (DPSCs) and promotes the production of Dentin Sialophosphoprotein (DSPP) and dentin matrix protein-1.[4] This study has attempted to clarify the function of inflammation in dentinogenesis in order to develop effective ways for engineering stem cell-based approaches.[5]

In a clinical study, Mantesso A et al. evaluated the capacity of Adipose-Tissue Stromal Vascular Fraction (AT-SVF) and Leukocyte-Platelet-Rich Fibrin (L-PRF) to treat Medication-Related Osteonecrosis of the Jaw (MRONJ).[6] As we know, the AT-SVF consists of Mesenchymal Stromal Cells (MSC) and Endothelial Progenitor Cells (EPC) that stimulate the growth of bone tissue. The L-PRF scaffold facilitates tissue repair by

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releasing growth factors. The study included nine individuals who had a total of ten MRONJ lesions, all of which showed no symptoms of recurrence. Three-dimensional medical imaging demonstrated bone regeneration 6 months post-surgery. The findings indicate a novel therapeutic strategy for MRONJ involving the use of autologous AT-SVF within an L-PRF scaffold.[7]

Besides teeth and jawbone repair, stem cell therapy can also target other oral diseases. One example is Salivary Gland Hypo-function (SGH) a condition that causes dry mouth, increases the risk of oral infections and reduces quality of life. Current treatments mainly focus on easing symptoms but cannot repair the damaged glands. Pluripotent Stem Cells (PSCs) have recently shown promise as a possible treatment for SGH. According to a review, preclinical studies show that PSCs have strong immune-regulating and tissue-regenerating abilities that could help restore salivary gland function. Their research provides useful insights and direction for future studies on using PSCs to treat SGH.[8]

Overall, regenerative dentistry is expected to keep advancing quickly as more scientific fields come together and as stem cell and tissue engineering technologies continue to improve. These innovations hold great promise for the future of dentistry, offering new and effective ways to treat oral and maxillofacial diseases.

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Original Article

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Effect of Micro-Osteoperforation on the Rate of Orthodontic Tooth Movement

Minhazz Yamim Zibran[1*] Kajal Chandra Paul[2] Monwoar Kabir[3]
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Abstract

Background: *Due to long treatment duration many orthodontic patients seek otherwise options beyond orthodontic boundary. Lengthy treatment duration also causes root resorption, periodontal damage and enamel decalcification. Among all techniques of accelerating orthodontic tooth movement, Microosteoperforation is minimally invasive. Its effectiveness is also inspiring as observed in previous studies to see its success on animal and human. Aim of the study was to evaluate the accelerating effect of Micro-osteoperforation on the rate of canine retraction at maxilla on Bangladeshi population.*

Material and methods: *This was a randomized clinical trial. Ten orthodontic patients needed therapeutic maxillary 1st premolar extraction in Orthodontic and Dentofacial Orthopedic department of Dhaka Dental College Hospital, Bangladesh, were sample of this study. Nine of them were 19 years old and one was of 25 years age. One participant was male and all others were female. By doing lottery, right or left sides of maxilla of each participant were selected as experimental side and the other sides were kept as control side. Same mechanotherapy, same materials, same magnitude and angulations of force were applied on experimental and control side of each participant. Two Micro-osteoperforatons were done by 1.4 mm mini-implant of 8 mm length on experimental side and canine retraction was started at the same appointment. After 28 days amount of canine retraction was measured by digital vernier caliper.*

Results: *Canine moved on average 1.7 times faster at experimental side than at control side and p value obtained from t test was 0.02, so the difference was statistically significant (p<0.05).*

Conclusion: *Micro-osteoperforation accelerates rate of orthodontic tooth movement but the effect varies in different individual.*

Key words

Canine retraction; Micro-osteoperforation; Mini-implant; Orthodontic tooth movement

Introduction

Prolonged orthodontic treatment duration is a major concern for both patients and clinicians. Lengthy treatment times can lead to patient dissatisfaction, reduced compliance, and increased risk of complications such as root resorption, enamel decalcification, and periodontal damage.[1–3] Numerous methods have been proposed to shorten treatment duration, including pharmacologic agents, mechanical stimulation and surgical interventions, Surgical acceleration methods, such as corticotomy and piezocision, although effective, are invasive and often less accepted by patients due to postoperative discomfort.[4-14]

Micro-Osteoperforation (MOP) represents a minimally invasive alternative that induces a localized Regional Acceleratory Phenomenon (RAP) by creating small perforations in the alveolar bone without flap elevation. This triggers bone remodeling, enhancing osteoclastic activity and potentially accelerating tooth movement.[15] The current study investigates the clinical effectiveness of MOP in accelerating orthodontic tooth movement in Bangladeshi patients, where no prior study has been conducted.

Research question was whether Micro-osteoperforation accelerate the rate of orthodontic tooth movement? General objective was to measure and compare the rates of canine retraction with MOP and conventional procedure without MOP. Specific objective was to measure the rate of canine retraction at the clinical test side and conrole side of maxilla and compare the amount and rate of canine retraction between experimental side and control side.

Materials and methods

A randomized clinical trial was carried out in the Department of Orthodontics and Dentofacial Orthopaedics, Dhaka Dental College and Hospital, from July 2019 to November 2020. Ten adult patients aged

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18–25 years requiring bilateral maxillary first premolar extractions were selected. Following leveling and alignment using 0.022 slot MBT brackets, MOPs were performed unilaterally distal to the canine using a mini-screw (1.4 mm×8 mm, Osstem Implant). Two perforations were made 5 mm and 8 mm from the alveolar margin under local anesthesia. The side for MOP was determined by lottery. The contralateral side served as the control.

Canine retraction was initiated immediately after MOP using a 100 g NiTi closed coil spring attached to a mini-implant for anchorage. Measurements were taken after 28 days using a digital vernier caliper at four sites:

i) canine tip to 2nd premolar tip

ii) bracket-to-bracket distance between canine and 2nd premolar

iii) canine tip to buccal groove of 1st molar

iv) vertical slot distance between lateral incisor and canine brackets. Data were analyzed using SPSS v24 with Shapiro–Wilk's normality test and independent t-tests, with significance at $p < 0.05$.

Main outcome variable:

Rates of canine retraction with MOP and without MOP.

Confounding variable: age and sex

Sample size: 20 sites (Right & left side) of 10 patients.

Sampling method: Simple random sampling.

Inclusion criteria

- Therapeutic extraction of the maxillaryfirst premolars.
- Levelling and alignment completed.
- Age of 18-35 years.

Exclusion criteria

- Any systemic illness that affects bone tissue
- Missing, impacted or significant morphological anomalies in canine.
- Presence of any local pathology such as cyst, tumor, bony lesion, periodontaldiseases.

Figure 1 Micro-osteoperforation procedure

The statistical evaluation of the findings was performed using 24th version SPSS software.

Parametric tests (t test) were used to compare the treatment efficacy.

Previously mentioned parameters were measured by digital vernier caliper and filled in data collection sheet. Each participant had a separate data collection sheet with separate ID number.

Figure 2 Clinical measurement by digital caliper

The experimental procedure was clearly explained to each participant followed by completing a written consent form.Sterilization was maintained properly and disposable instruments was used during the procedure. So, this study caused no risk of health throughout the study period. All participants had a case number to maintain their confidentiality.Post-operative bleeding was immediately stopped and there was minimal or no discomfort after the procedure.

Results

Seventeen adult patients between the ages of 18-25 were initially recruited from Dhaka Dental College hospital, Orthodontic Department's patient pool. All of these patients had a malocclusion that required extraction of maxillary first premolars as part of their treatment plan. Seven of the patients did not continue the study due to various reasons. The ten remaining subjects initiated the experimental phase and completed the study with no loss to follow-up. All patients maintained good oral hygiene throughout the study and took no medications including anti-inflammatory analgesics before and during the period of the study. The age range of the study subjects was from 18 to 25 years old.

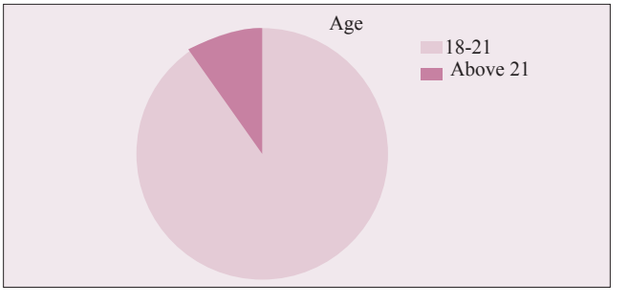

Figure 3 Pie chart for age percentage

All patients were of 19 years old except one who was 25 years old during the study. Nine subjects were females and one was male.

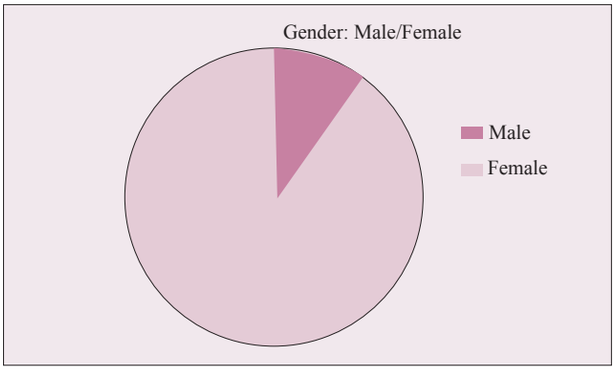

Figure 4 Gender percentage

Canine retraction was initiated on both sides of the mouth after the initial phase of leveling and aligning. The experimental side received two Micro-osteoperforations between the canine and the second premolar using the mini implant of 1.4 mm diameter while the control side did not receive any. After 28 days of intervention, canine retraction was measured on each patient on both experimental and control side by digital vernier caliper from four different sites. Measurement was taken in millimeterupto two decimals. An average of thefour obtained measurements for each category was then used for statistical analysis.

Site 1: Distance measured from 2nd premolar tip to canine tip.

Site 2: Distance measured between vertical slots of 2nd premolar bracket and canine bracket.

Site 3: Distance measured from buccal groove of 1st molar to canine tip.

Site 4: Distance measured between vertical slot of lateral incisor bracket and canine bracket

All ten participants completed the study. The mean canine retraction on the intervention side (MOP) was greater at all measurement sites than on the control side. Shapiro–Wilk's test confirmed normal distribution for all data sets.

Table I Shapiro-Wilk test for normality distribution of data set

Sites		Shapiro wilk statistics	Sig/ p value
Site 1	Control site	0.885	0.147
	Intervention site	0.924	0.396
Site 2	Control site	0.932	0.465
	Intervention site	0.895	0.193
Site 3	Controle site	0.896	0.196
	Intervention site	0.989	0.995
Site 4	Control site	0.944	0.601
	Intervention site	0.939	0.538

Df: Degree of freedom = 10

NDDS: Normally Distributed data Set (p >0).

Statistically significant differences were found at site 2 ($p = 0.012$) and site 3 ($p = 0.03$), while sites 1 and 4 showed non-significant trends ($p = 0.052$ and $p = 0.051$, respectively).

Table ll Comparison of mean of rate of canine movement at all four sites

	Mean at IS	Mean at CS	Difference of means	ratio (IS vs CS)	p value
Site 1	1.9200	1.2720	0.648	1.5	0.05
Site 2	2.2500	1.2550	0.995	1.8	0.01
Site 3	1.9360	1.0650	0.871	1.8	0.03
Site 4	2.1710	1.3630	0.808	1.6	0.05
Average of all sites	2.0692	1.2387	0.830	1.7	0.02

IS :Intervention Side , CS : Control Side, S : Significant ($p<0.05$) NS : Not Significant ($p>0.05$)

In the intervention side canine moved at least 1.5 times than control side observed at site 1. At the site 2 and site 3 maximum differences were observed which was 1.8 times. At site 4 the difference was 1.6 times. Last row of the table shows that on average canine moved 1.7 times in intervention side than in control side and according to p value the difference was significant.

Discussion

This study dealt with one of the crucial drawbacks of orthodontic treatment, which is its lengthy duration. Prolonged orthodontic treatment usually very disappointing for patients, especially for elderly.[15] Appreciating the above fact, researches progressed to evaluate the effectiveness of surgical and non-surgical adjunctive procedures aiming to accelerate OTM.[16,17] Although proved as effective, 28 patients are unwilling to undergo Corticotomies to reduce orthodontic treatment duration.[18] To achieve the acceleratory effects of Corticotomy and simultaneously patient comfort, the flapless Microosteoperforation (MOP) procedure was recently introduced.[19] Hence, the aim of this trial was to evaluate the effect of MOPs on the rate of OTM in a canine retraction model. Being a minimally invasive procedure, it was postulated that if MOP was performed on the day of premolar extraction, its effect would be easily overlapped with the RAP produced by premolar extraction. Therefore, 3 months time-gap between premolar extraction and MOP procedure was scheduled to permit obliteration of the RAP created at extraction site.[20] However, canine retraction was started on the same day of performing MOPs. After 28 days of intervention, canine retraction was measured on each patient on both experimental and control side by digital vernier caliper from four different sites. All data of all four sites both intervention and control side were normally distributed. Rate of canine retraction was

more in intervention side than control side of all participants except 5th and 8th number participant. Occlusal interference was the possible explanation of those conflicting results.

Canine retraction was measured from four sites in this study. Although absolute anchorage preparation was taken, minor amount anchorage loss is inevitable which must be included in the measurement of canine retraction taken from site1, site 2 and site3. But measurement taken from site-4 is free from anchorage loss. So, site4 data can represent absolute canine retraction. If we consider only site4 data, this study indicates that MOPs increase rate of canine retraction 1.6 times comparing with conventional process.[21] This finding is supported by previously conducted study of Abdulhameed and Refei. [33] They also found in their study, 1.6 times higher canine retraction rate at experimental side than at control side.

At site 1 & site 4, Rate of canine retraction at intervention side was 1.5 times and 1.6 times respectively comparing with control side, which were statistically not significant.The finding is supported by study of Aboalanga A et al. and Fattori L. et al. [22,23]

At site 2 & site 3, Rate of canine retraction at intervention side was 1.8 times comparing with control side, which were clinically and statistically significant (Table 3.6). This finding is supported by animal studies previously conducted by them and human studies conducted by others which were described above.[24-29,21,30-34]

On average

Canine moved 1.7 times in intervention side than in control side and according to p value the difference was significant. This finding is supported by animal studies previously conducted by them and human studies conducted by others which were already described.[24-28, 29,21,30-34] The current study result is complied with the above-mentioned studies in a sense that MOP accelerates orthodontic tooth movement but degree of acceleration significantly varied with previous studies.

Possible explanation of diversity in results of different studies

MOPs increased rate of OTM 2.3-fold, 2-fold, 1.6-fold, 1.3-fold in study of Alikhani et al. study of Feizbaksh et al. study of Abdulhameed & Refei and study of Kamal et al. respectively.[29,32,28,35] The current study shows 1.6-folds increase in rate of OTM after performing MOPs. Those studies varied in width, depth and number of MOPs and in device used for operating MOPs. Alikhani et al. used propel device in their study, age of their sample was senior people (18-45 years age range).[29] Usually, aged persons have matured and denser bone. As MOP works by transiently reducing bone density, it works better at higher density bone. Propel device is a specialized device for MOP by which more precise location and depth, diameter can be achieved during MOP. Due to precise control, they could perform three MOPs on each site. So higher age, a greater number of MOPs in exact location, larger diameter and depth of MOPs can be explanation of their better result. Feizbaksh et al. also took higher age sample (28 years average) and performed wider (1.6mm) and deeper MOPs.[32] Those could be explanation their better result (2-fold acceleration of OTM). In current study two MOPs was planned to perform each site. Instead of propel device, hand screw driver was used. In some case mucogingival junction was more occlusally situated, so area of attached gingiva was too less to perform two MOPs and in some case two calculated points of MOPs application both fallen beyond mucogingival junction. So, two MOPs in perfect location and depth was not possible in all sites. This may be explanation why in current study effects of MOPs were less than some previous studies.

Limitation

Anchorage loss and canine tipping were controlled via mini-implant reinforcement, although these parameters were not directly measured. Limitations include small sample size, short observation period, and lack of radiographic assessment for root resorption. Future studies should address these gaps and assess long-term stability, pain response, and bone density changes.

Conclusion

Micro-osteoperforation is an effective and minimally invasive adjunct to orthodontic treatment that can significantly accelerate tooth movement by approximately 1.7-fold. Although variability exists among individuals, MOP represents a promising approach to shorten orthodontic treatment duration with high patient acceptability. Larger randomized controlled trials are required for definitive conclusions.

Recommendation

Impressive outcome inspires and paves the way for a lot of scope for further orthodonticresearch in Bangladeshi population. Successive studies should include larger representative sample, larger duration of study period, measurement of anchorage loss, root resorption; measurement of degree of tipping during movement, age, sex and maxillae-mandible comparison, questioner study for pain discomfort following MOPs etc. Till now, effects of MOPs on different age group and gender group are not done globallyalong withBangladesh. Future studies can also include the effects of a second Micro-osteoperforation on the rate of tooth movement or changes in the bone density during treatment with Micro-osteoperforations.

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Discosure

All the authors declared no competing interest.

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Original Article

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Prevalence of Impacted Canines in a Tertiary Level Hospital : A Retrospective Study

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Abstract

Background: *An impackted tooth simply means that it is "Stuck" and cannot erupt into function. The objective of this study is to highlight the prevalence of impacted canines in patients who had attended the dental department of Faridpur Medical College Hospital from January 2023 to December 2024.*

Materials and methods: *This was a retrospective study on 500 panoramic radiographs. All panoramic radiographs were taken with standardized equipment and specifications. Frequency and prevalence of the patients were recorded. The total number of males was 250 (50%) and 250 (50%) were female. The mean age of the patients was 16.4 years.*

Results: *A total of 22 patients (4.4%) were diagnosed with impacted canines, including 12 females (4.8%). Impacted canines were seen mostly as unilateral 20 (90.9%).*

Conclusion: *The left and right sites of impaction found no significant difference.*

Key words

Canine impaction; Dental arch; Maxillary canine.

Introduction

An impacted tooth is one that fails to erupt into the dental arch within the expected developmental window. Teeth may become impacted because of adjacent teeth, dense overlying bone, excessive soft tissue or a genetic abnormality. arch length-tooth size discrepancy.[1] Third molars are the most commonly impacted teeth, followed by permanent canines.[2] Maxillary canine impaction occurs in approximately 2% of the population and is twice as common in females as it is in males. The incidence of canine impaction in the maxilla is more than twice that in the mandible. Of all patients who have impacted maxillary canines, 8% have bilateral impactions.[3] Approximately one-third of impacted maxillary canines are located labially and two-thirds are located palatally.[4,5] Canine impaction can be caused by various factors. The exact etiology of palatally displaced maxillary canines is unknown. The results of Jacoby's study showed that 85% of palatally impacted canines had sufficient space for eruption, whereas only 17% of labially impacted canines had sufficient space.[6] Therefore, arch length discrepancy is thought to be a primary etiologic factor for labially impacted canines.[5] Impacted teeth, especially canines or incisors, can be aligned with the rest of the dental arch by orthodontic treatment, thus regaining and retaining their mechanical and aesthetic function.[6]

Aim of the study The aim of the present study was to determine the prevalence of impacted maxillary canines in a sample of patients attending Faridpur Medical College Hospital, Faridpur.

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Materials and methods

A retrospective, descriptive, cross-sectional study of 500 digital panoramic radiographs was conducted. The radiographs were obtained from the records of Faridpur Medical College Hospital from the years 2023 to 2024. These radiographs were taken by the same operator with the same machine (PaX-iSc Korea) and the exposure time was set at 19 seconds. The x-rays were examined to confirm any evidence of impacted maxillary canines. The inclusion criteria involved radiographs of patients who were in the range of 13 to 25 years of age, as by this time all the permanent teeth would be erupted. The exclusion criteria included the presence of the following conditions: A history of orthodontic treatment, permanent maxillary canine extraction, hereditary disease or syndromes, a history of dentofacial injury, cleft lip and palate and radiographs of poor quality. The radiographs were examined two times to remove any biased error. Data were processed and analyzed using SPSS statistics, the chi-square test was used to reveal any differences in the

distribution of impacted canines when stratified by gender, location (Left or right) and being unilateral or bilateral. A p-value of <0.05 was considered statistically significan.

Results

A total of 500 OPG radiographs were subjected to canine evaluation, among them, 250 (50%) were female and 250 (50%) were male. The age ranges from 13 to 25 years, with a mean age of 16.4 years. A total number of impacted maxillary canines were found to be 22 (4.4%) of which 10 (4%) were in males out of 250 cases and 12 (4.8%) in females out of 250 cases. The chi-square test reveals a non-significant association between gender and canine impaction (p = 0.6627) as shown in [Table I].

Table I Gender prevalence of canine impaction

Gender	Canineimpaction		Number of subjects	p-value
	Impaction	No impaction		
Female	12(4.8%)	238(95.2%)	250(50%)	0.6627
Male	10(4.0%)	240(96.0%)	250(50%)	
Total	22(4.4%)	478 (95.6%)	500(100%)	

Table II Prevalence of unilateral and bilateral canine impaction

Variable	Canineimpaction		Total	p-value
	Impaction	No impaction		
Unilateral	20(90.9%)	480	500	0.0001
Bilateral	2(9.1%)	498	500	

Table III Prevalence of left and right impacted canines

Variables	Number of Impactions Prevalence %	p-value
Left	12(2.4%)	0.612
Right	10(2%)	
Total	22(4.4%)	

Table IV Prevalence of palatal and labial canine impaction

Variables	Number of Impactions Prevalence %	p-value
Palatal	8(1.6 %)	0.2379
Labial	14(2.8%)	
Total	22 (4.4%)	

Unilateral impaction was 20 (4%) out of 500, but bilateral was 2 (0.4%) out of 500. So the difference was statistically significant (p value 0.0001 < 0.05) Table II.

There was no significant difference between the right and left sides of the maxilla (p=0.612 >0.05) Table III.

In the case of position, palatal impaction of canine was 8 (1.6%) but labial placement of canine was 14 (4.4%) with a p-value of 0.2370>0.05. Table IV. So the difference was not statistically significant.

Discussion

The present study assessed the prevalence of impacted maxillary canines without considering impaction of other teeth.[7-10] The prevalence of maxillary canine impaction in our study was 4.4%, which falls within the range of 1.2% to 8.4% reported by other studies. The higher range of prevalence was because of including only orthodontic patients who had come to the hospital for comprehensive orthodontic treatment. Sandeepa et al. studied the panoramic radiographs of 1050 patients in an Indian population and reported 31 patients (2.95%) with at least one impacted maxillary canine.[11] Alif et al. investigated 580 panoramic radiographs of Bangladeshi patients and found that impacted maxillary canines were present in only 7 (1.2%) radiographs.[12] A prevalence of 1.36% was reported by Mustafa, who conducted a retrospective investigation on 3800 panoramic x-rays of patients who had attended for treatment at the Faculty of Dentistry at King Khaled University in Saudi Arabia.[13]

Ebrahim conducted OPG over the Saudi population in the Qassim region, and the sample was 4977.[14] The prevalence of impacted maxillary canines was 2.7%, with a higher prevalence of impacted maxillary canines in males (n=74, 2.94%) compared to females (n=60, 2.43%). The majority of the impacted canines were unilateral (n=105, 78.4%) compared to bilateral (n=29, 21.6%).

In our study, the prevalence of unilateral impaction was statistically significantly higher (4%) than bilateral impaction (0.4%) with a p-value of 0.001. This is in agreement with a study conducted by Ali Gashi et al. [14], which showed that the p-value was significant for unilateral and bilateral impaction. Though the left maxillary canine impaction was higher (2.4%) than the right side impaction (2.0%), the chi-square test reveals no significance, which is consistent with studies conducted by Ali Gashi et al.[15] Palatal impaction is also higher than labial impaction, which is also non-significant. A study conducted by Kaur et al. in 2024 found the prevalence for impacted canines was 2.46%. Prevalence was higher in female patients, which is also similar to our study.[16]

Conclusion

The prevalence of impaction of permanent maxillary canine impaction was 4.4% and occurred more commonly in females. The impaction was found more unilaterally than bilaterally and found no significant difference on both sides in relation to the maxilla.

Discosure

All the authors declared no competing interest.

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Original Article

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Comparison of the Effects of Gjessing Sectional Canine Retraction Arch and T-loop Sectional Canine Retraction Arch at Upper Jaw

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Abstract

Background: *Two stage space closure that is, canine retraction followed by incisor retraction has been a standard practice with edgewise practioners. A variety of methods have been in use to perform bodily canine retraction in continuous archwire mechanics and also with sectional springs. Canine retraction by sectional arches is described as a non-frictional system in Edgewise mechanics and this system overcomes some problems of friction and binding of the tooth which are produced by using continuous arch systems. Different clinical investigators have attempted to define optimal force systems to prevent uncontrolled tipping, rotation of teeth and anchorage loss by using canine retraction springs. The current study was attempted to compare the rate of canine retraction & anchorage loss between T-loop and Gjessing sectional canine retraction spring in case of sectional canine retraction at upper jaw.The purpose of the study is to compare the effects of Gjessing sectional canine retraction arch and T-loop sectional canine retraction arch at upper jaw.*

Materials and methods: *This qasi experimental study was conducted at the Department of Orthodontics and Dentofacial Orthopedics at Dhaka Dental College, Dhaka, during the period from January 2022 to September 2022.20 samples were included in the study. Sample was divided into 02 groups named Group I (10 samples, Gjessing spring was used at the right side) Group II (10 samples, T-loop canine retraction spring was used on the left side). 150gm of orthodontic force was given by spring from first molar anchorage. Time required for total retraction, rate of retraction per month, anchorage loss was measured by comparing pre and post canine retraction lateral cephalometric study.*

Results: *The mean canine retraction rate in maxilla on Gjessing spring side (Right) was 1.25± 0.337 and on T-loop spring (Left) side was 1.14 ± 0.251 mm/month. The mean anchorage loss in maxilla on Gjessing spring side (Right) was 2.6 ± 1.265 mm and on T-loop spring side (Left) was 3 ± 0.943 mm.There was no significant difference of mean value of canine retraction rate and anchorage loss between Gjessing canine retraction spring and T-loop canine retraction spring in maxilla.*

Conclusion: *This study presents a comparison of the effects like, rate of canine retraction and anchorage loss between Gjessing and T-loop sectional canine retraction spring at upper jaw among the patients attending in the Department of orthodontics, DDCH.*

Key words

Edgewise mechanics; Gjessing sprin; T-loop spring.

Introduction

Most orthodontic patient's desire treatment either for crowding or anterior proclination and this may often require extraction for alignment and to correct inclination of teeth respectively.[1]

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Following the completion oflevelling and alignment, and bite opening retraction of anterior teeth into extraction spaces is initiated. It can be accomplished as either en-masse, that is all the six teeth together or in two stages that is canine retraction followed by four incisors. Two stage space closure has been a standard practice with edgewise practitioners.[2]

Space closure can be achieved by either friction (Sliding) mechanics or frictionless (Loop) mechanics. The two step retraction (Segmental retraction) approach allows retraction of canine tooth independently, followed by the incisors in a second step. Springs of various designs for canine retraction [Gjessing, Ricketts retraction, NiTi coil and T-loop spring (TLSs)] have been described and their suitability and efficacy tested.[3]

Along with canine retraction several side effects usually occurred like as, mesial root /distal crown tip, anchorage loss, distopalatal rotation of the crown and the collapse of the arch width. To minimize these side effects clinicians have researched and devised springs that generated favourable Moment:Force (M:F) ratio for distal translation of canine, enhance buccal anchorage and generate the required force for a longer time to minimize the need for frequent activation.[2]

In our study we used two different loops for canine retraction such as T-loop and Gjessing canine retraction spring.

The T-loop design generally provides a constant Moment:Force (M:F) ratio, a light and constant force throughout the entire activation range of a closing loop, and a constant low load-deflaction rate.[4]

T-loop offers higher Moment: Force (M:F) ratio,but it also require gable bends or pre activation bend for translation movement.[2]

On the other hand in case of Gjessing spring, Paul Gjessing tried to combine optimal moments in the mesiodistal and labiolingual directions for a loop working with an optimal force for a long distance.[5]

Time required for total retraction, rate of retraction per month and anchorage loss was measured by comparing pre and post canine retraction lateral cephalometric study.

Thus, the present study aims to compare the effects by using different sectional arches (T-loop and Gjessing spring) in canine retraction at upper jaw on lateral cephalogram.

Materials and methods

This quasi experimental study was carried out from January to September 2022. Participants from both genders, ranging from of 14-35 years, who was underwent orthodontic treatment with fixed orthodontic appliances and need extraction of first premolars. None of the subjects had craniofacial disorder or malformations, facial asymmetries, congenital deformity like cleft lip and palate, had history of previous orthodontic treatment or any kind of syndrome. Total 20 sample (10 participants) was recruited purposively according to patient selection criteria. Sample was divided into 02 groups named Group l (Gjessing spring used at the right side) Group II (T-loop canine retraction spring used on the left side).Written informed consent was obtained from the participants.

The upper first molars were banded. Standard Edgewise 0.018 inch slot brackets were used on the canine and the premolars.

Two sets of records were taken; the first was before the retraction spring placement and other when canine retraction was completed . Records mainly include lateral cephalogram.

To differentiate the right and left sides on the lateral cephalograms, guides made of 0.017 × 0.025 inches SS wires were placed in the molar buccal tubes and canine brackets. These indicators were placed mesial to the buccal tube and canine bracket at right side and distal to the buccal tube and canine bracket in case of left side. The guides were placed at right angles to the occlusal plane. Then took a lateral cephalogram for cephalometric analysis.

Image 1 Guides placed in canine brackets and molar buccal tubes on the right side before canine retraction

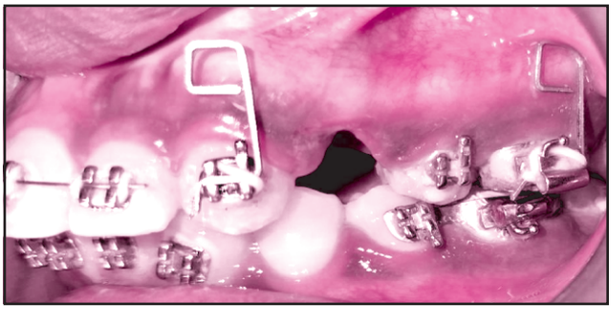

Image 2 Guides placed in canine brackets and molar buccal tube on the left side before canine retraction.

The horizontal distance was measured by using measuring scale from the Occlusal Plane Perpendicular (OLp) to the guide on the canine bracket on both sides at the beginning and end of canine retraction. The amount of canine retraction was calculated by the difference between the pre-retraction and post-retraction values. The rate of canine retraction was calculated by dividing the amount of canine retraction by time was taken for the retraction.

For measuring the amount of anchorage loss, the horizontal distance was measured by using measuring scale from the reference line to the guide on the molar buccal tube on both sides was calculated, at the beginning and end of canine retraction. The difference between the two values is the amount of anchorage loss.

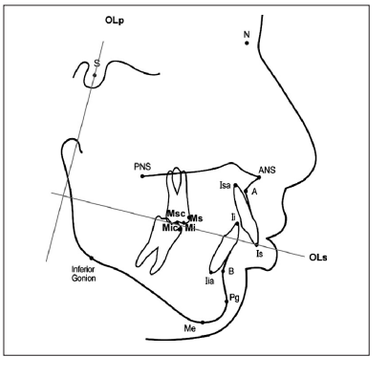

Figure 1 Cephalometric variables: OLs (OP, Maxillary occlusal plane, joining Is and the distobuccal cusp tip of the maxillary permanent first molar) and OLp (Occlusal plane perpendicular, reference line from S perpendicular to the maxillary occlusal plane).[6]

After data collection, data were analyzed using Statistical Package for Social Studies (SPSS) version 22. Shapiro-Wilk tests was done to see the normal distribution of quantitative data. Quantitative data were expressed as range, minimum, maximum, and mean±standard deviation and were presented through tables. Qualitative data were expressed as percentages and were presented in graphs. As data were normally distributed, Paired sample t-test was done to compare the data.

Results

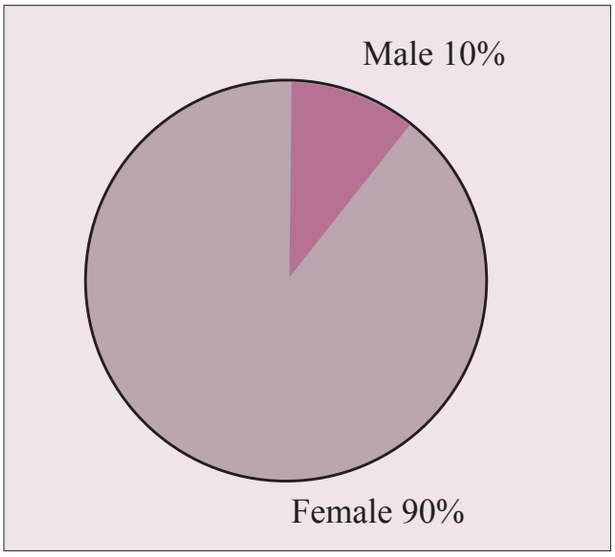

Figure 2 Percentage distribution of male and female.

Figure 2 shows the percentage of males and females. Females were more than males. The percentages of males and females were 10% (1) and 90% (9) respectively.

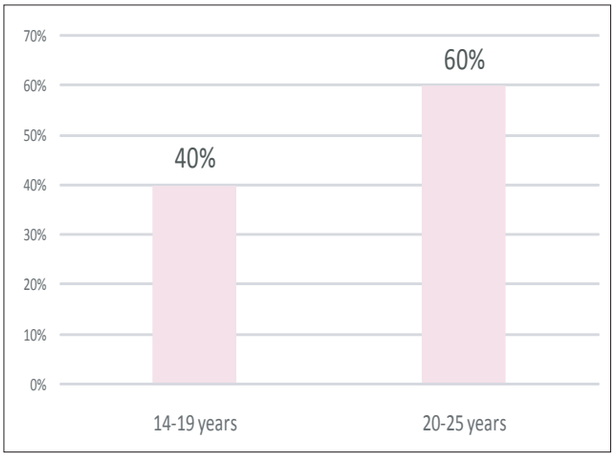

Figure 3 Percentage distribution of age groups

Figure 3, shows the percentage of patients in different age groups. More patients 60% (6) were from the age group 20-25 years and fewer patients 40% (4) were from the age group 14-19 years.

Table I Test of Normality of Data of Canine Retraction Rate and Anchorage Loss

	Shapiro-Wilk	
	Statistic	Sig.
RETRACTION RATE	.953	0.417
ANCHORAGE LOSS	.918	0.090

The test of normality shows the statistically nonsignificant values of Shapiro-Wilk tests in both retraction rate and anchorage loss data. It was concluded that both data were normally distributed (Table I).

Table II Descriptive statistics of canine retraction rate of two groups canine retraction spring (n=10 in each group)

Group	Range	Minimum	Maximum	Mean ±Std. Deviation
Gjessing canine retraction spring	0.93	0.88	1.81	1.25 ±0.337
T-loop canine retraction spring	0.90	0.63	1.53	1.14 ±0.251

Table II shows descriptive statistics (Range, minimum, maximum, mean, standard deviation) of canine retraction rate of Gjessing canine retraction spring group and T-loop canine retraction spring group. The mean ±Sd was 1.25 ±0.33 and 1.14 ±0.2514 for Gjessing canine retraction spring group and T-loop canine retraction spring group respectively.

Table III Descriptive statistics of anchorage loss of two groups canine retraction spring (n=10 in each group)

Group	Range	Minimum	Maximum	Mean ±Std. Deviation
Gjessing canine retraction spring	4	1	5	2.6 ±1.265
T-loop canine retraction spring	3	1	4	3 ±0.943

Table III shows descriptive statistics (Range, minimum, maximum, mean, standard deviation) of anchorage loss of Gjessing canine retraction spring group and T-loop canine retraction spring group. The mean ±Sd was 2.6 ±1.265 and 3 ±0.943 for Gjessing canine retraction spring group and T-loop canine retraction spring group respectively.

Table IV Comparison of canine retraction rate in between Gjessing canine retraction spring group and T-loop canine retraction spring group by paired T test

Group	Mean ±Std. Deviation	Mean difference	Std. Deviation difference	t- value	p-value
Gjessing canine retraction spring	1.25 ±0.337	0 .11	0.338	1.021	0.334
T-loop canine retraction spring	1.14 ±0.251				

p value is nonsignificant.

Table IV shows paired-T test to compare retraction rate betweenGjessing canine retraction spring and T-loop canine retraction spring. No significant (p >0.05) difference in canine retraction rate was found between two groups.

Table V Comparison of anchorage loss in between Gjessing canine retraction spring group and T-loop canine retraction spring group by paired T test.

Group	Mean ±Std. Deviation	Mean difference	Std. Deviation difference	t- value	p-value
Gjessing canine retraction spring	2.6 ±1.265	0 .40	1.349	-0.937	0.373
T-loop canine retraction spring	3 ±0.943				

p value is nonsignificant.

Table V shows paired-T test to compare anchorage loss between two-Gjessing canine retraction spring and T-loop canine retraction spring. No significant (p >0.05) difference in anchorage loss was found between two groups.

Table VI Comparison of canine retraction rate and anchorage loss in between male and female by independent sample t-test

	Gender	Mean± Std. Deviation	t-value	p-value
Canine retraction rate	Male	1.0770±.21072		
	Female	1.2087±.30455	-0.796	0.532
Anchorage loss	Male	1.9640±1.46513		
	Female	2.6667±1.02899	-0.660	0.619

In Table VI, data was expressed as mean± std. deviation. No significant difference was found in canine retraction rate and anchorage loss in between male and female groups.

Table VII Comparison of canine retraction rate and anchorage loss in different age groups by independent sample t-test.

	Age group	Mean± Std. Deviation	t-value	p-value
Canine retraction rate	14-19 years	1.0599±.25548	-1.824	0.084
	20-25 years	1.2859±.29391		
Anchorage loss	14-19 years	2.8750±.0.83452	1.034	0.321
	20-25 years	2.4107±.1.17262		

In Table VII, data was expressed as mean± std. deviation. No significant difference was found in canine retraction rate and anchorage loss in different age groups.

Discussion

Sectional retraction springs have been constructed to produce the best combination of force and moment acting on the bracket for the desired translatory tooth movement.[7-10]

On the other hand, optimum outcome of orthodontic treatment planning depends on good anchorage control. So maintaining good anchorage system from the very beginning of the orthodontic treatment is mandatory. Both intra-oral and extra-oral devices can be advocated to enhance the anchorage system.

Stoney and Smith (1952) have noticed that the burn of total extraction space can be 5% and 55% by the displacement of first molar and 2nd bicuspid while canine retraction.[11]

In the present study the effect of different sectional retraction arches was compared. Gjessing's arch and T-loop sectional canine retraction arch, were used in the same patients for retraction of the maxillary canines.

In our study we found that, canine retraction rate of Gjessing (PG) canine retraction spring group was 1.25 ±0.33 mm/month and for T-loop canine retraction spring group1.14 ±0.2514 mm/month (Table I). No significant (p >0.05) difference in canine retraction rate was found between two groups.

A study was done by Dincer et al. related to our study and found that, there was significant differences in the rate of canine retraction between two sectional canine retraction arches, that was (0.85 mm/month) for PG arch and (0.59 mm/month) with the reverse closing loop arch. Which favours the PG arch.[12]

Another similar study was done by Shijo Davis et. al. they used modified Marcotte and T-loop retraction springs. They found that, rate of maxillary canine retraction with the Marcotte spring (1.187 mm/month) and with T-loop spring (0.708 mm/month)were found to be significantly higher for MS when compared with TLS. Which favours the Marcotte spring.[3]

Peter Ziegler et al. they compare the efficiency of maxillary canine retraction by means of sliding mechanics along an 0.018-inch labial arch and an elastic chain was compared with that using the canine retraction spring designed by Gjessing. It is evident that the retraction was faster with the spring than with the sliding mechanics, the difference (0.5 mm/month) being significant.[13]

In our study we found that, anchorage loss for Gjessing canine retraction spring group was2.6 ±1.265.6mm and for T-loop canine retraction spring group 3±0.943mm(Table-III). No significant (p >0.05) difference in anchorage loss was found between two groups. (Table V)

The result of the current study conflict with the results of the study carried out by Dincer et al. though they used reverse closing canine retraction spring instead of T-loop sectional canine retraction spring. No extra-oral force or palatal/lingual arch was used in these cases like us.[12]

They found that, the average mesial movement of the first upper molars' (anchorage loss) was 1.63 mm at the PG arch side and 2.46 mm at the reverse closing loop arch side. The difference was significant.

Another study has related to the present study conducted by Shijo Davis et. al. They used modified Marcotte and T-loop retraction springs. All patients were group B anchorage cases, addressed with the use of trans palatal arches and banding of second molars. They found that, the amount of anchorage loss was significantly higher for MS.[3]

Peter Ziegler et al. they compare the efficiency of maxillary canine retraction by means of sliding mechanics along an 0.018-inch labial arch and an elastic chain was compared with that using the canine retraction spring designed by Gjessing.[13]

The first molars were stabilized with a trans palatal arch and, anchorage was reinforced by the use of standard headgear attached to the first molars with a horizontal line of traction. The headgear was worn 10 to 14 hours per day throughout the period of the experiment. At the elastic chain side and Gjessing spring side they use 380gm and 160gm force respectably.They found, the average anchorage loss was 0.4 mm on the side with the sliding mechanics and 0.6 mm on the side with a retraction spring, and the difference (0.5 mm/month) being significant.

Due to some inevitable limitations, the findings of the present study are inconsistent with the previous study done by Dincer et al. Shijo Davis et. al. and by Peter Ziegler et al.[12,3,13]

Limitations

In this study other variables (Bone density, size of extraction space, sex) was not considered. Also the type of malocclusion was not specified. Any special anchorage preparation plan like, trans palatal arch, head gear, temporary anchorage device was not considered here.So the results cannot be generalized.

Conclusion

- This study presents a comparison of the effects like, rate of canine retraction and anchorage loss between Gjessing and T-loop sectional canine retraction spring at upper jaw among the patients attending in the Department of orthodontics, DDCH.
- Both the springs showed similar type of effects in case of canine retraction rate.
- Both the spring also showed similar type of effects in case anchorage loss.
- Alternative hypothesis of this study was rejected. (There are differences in the rate of canine retraction and anchorage loss of Gjessing sectional canine retraction spring and T-loop spring sectional canine retraction spring at upper jaw).

Recommendations

- Similar type of malocclusion should be recommended for further evaluation.
- Future research could look further considering the other variables like bone density, type of malocclusion, sex to form a database regarding canine retraction & anchorage loss which can be used for future research purpose.
- Anchorage reinforcement can be considered.
- Future research could look further considering the others sectional retraction springs (Rickett's spring, Opus loop, Marcotte spring etc.).
- Future research could look further considering the lower jaw.

Discosure

All the authors declared no competing interest.

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Original Article

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Functional Outcomes Following Open Reduction and Internal Fixation of Mandibular Subcondylar Fractures Using Double Miniplates

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Abstract

Background: *Mandibular subcondylar fractures account for 34-45% of mandibular injuries, with single miniplate ORIF prone to complications like plate fracture and malocclusion, compromising functional outcomes (Occlusion, mobility, pain-free movement). Double miniplates offer superior stability and reduced complications, but comprehensive functional recovery data are limited. This study aims to evaluate functional outcomes following ORIF of subcondylar fractures using double miniplates.*

Materials and methods: *This experimental study was conducted in the Department of Oral and Maxillofacial Surgery, Dhaka Dental College and Hospital, Dhaka, over one year from June 20, 2021, to June 19, 2022, enrolling 35 adults (≥18 years) with bilateral non-comminuted subcondylar fractures. Data were analysed with descriptive statistics and chi-square test ($p<0.05$) via SPSS v25.*

Results: *After six months of follow-up, 68.6% (n=24) of patients achieved full recovery, with no significant association between fracture position and outcome ($p=0.576$) among them, 58.3% of displaced, 33.3% of deviated and 8.4% of dislocated cases showed complete recovery. Transient facial nerve weakness occurred in 8.6% of patients as the only reported complication.*

Conclusion: *Double miniplate ORIF yields excellent functional outcomes, with rapid resolution of deficits and minimal complications, supporting its superiority for subcondylar fractures.*

Key words

Double miniplates; Functional Outcomes; Mandibular Mobility; ORIF; Subcondylar Fracture.

Introduction

Traumatic injuries to the face frequently involve the mandible, with the condylar region representing a highly susceptible site for fracture, accounting for 34-45% of cases.[1,2] In developing nations, road traffic accidents serve as the primary aetiology of such maxillofacial trauma, while interpersonal violence predominates in developed and Western countries. The overarching goal of managing these fractures through open reduction and internal fixation is to achieve optimal functional outcomes, thereby preventing complications such as loss of overall jaw function, aesthetic disfigurement, and dental malocclusion. These outcomes encompass the restoration of mandibular mobility, occlusion stability, and pain-free jaw movements, which are vital for daily activities like eating and speaking. The decision for surgical intervention is often influenced by factors including fracture displacement, dislocation, and existing mandibular dysfunction.[2] Additional considerations, such as the size and position of the condylar segment, patient's age, general health status, and surgeon's experience, further shape the treatment pathway, all aimed at maximising long-term functional recovery. Traditionally, open reduction and internal fixation of subcondylar fractures has commonly utilised a single miniplate system, based on the principles outlined by Malik.[3] This approach involves exposing the condyle via various surgical incisions, such as preauricular, endaural, Risdon's, submandibular, retromandibular, rhytidectomy, or intraoral methods.[4,5] However, this approach has demonstrated inherent disadvantages that directly impact comprehensive functional outcomes. Documented complications such as plate fracture, plate bending, screw loosening, and jaw deviation can compromise the stability of the fixation.[4-7] These issues can hinder the restoration of proper occlusion and coordinated mandibular movements, ultimately leading to suboptimal long-term jaw performance and a reduced quality of life. For instance, instability may result in persistent mandibular dysfunction or deviation during function, prolonging rehabilitation and affecting the patient's ability to return to normal activities. In an effort to achieve more robust stability and superior functional outcomes, some literature has advocated for the utilisation of two miniplates for condylar fracture fixation[8,9]. In vitro

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studies have specifically demonstrated that a two-miniplate system, when strategically applied to the anterior and posterior regions of the condylar neck, provided greater biomechanical stability compared to a single plate system.[7] While earlier research noted potentially longer operating times and increased costs, significantly, an absence of complications was reported among patients treated with two plates, suggesting that this method offers a more stable osteosynthesis solution.[10] This enhanced stability and reduced incidence of plate-related complications are fundamental for promoting earlier and more reliable jaw function, directly contributing to improved functional outcomes. By ensuring better fracture alignment and load distribution, the double miniplate technique supports quicker adaptation of the temporomandibular joint, minimising risks of chronic issues like malocclusion or limited excursion. Given the ongoing clinical debate regarding optimal fixation strategies and the recognised limitations of single-plate systems in consistently achieving ideal functional results, this study aims to evaluate the comprehensive functional outcomes following open reduction and internal fixation of mandibular subcondylar fractures using double miniplates. By assessing various aspects of overall jaw performance, including occlusion, range of motion, and pain levels, this research seeks to determine if this method leads to superior functional restoration and an enhanced quality of life for patients.

Materials and methods

This experimental study was conducted in the Department of Oral and Maxillofacial Surgery, Dhaka Dental College and Hospital, Dhaka, over one year from June 20, 2021, to June 19, 2022. A total of 35 patients were included in the study in the study were those aged 18 years or older, with clinically and radiologically confirmed bilateral non-comminuted mandibular sub-condylar fractures, with or without condylar dislocation and associated symphysis or para-symphysis fractures.

Open reduction and internal fixation were performed via an extraoral approach and double miniplates were used for fracture part fixation in all cases.Postoperative evaluations were carried out at one week, one month, three months, and six months to assess, pain, mouth opening, Temporomandibular Joint (TMJ) function, occlusal stability, and mandibular movements.

Data were analysed with descriptive statistics and chi-square test ($p<0.05$) via SPSS v25.

Results

Table I Age distribution of the study patients (n=35)

Age group (Years)	Frequency (n)	Percentage (%)
19 to 29	11	31.4
30 to 40	17	48.6
>40	7	20
Mean±SD	32.1±9.1	
Total	35	100

Table I shows that the mean age of the patients was 32.1±9.1 years. The majority (48.6%) of the patients were aged between 30 to 40 years, followed by 21.4% aged between 18 to 29 years, and 20% were above 40 years.

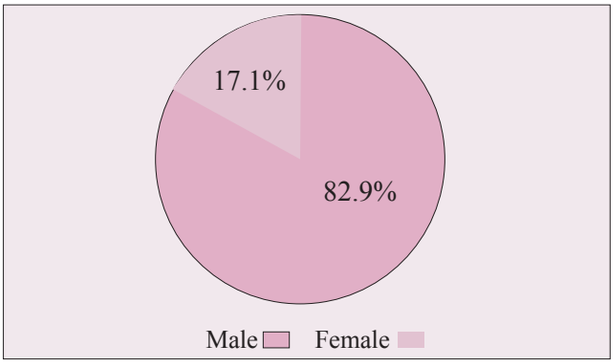

Figure 1 Distribution of the patients by Gender (n=35)

Among all the patients, 82.9% were male and 17.1% were female.

Table II Aetiology of the fracture among the study patients (n=25)

Etiology	Frequency (n)	Percentage (%)
Road traffic accident	23	65.7
Fall from one level to another	5	14.3
Assault	4	11.4
Fall on a level surface	1	2.9
Others	2	5.7
Total	35	100

Table II shows that among all, 65.7% had fractures due to road traffic accidents, 14.3% had fractures due to falls from one level to another, and 11.4% of the patients had fractures due to assault. Besides, 2.9% said fall on a level surface and 5.7% said other types of causes for fracture.

Table III Pre-operative assessment among the patients (n=35)

	Pre-operative assessment	
	Frequency (n)	Percentage (%)
Pain at rest	30	85.7
Occlusion		
Normal	7	20
Malocclusion	28	80
Protrusion		
≥7mm	6	17.1
3-6mm	3	8.6
<3mm	26	74.3
Lateral excursion		
3-6mm	5	14.3
<3mm	30	85.7
Mouth opening		
>40mm	5	14.3
30-39mm	14	40.0
<30mm	16	45.7

Table III demonstrates that the majority (85.7%) of the patients had H/O pain at rest, 74.3% had protrusion <3mm, 85.4% had lateral excursion <3mm and 45.7% had mouth opening <30mm. Among all, 80% had malocclusion.

Table IV Post-operative assessment among the patients after 1week, 1 month, 3 months, 6 months (n=35)

Variables	Outcomes after 1 week	Outcomes after 1 month	Outcomes after 3 months	Outcomes after 6 months
Pain at rest	16(45.7%)	9(25.7%)	0 (0%)	0 (0%)
Occlusion				
Normal	29(82.9%)	32(91.4%)	35(100%)	35(100%)
Malocclusion	6(17.1%)	3(8.6%)	0 (0%)	0 (0%)
Protrusion				
≥7mm	6(17.1%)	19(54.3%)	28(80%)	29(82.9%)
3-6mm	7(20%)	10(28.6%)	7(20%)	6(17.1%)
<3mm	22(62.9%)	6(17.1%)	0 (0%)	0 (0%)
Lateral excursion				
≥7mm	2(5.7%)	13(37.1%)	26 (74.3%)	28(80%)
3-6mm	9(25.7%)	12(34.3%)	7(20%)	5(14.3%)
<3mm	24(68.6%)	10(28.6%)	2(5.7%)	2(5.7%)
Mouth opening				
>40mm	2(5.7%)	18(51.4%)	21(60. 0%)	28(80%)
30-39mm	22(62.9%)	14(40%)	12(34.3%)	5(14.3%)
<30mm	11(31.4%)	3(8.6%)	2(5.7%)	2(5.7%)
Facial nerve function				
No-dysfunction	28(80%)	28(80%)	31(88. 6%)	32(91.4%)
Dysfunction (Temporary)	7(20%)	7(20%)	4(11. 4%)	3(8.6%)
Infection	0 (0%)	3(8.6%)	0 (0%)	0 (0%)
Screw loosening and plate bending	0 (0%)	0 (0%)	3(8.6%)	0 (0%)

Table IV illustrates that after 1 week, 1month, 3 months, 6 months follow-up, 0% of the patients had H/O pain at rest, 82.9% had protrusion ≥7mm, 80% had lateral excursion 7mm, 80% had mouth opening >40mm and 91.4 of % patients had no facial nerve dysfunction. Among all, 100% had normal occlusion and no sign of infection, no screw loosening after 6months of follow-up.

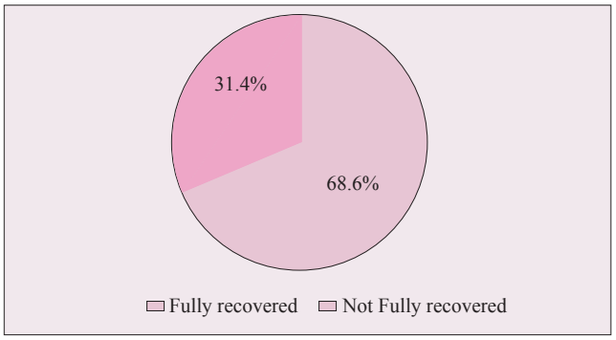

Figure 2 Outcome of the patients after 6 months of follow-up (n=35)

Figure 2 displays that, depending on gaining normal mouth opening and nerve function along with no history of pain, among all the patients, 68.6% were fully recovered. Whereas, 31.4% of the patients had either restricted mouth opening, abnormal nerve function, or a history of pain.

Discussion

This prospective study of 35 patients with mandibular subcondylar fractures treated via double miniplate fixation revealed robust functional recovery and minimal complications, aligning with contemporary evidence. The cohort's mean age of 32.1±9.1 years reflected a middle-aged predominance (48.6% aged 30-40). Shindy et al. documented similar age distributions in their randomised trial, while findings from Kim et al. further support this demographic pattern.[11,12] Male predominance (82.9%) characterised our patient population, consistent with the gender distribution reported by Liao and colleagues, likely tied to cultural and occupational risks prevalent in Bangladesh, where males face greater exposure to outdoor and labour-intensive environments.[13] Road traffic accidents dominated the aetiology (65.7%), followed by falls (14.3%) and assault (11.4%). Our results parallel the trauma patterns observed by Singh et al. who reported comparable distributions in their three-year analysis of mandibular fractures.[14] According to Wang et al. these regional patterns differ significantly from Western populations, a conclusion further strengthened by epidemiological data from Chen and colleagues, who identified demographic variations across different geographical settings.[15,16] Preoperatively, patients demonstrated severe functional deficits: 85.7% reported rest pain, 80% presented with malocclusion, 74.3% showed protrusion less than 3mm, and 85.7% exhibited lateral excursion under 3mm. Similar impairments were documented by Wang's team in their comprehensive preoperative assessment protocol.[15] Mouth opening was severely restricted in 45.7% of cases (<30mm) consistent with baseline measurements from multiple comparative studies. The postoperative course revealed progressive improvements: pain at rest declined from 45.7% at one week to complete resolution by three months, while malocclusion resolved entirely in most cases. Mouth opening exceeding 40mm increased dramatically from 5.7% at one week to 80% at six months, validating Rai's conclusion that double plate techniques provide superior stability compared to single-plate approaches.[17] Meyer et al. reported comparable functional recovery trajectories in their clinical series using specialised TCP plates, with excellent mouth opening recovery in 92% of their cohort.[18] Complications remained transient and manageable. Temporary facial nerve dysfunction affected 20% initially but decreased to 8.6% by six months. This pattern aligns with observations by Lee's group, who documented similar rates in their four-year retrospective analysis.[19] Infection occurred in 8.6% of patients but resolved with antibiotics.

Screw loosening was identified in 8.6% without long-term consequences, consistent with biomechanical expectations outlined in Huang's comprehensive analysis.[20] Rozeboom and colleagues specifically noted comparable complication rates in their review of extraoral approaches for condylar fixation.[21] By six months, 68.6% of patients achieved complete functional recovery, defined by normalised mouth opening, protrusion and lateral excursion, while 31.4% maintained minor limitations. Age-related factors likely influenced recovery trajectories, as suggested by Spinzia et al. whose long-term follow-up demonstrated similar patterns.[22] Clark's research team provides a biological explanation for these observations, linking delayed healing to age-related declines in osteochondral stem cell proliferation and differentiation capacity.[23] Comparative outcomes reported by Khandeparker and associates reinforce our findings, as they similarly documented excellent functional results in over 65% of patients treated with double miniplate fixation.[24]

Limitations

This single-centre study with six-month follow-up limits generalizability due to small sample size, absence of a control group, and potential selection bias. Long-term outcomes and multicenter validation are needed for broader applicability.

Conclusion

This study highlights the outstanding success of double miniplate ORIF for mandibular subcondylar fractures, achieving 68.6% full functional recovery at six months with progressive normalisation of occlusion, mouth opening (>80% >40 mm) protrusion and lateral excursion, alongside negligible complications. It establishes this technique as a highly effective, reliable method for restoring optimal jaw function.

Recommendation

The use of double non-compression miniplates for ORIF in mandibular subcondylar fractures is recommended to enhance recovery, minimize complications and improve patient well-being. Multicenter randomised controlled trials are crucial for enduring validation and guideline unification.

Discosure

All the authors declared no competing interest.

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Case Report

Chattagram International Dental College Journal

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Management of Skeletal Class III of a Growing Aged Patient with Reverse Pull Head Gear

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Abstract

Background: *Skeletal Class III malocclusion is one of the most difficult orthodontic problems to treat. Growing individuals with skeletal Class III malocclusion in presence of maxillary deficiency or mandibular excess or combination of both is a severe skeletal problem. Correction of maxillary deficiency and mandibular excess in a growing skeletal Class III patientis a challenging work. Management of such cases requires an integrated treatment plan including growth modification, dental camouflageor orthognathic surgery. In a growing patient, orthopedic correction of skeletal Class III malocclusion with the help of a reverse pull head gear is crucial a sit can reduce the chances of further surgical treatment to correct the skeletal discrepancy. The present case is a growing Bangladeshi male patient, aged eight years, who had a skeletal Class III malocclusion with retruded maxilla. In this case reverse pull head gear was use for correction of skeletal Class III with maxillary discrepancy. At the end of treatment an improvement in the facial profile was observed and skeletal as well as occlusal correction was achieved.as well a significant improvement in the patient's confidence and overall quality of life.*

Case Presentation: *An 7-year-old growing male patient came to the Orthodontic Department of Chattogram International Dental College on 10th February 2023 with chief complaints of upper front teeth cover the lower teeth. Extraoral examination showed-mesocephalic symmetrical face with concave profile and deficient maxilla. Growing skeletal Class III malocclusion with retruded maxilla was managed by reverse pull head gear.*

Conclusion: *The present case study shows the correction of skeletal Class III in a seven-year-old male with reverse pull head gear.*

Key words

ClassIII; Mandibular excess; Maxillary deficiency; Reverse pull head gear.

Introduction

The skeletal Class III malocclusion is characterized by mandibular prognathism and/or maxillary deficiency, clinically, these patients exhibit a concave facial profile, a retrusive nasomaxillary area and a prominent lower third of the face. The lower lip is often protruded relative to the upper lip. The upper arch is usually narrower than the lower and the overjet and overbite can range from reduced to reverse.[1] Class III malocclusion may have under developed maxilla, over developed mandible or a combination of both, dentoalveolar components with proclined maxillary incisors and retroclined mandibular incisors,to achieved entoalveolar compensation.[2] Management of Class III malocclusion is one of the most difficult problemsin the mixed dentition, often resulting in anterior and posterior cross-bites.[3] Class III malocclusionis commonly associated with a variety of environmental and genetic factors.[4,5] Prevalence of skeletal Class III malocclusion is greater among the Asian population as compared to Caucasians.[6] The main goal of early treatment of Class III malocclusionis facilitating a more favorable environment for normal growth and on improving the psychosocial development of the child.[7] Early management of skeletal class III by reverse pull head gear and /orchin cup therapy, improves the skeletal relationships, which inturnminimize excessive dental compensation such as overclosure of the mandible and retroclination of the mandibular incisors. Also correction of the anterior and posterior cross bite and avoids adverse growth potential. Early orthodontic or orthopedic treatment in mild and moderate class III patients may eliminate the necessity for orthognathic surgery. Treatment with reverse pull head gear and/orachin cup improves the lipposture and facial appearance.[8, 9]

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Case Presentation

An 7-year-old growing male patient came to the Orthodontic Department of Chattogram International Dental College on 10th February 2023 with chief complaints of upper front teeth cover the lower teeth.

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Extraoral examination showed-mesocephalic symmetrical face with concave profile and deficient maxilla [Figure 1].

Intraoral examination showed-mixed dentition, Class III molar relationship, anterior cross-bites along with a reverse overjet of 4 mm. Our treatment goal was to address the patient's primary complaint and the treatment plan was tailored to the patient's specific needs.

Figure 1 Pre-treatment extra-oral and intra-oral photograph

Treatment Objectives

- Protraction of maxilla
- Establish positive overjet
- Correction of Class III skeletal relationship
- Improve aesthetic

Treatment Plan

- Maxillary protraction with reverse pull head gear

Treatment Done

Intra oral splint construction

Occlusal splint was constructed with acrylic. The acrylic component ofthe plate was approximately 2 mm thick, covering the teeth from the deciduous canines to the first permanent molars, leaving a 1 mm clearance at the gingival margins on thebuccal. Hooks were positioned between the deciduous canines and the first molars.

Biomechanics

Amount of Force : Use 350 gm per side.

Direction of Force: 15-20 degree downward to the occlusal plane.

Frequency of Use : 12-14 hours per day.

Duration of Treatment: Take 7 month to produce desire result.

Figure 2 Treatment progress photograph

Figure 3 Post-treatment extra-oral and intra-oral photograph

Figure 4 Pre and post treatment extra-oral and intra-oral photograph

Discussion

Orthodontic orthopedic appliances are used in growing patient to correct skeletal discrepancy. Reverse pull Head gear was used in the present case, in a growing child, to correct skeletal Class III malocclusion due to maxillary deficiency. The reverse pull head gear provides a direct anterior force leading to down ward and forward displacement of the maxilla.[10] Reverse pull head gear allows the mandible to rotate down ward and back ward, increasing the lower facial height and acting as a major contributing factor in establishing a positive overjet. Maxillary protraction usually requires 300 to 600g of force per side,12-14 hours a day, depending on the age of the patient.[11,12] The facemask/reverse pull head gear projectsa downward and forward pull on the maxilla with protraction elastics attached near the maxillary canines, with a downward and forward pull of15° from the occlusal plane. The treatment was done in early mixed dentition to facilitate forward displacement of the maxilla by sutural growth.[13] Modification of occlusal splint was doneto provide rapid maxillary expansion to loosen the circummaxillary sutures.[14-19] Combination of rapid maxillary expansion and facemask therapy produces more favorable outcomes in patients treated in the deciduou so

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rearly mixed dentition than in late mixed dentition with respect to untreated Class III controls.[20-22]

Orthopedic correction of skeletal Class III malocclusion with the help of are verse pull head gear in a growing patientis crucial as it helps in achieving a better esthetic profile and reduces the chances of further surgical treatment to correct the skeletal discrepancy.

Conclusions

Skeletal Class III malocclusions due to a maxillary deficiency in a growing individual can be successfully treated with reverse pull head gear/facemask to achieve the desired orthopedic effect. Case selection, patient cooperation and long-term retention ensure ideal treatment results and stability. This treatment protocol is considered to be more effective in the early-mixed dentition as compared to late-mixed dentition and minimize the chances of further surgical treatment for correction of skeletal discrepancy.

Discosure

All the authors declared no competing interest.

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Case Report

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Endodontic Management of a Submandibular Abscess with a Subcutaneous Sinus: A Case Report Using a Recently Modified Treatment Plan

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Abstract

Background: *Chronically draining cutaneous sinus tracts are a common symptom of pulpal necrosis with periapical pathosis that requires endodontic therapy to resolve. However, it is frequently misinterpreted as cutaneous lesions and treated inappropriately. Extra-oral cutaneous sinus tract of dental origin is a rare yet serious clinical disease that is frequently misdiagnosed due to its unusual presentation. It is typically caused by a chronic periapical infection and is frequently treated incorrectly with medications or surgical excision. Proper diagnosis and endodontic treatment for the troublesome tooth can result in complete resolution without the need for surgical intervention.*

Case Presentation: *A 15 years old boy reported to the Department of Conservative Dentistry and Endodontics, Chattagram International Dental College and Hospital on 10 August 2025 with the chief complaint of pain and swelling in the lower right back tooth region. The patient had a history of intermittent discharge and fever. Clinically, this tooth had mild intense pain and it was hypersensitive to percussion. On extra oral examination revealed a diffuse swelling in the right side of the face near the submandibular region which was erythematous and draining pus. Preoperative periapical radiographs showed there was an evidence of dental caries which involved the pulp in the region of 47 along with an ill-defined periapical radiolucency surrounding the apical area of An instance of chronic periapical abscess with extra oral sinus in mandibular right second molar was diagnosed. This presented case, molar, managed using calcium hydroxide in multiple siting. A non-surgical endodontic management of extra oral sinus in the lower right mandibular second managed by using Bioceramic based material with multiple irrigation solution in recent updated protocol in multiple visit.*

Conclusion: *Extra-oral sinus tracts can be effectively treated without surgery with prompt non-surgical endodontic therapy and accurate radiographic imaging diagnosis.*

Key words

Bio active material; Chlorhexidine gluconat; Potaper file; Sub mandibular abscess; sub cutaneous sinus tract.

Introduction

The sinus tract is characterized as a route that connects a confined area of inflammation to the epithelial surface. The aperture of the sinus tract might be placed intraorally or extraorally.[1] The sinus tract arises more frequently from periapical lesions induced by mandibular teeth 80% than from those generated by maxillary teeth 20%, and this is primarily the appearance of cutaneous sinus tract of dental origin in the submental and submandibular regions.[2,3] Studies have showed that extra-oral sinus tracts are most typically located on the cheek, chin, and angle of the jaw.[4,5,6] The placement of the tooth, its relationship to the muscle attachments, and the location of the inflammatory hole in the cortical bone determine whether the sinus tract opens into the intraoral or extraoral region.[7] Lesions do not necessarily originate from the affected tooth and are frequently detected on the chin or jaw line as they follow the path of least resistance.[8,9] These abscesses are caused by bacterial invasion, chemical irritation, or trauma. These cutaneous lesions frequently appear as a result of bacterial invasion of the dental pulp through a rupture caused by trauma or carious defects.[10]

Furthermore, odontogenic infections with drainages can lead to misdiagnosis and, in certain cases, dermatological illnesses are incorrectly diagnosed. It may result in unneeded treatment, such as surgical procedures and long-term antibiotic therapy, before the accurate diagnosis can be determined.[11-14] Even a skin biopsy could leave needless scars. However, the identification of this entity results in a straightforward and efficient treatment that involves removing the infected pulp canal tissue, leaving little to no cutaneous scarring. These skin lesions typically develop as a result of bacterial invasion of the dental pulp following a carious defect or trauma-induced rupture.[10] Microorganisms and their byproducts found in the necrotic and infected pulp spread beyond the confines of the tooth into the periradicular area, potentially perforating the cortical plate through inflammatory and immunological processes, with the infection draining onto the intraoral mucosa or cutaneous surface, resulting in scarring or pimples of skin.[15] This type of infection caused by tooth caries spreads periapically and involves

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the alveolus, resulting in the creation of a sinus tract. Intraoral sinus tract infections are common in relation to chronic tooth infections, however sinus infections that drain extra orally through the skin are uncommon and are sometimes misinterpreted as dermatologic infections. In such cases, the patient typically seeks the opinion of a general practitioner rather than a dental clinician. Treatment for extraoral sinus fails and reoccurs even after surgical excision of the lesion with repeated antibiotic regimens because general practitioners treat patients without treating the primary dental etiology when the tooth is asymptomatic. For the lesion to be properly managed, either by non-surgical root canal therapy or root canal therapy with or without surgical excision, it is crucial to identify the right cause.[16] In this case, the young patient was diagnosed with extra oral sinus in relation to an infected mandibular right second molar tooth and successfully managed with non-surgical root canal treatment using bioactive material, resulting in complete dramatic healing of the periradicular lesion and cutaneous extra oral sinus.

Case Presentation

A 15 years old boy reported to the Department of Conservative Dentistry and Endodontics, Chattagram International Dental College and Hospital on 10th August 2025 with the chief complaint of pain and swelling in the lower right back tooth region. History revealed that the patient had pain on the lower left back tooth region which was intermittent and which aggravated on chewing food for the past 2 month, history also revealed that patient had symptoms of fever which subsided after medication. Patient also presented with a history that the swelling on face started only 5 days ago. No relevant medical history was found. On extra oral examination revealed a diffuse swelling in the right side of the face near the submandibular region which measure approximately 1 X 1.5 cm in size (Fig 2). The skin around the swelling was erythematous. On palpation the swelling was tender, firm in consistency with pus discharge. The patient revealed that the lesion appears and disappears alternatively for the past 2 month. Intraorally, there was a carious lesion in the left mandibular second molar and restoration in right mandibular second molar. The tooth was mild tender on percussion and it did not respond to heat and electric pulp testing. On radiographic examination, revealed that there was an evidence of dental caries which involved the pulp in the region of 47 along with an ill-defined periapical radiolucency surrounding the apical area of 47, it also revealed loss of lamina dura and widening of periodontal ligament (Fig 3). It was provisionally diagnosed as apical periodontitis leading to periapical abscess with extra oral sinus in mandibular right second molar.

The patient was informed of the risks and benefits of all available treatment choices, including extraction, but ultimately chose the latter. Preoperative disinfection was carried out using 1% Viodine (Square Pharmaceuticals Ltd, Bangladesh) after local debridement of plaque and calculus. An endodontic treatment was initiated, access opening was done in 47 using endo access bur (Dentsply Sirona, Switzerland) after canal orifice were located using DG16. The canals were enlarged with Protaper (Dentsply Sirona, Switzerland) Sx file, then with K-File #10 (Dentsply Sirona, Switzerland) Followed by #15 the glide path was obtained. Working length was determined using Radiographic method as well as apex locator (Apex ID, Karr Dental, USA), working length 21.5mm for mesiolingual and 22 for mesiobuccal canal, 22mm for distal canal. Cleaning and shaping were done using protaper universal till size F2 and irrigation was done by 5.25% NaOcL, 17% EDTA and followed by final irrigation using 2% chlorhexidine gluconate (CanalPro 2%. Coltene, USA). Bio C Temp (Angelus, Londrina – PR, Brasil) as Intra canal medicament was placed and radiograph was taken (Fig 4).

On the second appointment, the extraoral and intraoral sinuses were clinically observed to have diminished. The canals were reopened, watered and activated with EDTA as Na0cl individually, then dried with a paper point. F2 master cones were installed in mesiobuccal and mesiolingual canals (Fig 5). IOPA was taken and obturation was done using Bio C Sealer (Angelus, Londrina – PR, Brasil) seal and MTA Apical plug (Bio-C Repair Angelus, Lindoia, Londrina – PR, Brasil,) was placed using stainless steel hand pluggers that fits 0.5mm from the apex with the help of the plugger minimize voids during MTA packing specially in the distal canal due to large apical opening also back filled with thermo-plasticized gutta perchaand the other two canal were sealed with sealer and GP point and a radiograph was taken (Fig 6). Clinical and radiographic examinations conducted two months later showed that the additional oral sinus had disappeared and that the periapical disease had completely healed in respect to 47. After the endodontic procedure was finished, a nano-filled composite filling (Surefill, Dentsply, Switzerland) was used for the post-endodontic restoration.

Figure 1 A larger carious lesion was observed on intra oral examination

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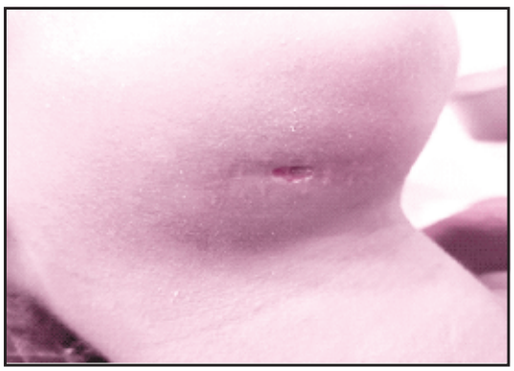

Figure 2 Extra oral sinus tract was observed

Figure 3 Optimum healing was observed after 14 days application of Bio C Temp as intra-canal medicament

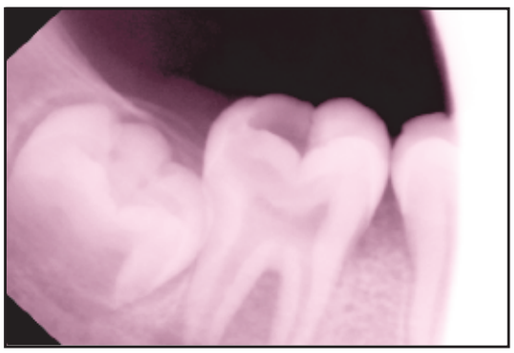

Figure 4 Preoperative Xray

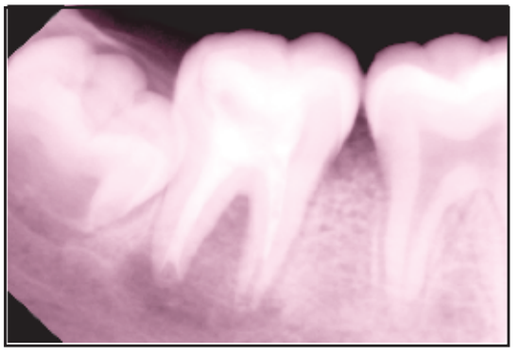

Figure 4a Application of bioceramic based intracanal sealer

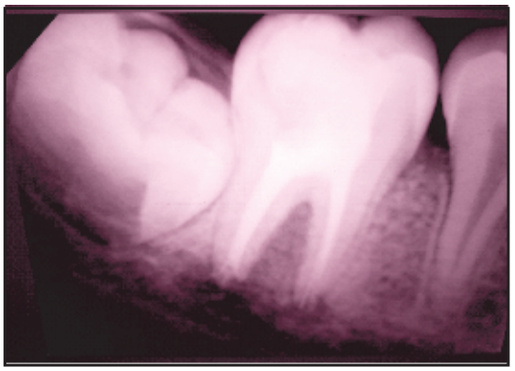

Figure 5 Per operative xray

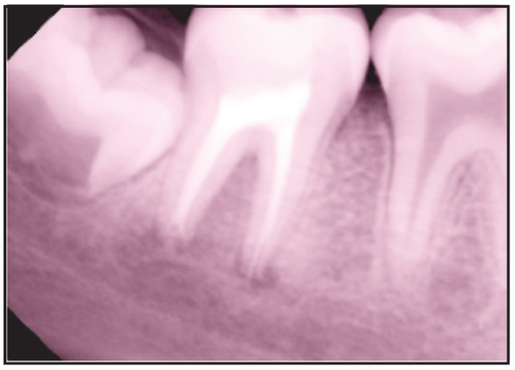

Figure 6 Followup xray after 2 month

Figure 7 Healing was observed after 1 months

Figure 8 Post endodontic restorstion

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Discussion

An extra oral sinus of odontogenic origin might be caused by a prolonged inflammation of pulpal origin.[17] The purulent discharge of the odontogenic infection will follow the path of least resistance from the periapical area. After the cortical plate is breached, the sinus tract exits as an intraoral or extraoral sinus, depending on the position of the muscle attachments and fascial sheaths. Chronically draining cutaneous sinus tracts are frequently misdiagnosed and incorrectly treated since there is no intraoral swelling or pain.[18] Nevertheless, a dental infection should be suspected as the main cause of chronic draining cutaneous sinus tracts of the face and neck doctors tend to ignore it, but dentists do not, nonetheless, many afflicted patients first seek treatment from a doctor.[19,20,21] The extraoral sinus is commonly associated with chronically infected pulp. It is followed by necrozed pulp, periapical inflammation, destruction of the alveolar bone and cortical plate, spreading over the face plane of muscles, and lastly draining through the skin. It is critical to accurately diagnose such cases by taking a proper history, conducting clinical and radiological investigations and being familiar with involved oral structures in order to provide a good prognosis with complete sinus tract healing. The main consideration in diagnosis is dental origin. The patient is usually asymptomatic because of the sinus tract's safety valve function, which allows inflammatory materials to drain. Culture sensitivity testing can help with correct diagnosis.[22] However, in particular, F. nucleatum and P. gingivalis are linked to sinus tract diseases.[23] Non-surgical endodontic treatment, similar to root canal therapy, entails correct cleaning, shape and disinfection of the root canal, which eliminates the source of infection, debris and germs, resulting in complex healing of periapical lesions and the extra-oral cutaneous sinus tract. Previous research suggests that RCTs should be conducted with single or several visits because bacteria must be eliminated as an intra-canal treatment using calcium hydroxide. However, in the realm of endodontics, a revolution has occurred in the use of novel intracanal materials. Hydraulic materials, also known as hydraulic silicate-based materials or Bioactive Cements (BECs) are novel materials that leach ions and may impact reparative/regenerative reactions.[24] These new materials improve mineral trioxide aggregate MTA-based products by reducing downsides such as teeth discolouration, difficulty handling, extended setting times, and the release of heavy metal ions.[25,26,27] Recently, new materials, Bio C temp, Bio-C Repair (Repair cement) and Bio-C Sealer (Endodontic sealer) (Angelus, Londrina, PR, Brazil) were introduced to the market as premixed bioceramic materials with the same biological interactions as mineral trioxide aggregate but with improved manipulation and insertion capabilities. These materials contain calcium silicates, which are hydrated by contact with the local humidity, forming a hydrated calcium silicate structure and calcium and hydroxyl ions, with zirconium oxide as a radiopacifier.[28]

BIO C Repair was employed as a root-end bioactive filling material due to its good sealing ability, antibacterial effects, biocompatibility, and cementogenic effects. Furthermore, it has been demonstrated that, when compared to Mineral Trioxide Aggregate (MTA) BIO C Repair apical plug has higher sealing ability. When BIO-C REPAIR comes into touch with moisture or tissue fluids, active ions are released that interact with the organic and inorganic dentin matrix, supporting the establishment of an intermediate area known as the Mineral Infiltration Zone (MIZ). This area of mineral infiltration in the dentin creates an excellent biological seal, reducing the possibility of bacterial infiltration and endodontic failure. As a result, BIO C Repair was employed to seal the root-end cavity in this situation.[29] Bioceramic endodontic materials have emerged as an alternative cement that can be employed for repair due to the limitations of MTA.[30,31] Compared to the other biomaterials, which are primarily constituted of oxygen and calcium, Bio-C Repair was shown to be primarily composed of carbon (34.81%) and oxygen (34.51%) with a lower proportion of calcium. This particular composition of Bio-C Repair may be linked to a greater ability for tissue repair because Bio-C Sealer, an endodontic sealer, also contained a higher quantity of calcium.[32] This result supports earlier research where Bio-C Repair outperformed Bio-C Sealer in terms of viability, adhesion and cell migration rates.[33] We used Bio C Temp, Bio C sealer and Bio C repair material in the case that was presented. On the other hand, CHX is a broad-spectrum antimicrobial agent, which is effective against Gram-positive and Gramnegative bacteria and yeasts. Due to its cationic property, it attaches to the tooth structure and hydroxyapatite, causing its optimal substantively.[34] The period of exposure and the concentration of CHX have a significant impact on its antibacterial action. One significant disadvantage of calcium hydroxide is its failure to remove Enterococcus faecalis. Evidence suggests that CHX can successfully eradicate the Enterococcus faecalis biofilm from the root canal system when administered as an intracanal irrigation.[35,36] In the entirety of our reported cases, 5.25% NaOCl, 17% EDTTA and 2% CHX was utilized as an intracanal irrigating solution, and a mixture of bioceramic based material like BIO C Temp was employed as an intracanal medicament till the healing of the extraoral sinus tract. Bio-C Temp Angelus is a ready-to-use bioceramic paste (Tricalcium silicate) used as an intracanal dressing in endodontics, offering a gradual, long-lasting release of hydroxyl ions for antibacterial action, promoting tissue repair and ideal for treating necrotic teeth, perforations and resorptions, providing a more stable pH and longer effect than traditional calcium hydroxide pastes. If the origin of an extraoral sinus tract is correctly recognized, it is expected to heal and disappear within 14 days. Similar to the other reported cases, the current case was conducted in an aseptic setting using an appropriate biomaterial with antibacterial properties, and no antibiotics were recommended because the patient had no systemic diseases. Follow-up investigations in all cases

revealed clinical sinus tract healing, whereas periapical radiography revealed healing of the periapical lesion and relief of signs and symptoms. In the presented example, only two months of radiological follow-up revealed increased bone healing; nevertheless, the patient should be followed for a longer amount of time to reach a more conclusive conclusion about the efficacy of such therapy. However, in the reported case, there was a scar from previous surgical procedures at the spot. Cosmetic surgical procedures or laser therapy may be recommended for these patients. It is clear that early correct diagnosis, proper treatment protocol-assisted process, and elimination of the major source of infection will result in success and a favorable prognosis.

Conclusion

This case study demonstrated the conservative management of extraoral sinuses using recently developed bioactive material with adequate diagnostic and treatment planning. The extraoral sinus in the case study was successfully treated with non-surgical endodontic therapy, however the patient's own carelessness caused significant suffering. Today's improved treatment modalities can be effectively managed in a single or multi-visit procedure by removing the primary etiology without the need for intra-canal medication. This is accomplished through accurate diagnosis, radiographic interpretation and the appropriate use of materials, armamentarium and techniques.

Discosure

The author declared no competing interest.

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