Introduction:

Periodontal accelerated osteogenic orthodontics (PAOO) is a clinical procedure that combines selective alveolar corticotomy, particulate bone grafting and the application of orthodontic forces. This procedure is theoretically based on the bone healing pattern known as the regional acceleratory phenomenon (RAP).

Regional acceleratory phenomenon

Orthopedist Harold Frost (1989) recognized that surgical wounding of osseous hard tissue results in striking reorganizing activity adjacent to the site of injury in osseous and/or soft tissue surgery. He collectively termed this cascade of physiologic healing events as the regional acceleratory phenomenon (RAP).

Who Developed PAOO?

The PAOO procedure was developed by Drs. Thomas and William Wilcko, in 1995. Thomas Wilcko is a Periodontist in practice for 25 years, and his brother, William Wilcko, is an Orthodontist in practice for 18 years. Both were interested in methods of growing bones called Distraction Osteogenesis and Regional Accelerated Phenomenon (RAP).

How Long Does Total Treatment Take?

Mean active treatment time for the corticotomy-facilitated patients is 6.1 months, versus 18.7 months for nonextraction orthodontics and 26.6 months for extraction therapy. Most people who have undergone AOO surgery are in braces from three to nine months.

Indications

Efficacious in the treatment of:
- Class I malocclusions with moderate to severe crowding
- Class II malocclusions requiring expansion or extractions
- mild Class III malocclusions.

Surgical Technique

Flap Design - Basic flap design is a combination of a full thickness flap in the most coronal aspect of the flap with a split-thickness dissection performed in then apical portions.

Decortication - Typically, a vertical groove is placed in the interradicular space, midway between the root prominences in the alveolar bone. This groove extends from a point 2 to 3 mm below the crest of the bone to a point 2 mm beyond the apices of the roots. These vertical corticotomies are then connected with a circular-shaped corticotomy. Care is taken not to extend the cuts near any neurovascular structures. If the alveolar bone is of sufficient thickness, solitary perforations may be placed in the alveolar bone over the radicular surface. However, if this bone is estimated to be less than 1 to 2 mm in thickness, these perforations are omitted to ensure no damage to the radicular surface.

Particulate Grafting - The most commonly used materials are deproteinized bovine bone, autogenous bone, decalcified freeze-dried bone allograft or a combination thereof. The use of a barrier membrane is not suggested. The grafting material is placed with an effort not to place an excess amount. A typical volume used is 0.25 to 0.5 mL of graft material per tooth.

Closure Techniques - Primary closure of the gingival flaps without excessive tension and graft containment are the therapeutic endpoints of suturing. These are typically achieved with nonresorbable interrupted sutures. No packing is required. The sutures are usually left in place for 1 to 2 weeks.

Patient Management - Antibiotics and pain medications are administered at the clinician's preference. However,
long-term postoperative administration of nonsteroidal anti-inflammatory agents is discouraged, because they may theoretically interfere with the regional acceleratory process. The application of ice packs to the affected areas also is suggested to decrease the severity of any possible postoperative swelling or edema.

TECHNIQUE MODIFICATIONS - PAOO can be successfully combined with gingival augmentation procedures. This is particularly important to the adult patient who presents with significant gingival recession.

Pros and Cons of AOO Surgery

Pros:
- You are in braces less time than traditional orthodontics
- There is less likelihood of root resorption
- After AOO, there is more bone to support your teeth and facial profile
- History of relapse has been very low
- There is less need for appliances and headgear (depending on the case)
- In the eight years since AOO was first applied, the patients' outcomes were good and have remained stable
- The technique has its roots in proven orthopedic research and treatments You can wear either metal or ceramic brackets

Cons:
- It is an expensive procedure, often not covered by insurance
- It is a mildly invasive surgical procedure, and like all surgeries, it has its risks
- You will experience some pain and swelling, and the possibility of infection
- It is not for you if you take NSAIDs on a regular basis or have other chronic health problems
- Some form of anesthesia must be used
- You will probably miss a week of school or work
- It does not lend itself to Class III malocclusion cases
- It is not "pain free;" your teeth will still hurt when the braces begin to move them

Conclusion:
The PAOO technique requires the utilization of numerous modified diagnostic and treatment parameters, but once these are mastered the Orthodontist and Periodontist has a powerful new-treatment option to offer his or her patients. With the increasing number of adults considering orthodontic treatment, the propensity for adults and even some nongrowing adolescents for periodontal problems, the PAOO technique can be an especially attractive treatment option and be a "win-win" situation for both the Orthodontist, Periodontist and the patient.

References
8. www.archwired.com