

“COMPARATIVE EVALUATION OF RATE OF CANINE RETRACTION IN CORTICOTOMY FACILITATED ORTHODONTICS AND PIEZOCISION TECHNIQUE IN ADULT POPULATION” – PROTOCOL FOR A IN VIVO STUDY

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Abstract: Background: Accelerated orthodontics aimed at reducing orthodontic treatment duration. The main setback that occurs in the treatment of patients who require first premolar extraction is the distalization of the canines, which requires longer treatment duration. There are many surgical techniques evolved to accelerate tooth movement. So this study will help us to evaluate and compare canine retraction rate between two surgical techniques i.e corticotomy facilitated orthodontics and piezocision technique. Objective: The main objective of this study is to compare rate of canine retraction in corticotomy facilitated orthodontics and piezocision technique. Methods: The sample consisted of 22 patients (15-25 years old) with Class II Division 1 malocclusions. The suggested treatment plan for the given sample was extraction of the maxillary first premolars with subsequent canine retraction. Split mouth study design was selected for study. After initial leveling and alignment, first premolar will be extracted then one side was assigned for corticotomy and contralateral side for piezocision in the area of first premolar and canine retraction was initiated bilaterally with 0.019×0.025 SS wire in slot. Study models will be obtained presurgery T0 and postsurgery at T1, T2 and T3 time interval. The following variables were examined over a 3-month follow-up period: rate of canine retraction, molar anchorage loss, canine rotation with the help of study model. Results: This study will found that rate of canine retraction will be more in corticotomy facilitated orthodontics when compared with piezocision. Conclusion: This study will conclude that corticotomy will be more efficient technique for canine retraction when compared to piezocision.

Keyword : Canine Retraction, Corticotomy, Piezocision, Accelerated orthodontic

Introduction :

Orthodontic treatment helps the patient to improve his dentofacial functions and esthetics. Nowadays demand of orthodontic treatment, among adult patients increases for better esthetics and proper mastication. The main requirement of adult patients are esthetic appliances and less duration of treatment time. Esthetic demands are fulfilled by composite bracket, lingual bracket and invisalign but treatment duration was still the problem with these appliances as movement of teeth can not exceed the biologic limit.[1]

Prolonged orthodontic treatment may increase risk of various complications such as caries, periodontal diseases and root resorption. The main setback that occurs in the treatment of patients who require first premolar extraction is the distalization of the canines, which requires longer treatment duration. Thus accelerating orthodontic treatment was introduced to shorten the treatment duration with minimal complications and maximum support and stability that is desired by the orthodontist.

Corticotomy or decortication can be defined as intentional cutting of cortical bone [2]. Kole in 1959 was first to describe the original corticotomy method [3]. This technique removes the opposition of dense cortical bone to orthodontic tooth movement thus decreasing the treatment duration. These methods are based on RAP [regional acceleratory phenomenon]. This phenomenon accelerates the remodelling process and makes the bone softer and thus faster tooth movement [2]. But the corticotomy has minimal approval by the patients due to its invasive procedure. [2]

So Dilbart et al in 2009, developed piezocision as a minimally invasive procedure as it doesn't include flap reflection. [4] In piezocision technique, gingival microincisions were performed with a microsurgical blade and cortical alveolar bone incisions were made with a piezosurgical knife. [2] The parallel group study will be conducted to evaluate which method is better for canine retraction.

OBJECTIVES:

1. To evaluate and compare the rate of canine retraction with corticotomy facilitated orthodontics and piezocision.
2. To evaluate and compare anchorage loss with corticotomy facilitated orthodontics and piezocision technique.
3. To evaluate and compare canine rotation with corticotomy facilitated orthodontics and piezocision technique.

MATERIAL AND METHODS:

STUDY DESIGN

- The interventional study will be conducted in the Department of Orthodontics and Dentofacial Orthopedics, Sharad Pawar Dental College, Sawangi (M), Wardha in collaboration with The Department of Oral and Maxillofacial surgery, DMIMS (DU), Wardha.
- A split mouth design will be followed. Total 22 patients in age group of 18 to 25, will be

selected from the patients coming to Out Patient Department (OPD) of Orthodontics and Dentofacial orthopaedics of Sharad Pawar Dental College, Wardha.

- Informed & written consent will be taken from the selected patient

INCLUSION CRITERIA

- Patient with age group 18-25 year indicated with first premolar extraction.
- Patient with healthy gingiva, healthy periodontium.

EXCLUSION CRITERIA

- Patient with previous orthodontic treatment.
- Patient with systemic disease.
- Patients with severe periodontal problem and less alveolar bone support

METHOD

Leveling & alignment

- Treatment will be started with initial leveling and alignment of teeth using MBT 0.022 inch slot size appliance. Arch wire sequence will be as follow :

- | |
|--|
| <ol style="list-style-type: none">1) 0.014 NiTi or 0.016 NiTi2) 0.016×0.022 NiTi,3) 0.017×0.025 NiTi,4) 0.017×0.025 SS. |
|--|

- Then first premolar will be extracted. Surgical procedure will be explained to each patient and written consent will be obtained

Corticotomy

- One side of arch is assigned for corticotomy and one side for piezocision randomly.
- In corticotomy technique,
- Flap will be reflected and bur holes will be created on cortical bone in premolar area.



Piezocision

In piezocision technique gingival microincisions will be made with number 15 blade in premolar area without any flap reflection. Then piezoknife will be used for cortical alveolar incisions.



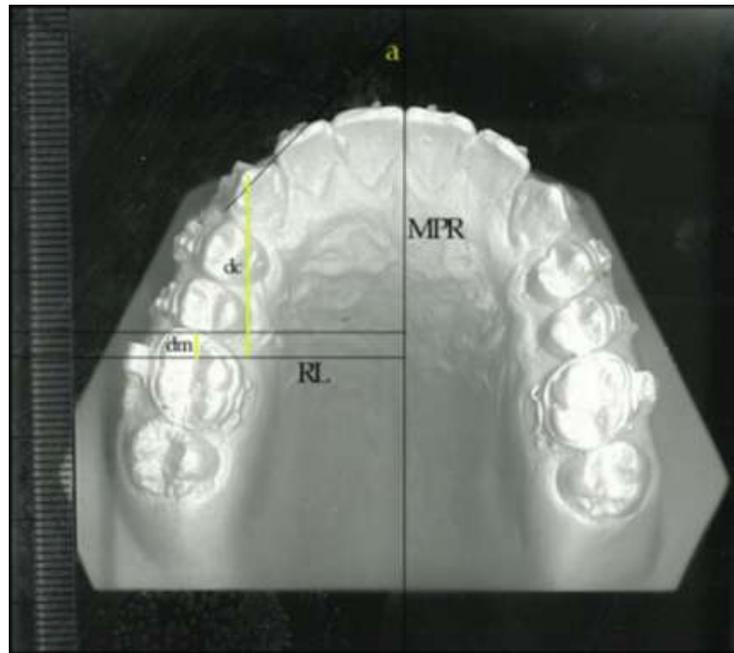
Canine retraction

After surgery 0.019×0.025 SS wire placed and canine retraction will be started by chain. The amount of canine retraction will be measured on study models of the 22 patients, which will be taken as follows

| | |
|----|-----------------------|
| T0 | Before surgery |
| T1 | 1 month after surgery |
| T2 | 2 month after surgery |
| T3 | 3 month after surgery |

The retraction of upper canines and anchorage loss of molar and the canine rotation will be evaluated on study models. Lateral cephalogram and OPG will also be taken after 6 month to assess canine retraction.





Primary outcome of the study is to check accelerated orthodontic tooth movement in conventional corticotomy and piezocision technique.

Ethical approval has been obtained from Institutional Ethics Committee (IEC) Ref. No. DMIMS(DU)/IEC/2018-19/7518

Statistical Analysis

- Software SPSS 22.0 version and graph pad prism 6.0 version will be used for statistical analysis and $P < 0.05$ will be considered as level of significance

Discussion:

Duration of treatment time is an important factor for adult patients. The main aim of orthodontist is to reduce treatment duration which will increase patients satisfaction. In adults, cells become less reactive which slows down the bone remodeling process and thus less rate of orthodontic tooth movement.

Increased treatment duration may prompt adult patients to either stop treatment or to accept compromised alternative options. Therefore, different modalities that would shorten the treatment time without undermining the treatment outcome are in demand. Shorter overall treatment time, leads to fewer complications, more compliant and satisfied patients. Till date, many techniques such as corticotomy and piezocision have been made to minimize the duration of treatment [5,6].

Thote et al reflected on optimum pure intrusion of a mandibular canine with the segmented arch in lingual orthodontics[7]. Advantages of Piezo surgery were reported by Patil et al [8] ,Pakhare et al[9] and Viscuso et al [10].

N Hussein Abbas et al [1] studied rapid canine retraction using corticotomy and piezocision methods. First group treated with corticotomy and second group with piezocision. Contralateral side in both group treated with conventional method. Extraction of first premolar was done on

table during surgery and retraction started immediately after surgery. Results showed that canine movement was greater with corticotomy than piezocision.

Alfawal et al [4] studied piezocision and laser assisted flapless corticotomy to check rate of canine movement. Results showed that retraction was faster with piezocision and corticotomy when compared with conventional method. They found non-significant difference between both methods when parameters like canine movement, anchorage loss and canine rotation were compared.

Our study is similar to above mentioned study and will found similar results.

Expected Results :

This study is expected to find that rate of canine retraction will be more in corticotomy facilitated orthodontics when compared with piezocision.

Conclusion :

This study will conclude that corticotomy will be more efficient technique for canine retraction when compared to piezocision.

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