

Evaluating the Effectiveness of Piezocision Based Flapless Corticotomy in Class I and Class II Malocclusion Orthodontic Correction: An Accelerated Orthodontics

Ranjit Omprakash Pawar^{1*} Sagar Arjun Mapare² Kailas Tukaram Gawai³ Bhishma Digambar Zunjare⁴ Anurup Nitin Masal⁵ Sushil Bhagwan Mahajan⁶

¹Reader, Department of Orthodontics and Dentofacial Orthopedics, Aditya Dental College and Hospital, Beed, Maharashtra, India.

²Professor and Head, Department of Orthodontics and Dentofacial Orthopedics, Dr. H.S.R.S.M. Dental College and Hospital, Hingoli, Maharashtra, India.

³Dental Surgeon, Department of Oral and Maxillofacial Surgery, Rural Hospital, Buldhana, Maharashtra, India.

⁴Lecturer, Department of Orthodontics and Dentofacial Orthopedics, Aditya Dental College and Hospital, Beed, Maharashtra, India.

⁵PG Student, Department of Orthodontics and Dentofacial Orthopedics, Dr. H.S.R.S.M. Dental College and Hospital, Hingoli, Maharashtra, India.

⁶PG Student, Department of Orthodontics and Dentofacial Orthopedics, Dr. H.S.R.S.M. Dental College and Hospital, Hingoli, Maharashtra, India.

ABSTRACT

Background: Time is the greatest difficulty for both orthodontists and patients during orthodontic treatment. For the past several years, however, researchers have been attempting to improve multiple surgical procedures to minimize the time spent on the treatment. Piezocision-based orthodontic treatment flapless corticotomy is minimally invasive in principle and is recommended these days. Evaluating the effectiveness of piezocision-based flapless corticotomy in class I and class II malocclusion orthodontic correction: An accelerated orthodontics.

Methodology: For the current research, a total of 50 patients aged 18 to 25 years in need of orthodontic treatment with a set orthodontic appliance were selected. Patients were separated into two groups as a research group and control group.

Results: It was found that anchorage loss and canine distalization were statistically significant ($p < 0.01$). The amount of distalization suggested a decrease in canine distalization time. Mobility scores before and after distalization were not found to be significantly different between the two classes.

Conclusion: The effectiveness of piezocision-based flapless corticotomy in class I and class II malocclusion orthodontic correction is known to be a successful treatment process.

Keywords: Corticotomy; Minimally invasive; Distalization and piezosurgery.

INTRODUCTION

For better esthetics and/or a mastication process, a growing number of patients seek orthodontic care.¹ However, patients prefer quicker results for treatment these days. Various authors also indicated that such care is only possible in combination with surgical procedures for patients who want a shorter time to complete treatment for

both social and psychological reasons.^{2,3} Harold Frost named the Regional Acceleratory Phenomenon first and described it as a cascade of events of physiological healing following surgical cortical bone injury.^{4,5} The rate of orthodontic tooth movement is around 1 mm in a month. Rapid orthodontic tooth movement occurs in regional

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*Correspondence Dr. Ranjit Omprakash Pawar.

Department of Orthodontics and Dentofacial Orthopedics, Aditya Dental College and Hospital, Beed, Maharashtra, India.

Email: dranjitpawar@gmail.com

acceleratory phenomenon along with periodontal changes with a bone graft which raises the alveolar bone and also corrects alveolar bone dehiscences and fenestrations.⁶ Lee et al., proposed that alveolar decortication, osteotomy and/or dental distraction strategies are related to biology in relation to the tooth movement.⁷ Ferguson et al., reported that a burst of osteoclastic activity leading to lower bone density and increased osteoblastic activity follows the onset of RAP in the alveolar bone. So we attempted to research the efficacy of peizocision-based flapless corticotomy in the orthodontic correction of class I and II malocclusion in the present study.

MATERIALS AND METHODS

In the department of orthodontics, this randomized controlled crossover clinical trial was carried out. Ethical committee approval was obtained from the Institutional Ethics Committee. Before the study, written consent was obtained from the participants. A total of 50 patients aged between 18 and 25 years in need of orthodontic care with a fixed orthodontic appliance were chosen for the study and randomly separated to the study (n=25) and the control group (n=25). Radiographic guided micro incisions and localized peizocision corticotomies were performed after first premolar extraction to correct malocclusion in class I and class II. The surgical processes were carried out under local anesthesia.

Inclusion criteria:

- Patient with class I and/or class II malocclusion and aged between 18 to 25 years.

Exclusion criteria:

- Patients with systemic diseases.
- Physically and mentally challenged patients.

At monthly intervals, Little's Irregularity Index (LII) was measured. A software-generated list of random numbers was used to conduct randomization; the recruited patients were split into two parallel groups with a 1:1 allocation ratio. Assessor blinding was also applied. The values obtained during each session were measured, tabulated and statistically evaluated accordingly.

RESULTS

Graph 1: Distribution of group

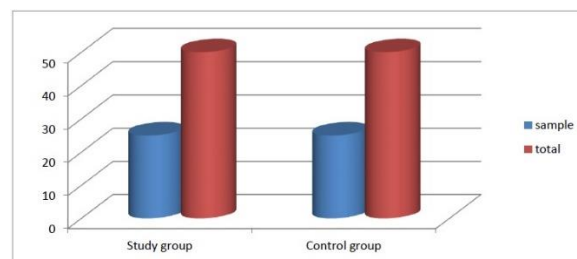


Table 1: Time elapsed from canine distalization.

Groups	Mean	Min	Max
Study group	3.44±0.80	2.88	4.24
Control group	5.24±0.91	4.68	6.28

Table 2: Amount of distalization.

Groups	First Month	Second Month
Study group	1.44±0.61	2.11±0.81
Control group	0.71±0.26	1.81±0.65

Table 3: Anchorage loss observed.

Groups	First Month	Min	Max
Study group	2.01±0.61	1.58	2.44
Control group	3.01±0.39	2.86	3.46

Table 4: Intra and inter group comparison of oxygen saturation between both groups.

Visit	Group A Mean	Group B Mean	P Value*
Screening & Prophylaxis	99.8±1.2	98±1.7	-
Restoration	98.1±1.1	98.0±0.5	-
Extraction	97.0±1.3	97.0±0.5	-

In the current error analysis report, coefficients have been found to be close to 1.00. In addition, to verify error analysis of the tooth movements, all measurements were performed. The time elapsed from canine distalization is represented in Table 1. We found that piezocision-assisted canine distalization in the piezoelectric group decreased the total period of treatment and loss of anchorage in the molar area. The quantity of distalization and

the decreased length of canine distalization is represented in Table 2.

Findings of current research showed that the amount of canine distalization in the piezocision group was greater than compared to the control group. The loss of anchorage was assessed and we found that the loss of anchorage for the first molars was comparatively lower, but the canine distalization in the sample group was greater relative to the control group. The difference observed was statistically significant ($p < 0.01$). Whereas in the present study, pre- and post-distalization mobility scores were not found to vary significantly between the groups.

DISCUSSION

Corticotomy is deemed successful in speeding up orthodontic therapy. Proper case selection and careful surgical and orthodontic treatment are the secrets to the success of orthodontic treatment. Corticotomy encouraged orthodontics in combination with full-thickness flaps and labial and lingual corticotomies around teeth to be relocated for extensive fixed orthodontic appliances. Bone graft should be placed directly over the bone cuts and the sutured flap. With this procedure, orthodontic care time is reduced to one-third of the time of traditional orthodontics. Researchers also indicated that the minimally invasive technique involves corticision and piezocision.^{9,10}

In the current research, the piezocision-based flapless corticotomy was contrasted with the traditional procedure in class I and class II patients by divided two groups of 25 patients each, i.e. 50% of the total selected sample in each group. We observed that piezocision-assisted canine distalization shortened the overall period of care and loss of anchorage in the molar area in the current study. We found in our research that the amount of distalization showed a reduction in canine distalization length. Aboul-Ela et al and Sertac Aksakalli also observed similar outcomes.^{11,12}

The quantity of canine distalization in the piezocision group was greater than compared to the control group in the present study. The first molar anchorage loss was comparatively lower, while statistically significant differences ($p < 0.01$) were found in the canine distalization in the sample

group relative to the control group. In the present analysis, pre- and post-distalization mobility scores were not found to be substantially different between the groups. In their study, Wilcko WM et al demonstrated similar outcomes. In their experiment, Omar et al stated that OAT in the experimental group was reduced by 59 percent relative to the control group, with a statistically significant difference ($P < 0.001$) between the two groups.¹³

CONCLUSION

It has been concluded that the flapless piezocision technique was very successful in accelerating orthodontic tooth movement within the limits of our research. It can be conveniently used for orthodontic care as an alternative choice.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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