ABSTRACT

Corticotomy facilitated orthodontics has been practising for longer periods, but a novel approach of a periapical incision to make horizontal cuts 5 mm above the apex of the maxillary anteriors along with vertical cuts requires a detailed investigation. The purpose of this study was to assess the outcome of skeletal cases with spacing in the anteriors using a novel method of modified surgical approach utilizing the corticotomy facilitated orthodontics. Patients for this study were randomly selected from a very intensive screening in the Department of Orthodontics, Saveetha Dental College and Hospital, Chennai, out of which seven patients were selected for this procedure. The patients were subjected for corticotomy procedure under local anesthesia after the leveling and aligning stage (0.019” × 0.025” stainless steel wire), and the retraction was continued still the space was closed. AutoCAD and palatal rugae assessment programs were used to assess the orthodontic tooth movement. The results of the study demonstrated that when compared to conventional orthodontics alone, the corticotomy facilitated approach produced faster tooth movements in all the seven patients reducing the overall treatment time by 60%. The use of this modified technique of labial, palatal and apical cuts could be beneficial for adult patients with difficult surgical access from the lingual side.

Keywords: Corticotomy, Orthodontic tooth movement, Regional acceleratory phenomenon, Space closure, Reduces treatment duration.

INTRODUCTION

In orthodontics today, there is a paradigm shift in the various modalities of treatment procedures to decrease the overall treatment time taken for orthodontic treatment. Orthodontic tooth movement is accomplished by means of application of light force to the tooth for a period of time until the tooth moves within the jaw to a desired position. It is a slow osteogenic process, wherein the cortical plate surrounding the tooth responds as if an injury to it has occurred by softening slightly to ease tooth movement and hardens again once the force subsides. The principal disadvantage of this conventional orthodontic tooth movement is that, it takes many months or even years, to accomplish the desired positions.

A simple, minor surgical procedure called corticotomy was introduced to significantly reduce the time required to complete an orthodontic case. Corticotomy is the process of intentionally inducing injury to the cortical plate for the purpose of softening the cortical plate. A penetration of the cortical plate permits vascular access from the medullary bone to the now exposed portions of the cortical plate thereby facilitating rapid osteogenic repair of the injury site.

Therefore, it is known according to prior art taught by Suya1, Kole2 and later Wilcko3 to utilize multiple corticotomies (injuries inflicted to the cortical plate) in conjunction with traditional orthodontic techniques (to urge motion of the tooth or teeth proximate the softened cortical plate) to accelerate the repositioning of teeth. The softening of the cortical plate in an area surrounding the injury site results in a process known as regional acceleratory phenomenon (RAP).4,6

Modifying the balance between resorption and apposition through selectively injuring the cortical plate of the alveolus has been an approach to speed tooth movement using orthodontics and is rightly referred to as corticotomy facilitated orthodontics. Since, the whole procedure shortens the overall treatment time and considering the pulpal response and the alveolar bone to remodeling due to orthodontic forces, it is really a boon to an orthodontist adding up to the various modalities of treatment philosophies. Corticotomy facilitated orthodontics has been in use for longer periods, but a novel approach of a periapical incision to make horizontal cuts 5 mm above the apex of the maxillary anteriors along with vertical cuts of alveolar bone adjacent to the teeth

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requires a detailed investigation. This study was conducted to analyze the viability of this procedure.

**MATERIALS AND METHODS**

Patients for this study were randomly selected from a very intensive screening in the Department of Orthodontics, College of Dental Surgery, Saveetha University, Chennai. Out of which seven patients were selected for corticotomy facilitated orthodontics procedure who matched the following selection criteria: adult patients with healthy periodontal status; adult patients with severe bidental protrusion, proclination of teeth with spacing, increased overjet and minimal overbite; cooperative patients and those willing to undergo the corticotomy surgical procedure; patients without any history of systemic illness. After a stringent patient selection, the entire procedure was explained to the patient and their parent and a consent form duly signed was obtained before initiating the treatment. The ethical committee approval was obtained after scrutinizing the relevant study documents.

**PROCEDURE**

**Initial Orthodontic Leveling and Aligning Phase**

The selected patients were bonded with 0.022” × 0.028” Roth PEA. The patients were subjected for corticotomy procedure after the leveling and aligning stage (0.019” × 0.025” SS archwire). At this stage, periapical radiographs of anterior teeth, orthopantomogram, photographs (Figs 1 and 2) and study models were taken and electric pulp tester was conducted to check the teeth vitality before the corticotomy procedure.

**Surgical Phase**

The corticotomy procedure (Figs 3A and B) was carried out by an oral and maxillofacial surgeon with utmost care and with minimal trauma to the oral tissues. The procedure was performed under local anesthesia infiltrated at the surgical sites using lidocaine 2% and epinephrine 1:100000. The mucogingival flaps were first elevated on the labial side to completely expose the cortical bone beyond the apical region....

![Figures 1A to G: Pretreatment photographs: Extraoral and intraoral](image-url)
of the upper anterior teeth. The greatest mesiodistal width of the incisors and the canines guided the vertical bone cuts in the cortical bone from the gingival margin to 4 to 5 mm below the apices of the teeth. The vertical cuts were given on the alveolar bone from distal of the right upper canine to the distal of the left upper canine using 701 surgical bur under saline irrigation. Horizontal cuts were given at about 5 mm apical to the apex of teeth to join the interdental vertical cuts. The depth of the bone cut should be limited to the cortical bone, as it is indication of bleeding in the osteotomy site encroaching the medullary bone. After the control of bleeding and careful irrigation of the surgical site, the gingival flaps were repositioned and sutured approximately. Antibiotics and anti-inflammatory were prescribed 1 day prior to surgery and 3 days postsurgery with intensive and thorough chlorhexidine mouth rinses. After a week, the patient was recalled for undergoing the palatal corticotomy procedure and the same precautions that were taken during labial corticotomy were strictly adhered to.

**Orthodontic Phase Postcorticotomy**

It is critical to begin the orthodontic tooth movement immediately after surgery, before the bony healing occurs to take the advantage of regional acceleratory phenomenon (RAP). Rapid orthodontic tooth movement following corticotomy was due to the reduced mineralization of the alveolar bone housing the involved teeth. The 0.019" × 0.025" SS archwire postsurgically in 0.022" slot almost expresses the tip and torque as given in the original prescription with 7° slop. Elastomeric chains (continuous) were engaged (Fig. 4) immediately after corticotomy procedure for force application. Anchorage considerations in extraction and nonextraction cases varies with application of TPAs and other modifications. The archwires were bent back, and the E-chain applied produced forces ranging from 130 to 150 gm measured using Dontrix gauge. The E-chain was changed once in every 21 days to maintain the optimum force for orthodontic tooth movement. Patients were advised to use 0.12% chlorhexidine gluconate mouth rinse twice daily, to maintain the oral hygiene in and around the orthodontic braces and the surgical sites.

**STUDY DESIGN**

The method of investigation of maxillary anterior teeth movement was assessed precisely using the following methods: (1) AutoCAD program and (2) palatal rugae assessment using digital calipers.
Study models played a crucial role in the assessment of the orthodontic teeth movement of the anterior teeth associated with corticotomy procedures. Almeida suggested the position of palatal rugae assessment was designed to investigate the minor changes using the callipers. Study models were obtained pre- and postcorticotomy treatment for the subjects included in the study. The outline of the first primary rugae was traced using 0.5 mm graphite marker. Study models were oriented by placing them on a template parallel to the floor, so that the orientation of the pre- and post-treatment models does not change. Subsequently, photographs of the occlusal view of the study models were then taken using a digital camera Canon Powershot SD 1100. The camera was mounted on a tripod at a standardized height of 20 cm from the table, parallel to the floor as a method of standardization. Digital images of the models were then fed into the computer using USB port and flash card reader. Landmarks were then digitized using the onscreen digitization technique. After on screen digitization, specified distances can be calculated using AutoCAD between the points plotted, so that changes in the anterioposterior and transverse dimensions can be assessed accurately.

In the AutoCAD analysis, all the drawing are superimposed on an invisible grid or co-ordinate system with horizontal and vertical axis. Using the AutoCAD software, a series of points can be plotted and the distance between them was measured. Photographs intraoral and extraoral radiographs including sequential intraoral periapical radiographs, lateral cephalogram and orthopantomogram were taken preoperatively and at the end of treatment (Figs 5 and 6). The periapical radiographs were assessed for apical root changes in each case as the literature reveals a likely consequence of periapical changes, hence a method of assessing this was used as advocated by Sharpe.

**RESULTS**

It is a well-known that orthodontic therapy with corticotomy shortens the period of entire orthodontic treatment compared with conventional orthodontic treatment. In this study, most of the patients completed retraction and intrusion in a span of 3.5 to 4 months. It is known that a heavier orthodontic force exerting nearly 150 gm is needed in a corticotomy treatment for the movement of the bone block with teeth. Clinical healing after the surgical procedure and during orthodontics were generally uneventful and all the patients reported mild discomfort levels during and after surgery, but less the course of treatment progressed.

Corticotomy for surgically assisted retraction in the maxillary anterior segment did not have any serious effect on pulpal blood flow in this study as revealed by pulp vitality tests. In fact the pulpal blood flow was altered only for 2 to 3 weeks as revealed by the bony architecture and the status of the apical portion of root on periapical radiograph taken at definite intervals comparison of bone levels on periapical radiograph revealed no difference. In all, seven patients underwent corticotomy facilitated orthodontics and the overall treatment time was comparatively less than the conventional orthodontic procedure. Furthermore, periodontal probing showed no clinical difference between the corticotomy facilitated orthodontic procedure and conventional orthodontic treatment. At the end of treatment, all the seven patients who had severe maxillary prognathism revealed drastic changes as revealed by the cephalometric values (Table 1 and Graph 1). The pretreatment protrusive facial profile achieved near normal status after 12 to 14 weeks of postcorticotomy. The spacing was corrected and Class I molar relationships maintained with normal overjet and overbite being established. There was no change in the mandibular position as revealed by the facial axis angle. On the panoramic and periapical radiographs taken during and at the end of treatment, well aligned and parallel roots of the teeth were noted.

The pre- and postlateral cephalometric measurements and superimpositions (Figs 7A to C) based on Rickett’s analysis, reveals that the overall facial height remained same. Mild extrusion of molars, retraction of the upper incisors and the overall length of maxilla was reduced. Patients revealed a perfect lip competency after this corticotomy facilitated orthodontics. Analyzing the parameters of AutoCAD study and manual analysis of the study models using digital calipers the initial and final measurements of the study models revealed significant movement of the upper anteriors horizontally. The statistical difference between AutoCAD and the manual study of models using digital calipers were not very significant.
A Clinical Assessment of Corticotomy Facilitated Orthodontics in the Retraction of Maxillary Anterior Segment

Figs 5A to G: Post-debonding photographs: Extraoral and intraoral

Figs 6A and B: Post-treatment lateral cephalometric radiograph and orthopantomogram
Table 1: Statistical analysis cephalometric values

<table>
<thead>
<tr>
<th></th>
<th>Pretreatment Mean ± SD</th>
<th>Post-treatment Mean ± SD</th>
<th>Mean difference</th>
<th>t-value</th>
<th>p-value</th>
<th>Significant/ Not significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNA</td>
<td>85.29 ± 3.094</td>
<td>82.57 ± 1.272</td>
<td>2.72</td>
<td>3.634</td>
<td>0.011</td>
<td>S</td>
</tr>
<tr>
<td>SNB</td>
<td>80.57 ± 3.645</td>
<td>79.86 ± 2.545</td>
<td>0.71</td>
<td>1.508</td>
<td>0.182</td>
<td>NS</td>
</tr>
<tr>
<td>ANB</td>
<td>4.71 ± 5.360</td>
<td>3.29 ± 1.496</td>
<td>1.42</td>
<td>1.843</td>
<td>0.026</td>
<td>S</td>
</tr>
<tr>
<td>Facial axis angle</td>
<td>93.29 ± 3.684</td>
<td>93.0 ± 3.742</td>
<td>0.29</td>
<td>1.549</td>
<td>0.172</td>
<td>NS</td>
</tr>
<tr>
<td>Effective maxillary length</td>
<td>105 ± 14.27</td>
<td>101.2 ± 14.19</td>
<td>3.8</td>
<td>8.832</td>
<td>0.000</td>
<td>S</td>
</tr>
<tr>
<td>1 to NA (mm)</td>
<td>12 ± 1.63</td>
<td>5.29 ± 0.756</td>
<td>6.71</td>
<td>8.629</td>
<td>0.000</td>
<td>S</td>
</tr>
<tr>
<td>1 to NA (angular)</td>
<td>40.43 ± 5.381</td>
<td>25.43 ± 1.813</td>
<td>15</td>
<td>5.708</td>
<td>0.001</td>
<td>S</td>
</tr>
<tr>
<td>Interincisal angle</td>
<td>101.8 ± 8.355</td>
<td>122.4 ± 8.223</td>
<td>0.132</td>
<td>–4.221</td>
<td>0.006</td>
<td>S</td>
</tr>
</tbody>
</table>

p-value of SNA is 0.011 (S: Significant); p-value of SNB is 0.182 (NS: Not significant); p-value of ANB is 0.026 (significant); p-value of facial axis angle (FAA) is 0.172 (not significant); p-value of effective maxillary length is 0.000 (significant)

DISCUSSION

Conventional orthodontics is accomplished by moving the root of a tooth through its surrounding bone in the jaw of a patient. The bone of the jaw is similar to the long bones in one’s arms and legs in that there is a hard outer shell, called the cortical plate or cortical bone, and a softer interior called the medullary bone. The medullary bone has a good blood supply with increased turnover of pluripotent cells that can convert to osteoclasts and osteoblasts to form a new bone. It is this vital nature of the medullary bone which gives it the ability to respond promptly to the physical forces, such as the orthodontic forces. The medullary bone in alveolar bone is sandwiched between the two into a narrow space as a result much of the root is covered with hard cortical plate and a greatly reduced vascularity resulting in a negligible compliment of pluripotent cells. This greatly reduces the ability of the cortical plates to remodel during the course of orthodontic treatment.

Graph 1: Comparison of pre- and postskeletal parameters

Figs 7A to C: Rickett’s superimposition pre- and post-treatment
A major drawback to conventional orthodontics is the duration of the treatment time which generally ranges from 1 to 3 years. Several attempts have been made to shorten the treatment time but have not adequately addressed the problem of dehiscence formation in the bone over the prominence of the roots as a consequence of orthodontic treatment. Surgical procedure called corticotomy has been employed for several decades to attempt to shorten the duration of orthodontic treatment. Corticotomy has been regarded to have been used only following the cessation of growth in post adolescents and adults. There are other references in the literature dating back to the late 1800’s, but Kole is generally credited with the introduction of this procedure. Kole’s corticotomy was generally used in conjunction with osteotomies in both expansion and retraction procedures. He claimed that most of the cases were completed in 12 weeks or less.

Suya first traced the history of corticotomy and described the same procedure of corticotomy as a surgical technique ‘in which a fissure is made through the cortical bone (compact bone) that surrounds a tooth so that the tooth is embedded within a block of bone that is connected to adjacent blocks only through the medullary bone. In other words, the orthodontic tooth movement in corticotomy procedure is a process of moving blocks rather than moving only the teeth themselves.’ He has advised a combination of horizontal and vertical grooves of corticotomy cuts both labially and lingually around the teeth to be moved. The vertical interdental cuts begin 2 to 3 mm below the alveolar crest, as recommended by Duker and extend beyond the apices of the teeth as recommended by Kole. The horizontal cuts were made beyond the apices of teeth and connected the interdental vertical cuts in this respect, Suya deferred from Kole who used horizontal osteotomy rather than horizontal corticotomy except on the posteriors where Kole used horizontal cuts. Chung advised the corticotomy procedure to be carried out in two phases, initiated with a palatal side corticotomy followed by a labial corticotomy after 2 weeks. A connecting horizontal bony cut is then made at the level of the Le Fort I osteotomy with a round bur. The depth of the bony cut should be limited to cortical bone, as evidenced by the bleeding during the procedure in the site of the osteotomy.

In our procedure, vertical cuts commence 2 to 3 mm above the interdental alveolar margin between all the anterior extending upto the distal aspect of the maxillary canines. The vertical bone cuts were given after elevation of the periodontal flap exposing the cortical bone beyond the apical region of the upper anterior teeth. The greatest mesiodistal width of incisors and canines guided the vertical bound cuts in the cortical bone from the gingival margin to 4 to 5 mm below the apices of the teeth. The vertical cuts were given from distal to right upper canine to distal to the left upper canine. Horizontal cuts were given at about 5 mm apical to the apex of the teeth to join the interdental vertical cuts, the depth of the bone cuts should be limited to the cortical bone. The patients were instructed about strict oral hygiene and were advised to use 0.12% chlorhexidine mouth rinses twice daily to maintain oral hygiene in and around the orthodontic appliance. Patients were advised to use analgesics for pain postsurgically, soft diet and meticulous brushing to avoid damages to the orthodontic appliance and to prevent any infection around the surgical environment. Any infection around the periodontium may delay the tooth movement and the bone remodeling.

In our study, the orthodontic phase was initiated immediately after both labial and palatal corticotomy to take the advantage of immediate bone reaction after corticotomy. The intrusion and retraction was achieved using a full near slot wire of 0.019” × 0.025” stainless steel in 0.022” slot which permits 7° of SLOP/play in the bracket slot. Forces were exerted using a continuous elastomeric chain exerting 130 to 150 gm of force. At each appointment pulp vitality test (Parkell’s electric pulp tester) and radiographic assessment for root resorption were carried out. At the end of 14 weeks, periodontal status assessment revealed that the surgical procedure did not extensively damage the periodontal tissues. Gingival recession was minimal, interdental papilla was preserved ensuring good post-treatment esthetic result. In addition, the orthodontic treatment had improved the clinical attachment of some teeth which were out of alignment prior to the treatment.

Various investigations like study models, radiographs (periapical radiographs, lateral cephalogram and orthopantomogram) and intraoral photographs (Figs 1 and 2) of all the patients were taken during the pretreatment, precorticotomy and after intrusion and retraction of anterior. The overall crown root ratio remained normal and the reading of Parkell’s pulp tester (Table 2 and Graph 2) revealed that vitality was intact with a marginal reduction during the orthodontic phase of intrusion and retraction. There was no significant bone loss except therapeutically induced which was beneficial for space closure in the anterior. The lateral cephalogram was taken with all precautions of standardization and various parameters were considered for assessment of pre- and postsurgical and orthodontic procedures.

In evaluating various skeletal landmarks identifying the maxillary skeletal base, the corticotomy procedure has a direct effect on reducing the resistance to allow more rapid tooth movement especially in non-growing patients.
The SNA relating the position of maxillary base to skeletal base had a significant change anteroposteriorly (p = 0.011) (Table 1 and Graph 1). The SNB was the same and was not statistically significant (p = 0.182) (Table 1 and Graph 1) reveal that mandibular skeletal base did not have a role to play during maxillary procedures. The maxillo-mandibular relation exhibited by ANB angle was significant (p = 0.026) (Table 1 and Graph 1) as the whole change was brought by the maxillary anterior remodeling. The relationship of mandibular arch in space as revealed by facial axis angle was not significant (p = 0.172) (Table 1 and Graph 1) as endorsed by the fact that mandibular anterior alveolar changes are very minimal and does not have a direct influence on maxillary position. The effective maxillary length was very significant (p = 0.000) (Table 1 and Graph 1). The overall corticotomy procedure involving both labial and palatal osteotomy had a definite effect in reducing the maxillary prognathism and the overall size of the maxilla both vertically and anteroposteriorly.

The dental parameters reveal that the inclination of upper incisor significantly reduced (p = 0.001) (Table 1 and Graph 3) and the linear value of the upper incisor was also significant (p = 0.000) (Table 1 and Graph 3). The interincisal angle was also reduced to give us the inference that there was a significant reduction of the angle (p = 0.006) (Table 1 and Graph 3). Owing to the corticotomy procedure actively reducing the spacing between anteriors as well as reducing the proclination of the upper incisors in relation to the mandibular anteriors. The overjet was significantly reduced (p = 0.000) (Table 1 and Graph 3), reducing the maxillary convexity and gingival show resulting in lip competency.

Using AutoCAD (version 2008) precise assessment of the palatal rugae was selected and the linear measurements were measured using the digital setup. The AutoCAD analyzer was used with utmost precaution using precise landmark identification, such as medial and distal parts of the first rugae and the third rugae on the palatal mucosa. In our study, the mesial and distal parts of first palatal rugae was selected owing to the fact that the line of malocclusion lies in a close relation to this landmark. The various parameters (Table 3 and Graph 4) revealed that there was significant movement of all the anterior teeth mesial to the premolars on either side resulting in retraction and retrusion in a very short period of time. The advantage of corticotomy can be revealed by the fact that space closure commences within 48 hours postsurgical. The osteotomy restricted to cortical bone layer minimize the injury of the vital structures. Kole showed importance of preserving an intact spongiosa using this technique. Bell revealed that the total alveolar osteotomy may impair intraosseous and intra pulpal blood circulation.

Rapid orthodontic treatment using heavy forces in combination with corticotomy does not affect tooth vitality but induces histological changes in the periodontal ligament. The short-term changes seem to be of no clinical importance. The observation of the postoperative periapical radiograph

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**Table 2: Pulp vitality test values**

<table>
<thead>
<tr>
<th>Pre-corticotomy</th>
<th>At 4 weeks</th>
<th>At 8 weeks</th>
<th>Post-treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>2</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>X2</td>
<td>2</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>X3</td>
<td>3</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>X4</td>
<td>2</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>X5</td>
<td>2</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>X6</td>
<td>2</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>X7</td>
<td>2</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

0-1: Acute pulpitis; 2-4: Normal pulp response; 4-6: Chronic pulpitis (inflamed pulp); 6-8: Toward necrosis (severely inflamed pulp); 8+: Nonvital (necrosed pulp)

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**Graph 2:** Comparison of pre- and postdentoalveolar parameters

**Graph 3:** Comparison of pre- and post-treatment study models using AutoCAD
Table 3: Statistical analysis of AutoCAD values

<table>
<thead>
<tr>
<th>Pretreatment Mean</th>
<th>SD</th>
<th>Post-treatment Mean</th>
<th>SD</th>
<th>Mean difference</th>
<th>t-value</th>
<th>p-value</th>
<th>Significant/ not significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1-MR</td>
<td>1.6491</td>
<td>0.1226</td>
<td>1.4746</td>
<td>0.1184</td>
<td>0.1702</td>
<td>9.148</td>
<td>0.000 S</td>
</tr>
<tr>
<td>R2-MR</td>
<td>1.6211</td>
<td>0.2656</td>
<td>1.3680</td>
<td>0.1098</td>
<td>0.2531</td>
<td>2.995</td>
<td>0.024 S</td>
</tr>
<tr>
<td>L2-MR</td>
<td>1.5629</td>
<td>0.2481</td>
<td>1.3955</td>
<td>0.2529</td>
<td>0.1717</td>
<td>6.283</td>
<td>0.001 S</td>
</tr>
<tr>
<td>R3-MR</td>
<td>1.7441</td>
<td>0.1158</td>
<td>1.6957</td>
<td>0.1150</td>
<td>0.0484</td>
<td>3.233</td>
<td>0.018 S</td>
</tr>
<tr>
<td>L3-MR</td>
<td>1.7196</td>
<td>0.1043</td>
<td>1.6361</td>
<td>0.0847</td>
<td>0.0835</td>
<td>7.291</td>
<td>0.000 S</td>
</tr>
<tr>
<td>R3-L3</td>
<td>3.7803</td>
<td>0.0994</td>
<td>3.6661</td>
<td>0.1166</td>
<td>0.1202</td>
<td>8.713</td>
<td>0.000 S</td>
</tr>
</tbody>
</table>

p-value of R1-MR is 0.000 (S: Significant); p-value of R2-MR is 0.024 (significant); p-value of L2-MR is 0.001 (significant); p-value of R3-MR is 0.018 (significant); p-value of L3-MR is 0.000 (significant); p-value of R3-L3 is 0.000 (significant); KEY: R1: Mid space point of the maxillary central incisors; R2: Mesial point of the right lateral incisor; R3: Cuspal tip of the right canine; L2: Mesial point of the left lateral incisor; L3: Cuspal tip of the left canine; MR: 1st mesial rugae.

CONCLUSION

Adult patients who seek orthodontic treatment often desire that their treatment be completed in as short period as possible. At present, however adult patients with severe maxillary protrusion require maximum anchorage and at least 2 years of active treatment. One possible method of completing treatment in a shorter period is through an orthodontic treatment combined with corticotomy.

The results of the study demonstrated that under the same conditions the corticotomy facilitated approach produced faster tooth movements in all the seven patients. This surgical procedure did not produce any significant difference in the periodontal health of the teeth involved. Considering the surgical access of the bony structures, this procedure was designed primarily for the anterior tooth movement. However, it may be possible to apply this technique to posterior segments as well when anatomical considerations permit. In conclusion, all the seven patients with the corticotomy facilitated orthodontics reduced the orthodontic treatment time to nearly 3 to 4 months to achieve intrusion and retraction compared to the conventional which usually spans for 8 to 10 months. However, this procedure should be carefully applied with respect to the teeth, bone and surrounding tissues to avoid the risk of devitalization of the teeth and periodontal damage. The stringent clinical and cephalometric assessment can ideally select patients for this corticotomy facilitated orthodontics. So one needs to choose a patient for this procedure and not vice versa.

REFERENCES