

PERIODONTALLY ACCELERATED OSTEOGENIC ORTHODONTICS(PAOO): A NOVEL RAPID APPROACH

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ABSTRACT

Wilckodontics', also known as Periodontally Accelerated Osteogenic Orthodontics (PAOO) is a relatively new treatment in the dental realm. It is a clinical procedure that combines selective alveolar corticotomy, particulate bone grafting and the application of orthodontic forces. Basically it is a combination of selective decortication facilitated orthodontic technique and alveolar augmentation.¹

This procedure is theoretically based on the bone healing pattern known as the regional acceleratory phenomenon (RAP).² Regional acceleratory phenomenon was developed by Frost and Jee in 1983^{3,4}. The decortication of bone results in an increased turnover of alveolar spongiosa with areas of alveolar demineralization. This results in osteopenia, where its mineral content temporarily decreased which enables teeth to be moved more rapidly and further through the collagenous soft tissue matrix of the bone. Following the completion of orthodontic treatment, remineralization takes place resulting in greater stability in the orthodontic treatment outcome.

Dr. Thomas Wilcko (Periodontist) and William Wilcko (Orthodontist), of Erie, PA in 1995 further modified the corticotomy assisted orthodontic technique with the addition of alveolar augmentation and named the procedure as Periodontally Accelerated Osteogenic Orthodontics (PAOO) later patented as "Wilckodontics" based on the emerging concepts of Wilcko brothers.

This procedure has been shown to be particularly effective in treating moderate to severe crowding, in Class II malocclusions requiring expansion or extractions, and mild Class III malocclusions. As long as healthy periodontium is present, PAOO can be done at any age (from 11 years to 77 years of age)⁶

KEYWORDS : PAOO, Wilckodontics, RAP, Alveolar Osteogenic Orthodontics

Case Report

A 25 year old male patient had a complaint of forwardly placed upper and lower front teeth with spacing between the teeth. The case was diagnosed as Bilateral end on malocclusion with proclination and spacing of upper and lower anterior teeth. Appropriate treatment plan was made through an interdisciplinary approach and PAOO was opted for the correction of spacing and proclination, in consideration with all the clinical and biological conditions.

Surgical procedure was described to the patient. Other orthodontic treatment options available were also explained to the patient including orthognathic surgery. The patient consented to the PAOO. Prior to surgical and orthodontic treatment, periodontal health of the patient was restored by phase I periodontal therapy including plaque control measures and scaling and root planing. The results obtained by this phase of therapy were monitored monthly during the treatment period.

Surgical procedure

The surgical procedures were performed under local anaesthesia. First, corticotomy was done for maxillary anterior teeth followed by mandibular anterior teeth. Vertical releasing incisions were placed extending from gingival margin toward level apical to the apices of maxillary anterior teeth. Mucoperiosteal flaps were reflected beyond the level of the apices of the teeth and modified papilla preservation was done for integrity of interdental papillae (fig.2).

Vertical buccal grooves were made through the cortical layer of the exposed bone with a round fissure bur mounted on a micromotor hand piece with concomitant saline irrigation, starting 1.5 mm below the interdental crest. (fig.2) A horizontal groove penetrating the cortical bone connected all vertical grooves 2-3 mm apical to the apices of the teeth. Adequate bio absorbable grafting material was placed over the decortication site. The surgical sites were vigorously irrigated with saline prior to flap repositioning and sutured. Analgesics and adjunctive antibiotics were prescribed for 1 week. Corticosteroid injection was given on the same day to avoid swelling.

After a period of 1 week, procedure was performed on the mandibular arch. Full thickness mucoperiosteal flaps were reflected beyond the level of the apices of the mandibular anterior teeth with modified papilla preservation. Vertical buccal and palatal grooves were made through the cortical layer of the exposed bone, starting

1.5 mm below the interdental crest. A horizontal groove penetrating the cortical bone connected all vertical grooves 2 to 3 mm apical to the apices of the teeth. (fig 3)

Adequate bio absorbable grafting material was placed over the decortication site. The surgical sites were vigorously irrigated with saline prior to flap repositioning and sutured. Analgesics and adjunctive antibiotics were prescribed for 1 week. Follow up was done after 1 week.

Heavy orthodontic forces were applied within 1 week of corticotomy procedure in mandibular and maxillary arches. Orthodontic retraction and space closer was achieved in 4 months followed by finishing and CSF procedure to avoid relapse. (fig4)

Conclusion

Periodontally accelerated osteogenic orthodontics is a technique that has many applications in the orthodontic treatment. This technique helps to overcome many of the current limitations, including lengthy duration, potential for periodontal complications, lack of growth and the limited envelope of tooth movement. The mechanism can be summarized as the induction of bone metabolism via decortication lines and points around the teeth to be moved to enhance bone and periodontal turnover, resulting in a transient stage of osteopenia during treatment. This increases the rate of tooth movement if followed by a short period of orthodontic appliance treatment.



Figure 1. Preoperative picture



Figure 2: Verticle and bullet shot Corticotomy procedure done In maxillary arch

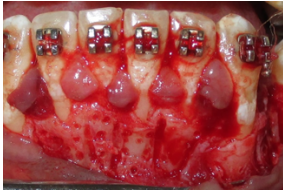


Figure 3: Verticle and bullet shot Corticotomy procedure done In mandibular arch



Figure 4: 4 months post operative picture

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