Corticotomy-assisted Orthodontics

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ABSTRACT
This procedure involves osteotomy and corticotomy to accelerate orthodontic tooth movement. It reduces the resistance offered by surrounding structures and thus helps in faster orthodontic tooth movement. This method has claimed to have an advantage like reduced treatment time, rapid and effective retraction, minimal possibility of anchorage loss, and more post-orthodontic stability. With the increasing knowledge of dentistry, people seeking orthodontic treatment are also increasing, including both adolescents and adults. Therefore, in patients who want early treatment, corticotomy can accelerate the orthodontic tooth movement and reduce the treatment time.

Keywords: Corticotomy, Osteotomy, Stability, Treatment time.

INTRODUCTION
Surgically assisted orthodontic tooth movement has been used since the 1800s. Corticotomy-facilitated tooth movement was first described by LC Bryan in 1893, which was published in a textbook by Guilford.1 Alveolar corticotomy is defined as a surgical intervention limited to the cortical portion of the alveolar bone. Whereas, in osteotomy, both cortical and trabecular bone materials are removed in considerable quantities, in alveolar corticotomy, the incision must pierce the cortical layer, and at the same time, penetration into the bone marrow should only be minimal.2 In corticotomy cases, the total treatment time is reduced to one-third to one-fourth than that of traditional nonextraction and extraction orthodontic treatments.3

CASE REPORT
A 24-year-old male patient reported to the Department of Periodontology and Implantology, Institute of Dental Sciences, Bareilly, in April 2016, referred from the Department of Orthodontics for the corticotomy procedure.

On clinical examination, the patient had class 1 malocclusion with bimaxillary protrusion. The patient wanted early orthodontic treatment. So, considering the demand of the patient, corticotomy-assisted orthodontics was planned for the patient. Phase 1 therapy was completed and oral hygiene instructions were given to the patient. All the investigations were done. The hemogram was found to be normal.

The patient was told about the procedure and written informed consent was taken. He was administered 2% lignocaine with adrenaline (1:80,000). A full thickness flap was raised from 15 to 25 tooth region, both labially and palatally (Figs 1 and 2). Decortication of the bone was done using high-speed round bur and it was done without entering the the cancellous bone (Fig. 3). Corticotomy was performed both on the labial and palatal aspect of the alveolar bone. The operated field was irrigated using sterile normal saline. Then, hydroxyapatite bone graft was placed over the decorticated sites (Fig. 4). Interrupted sutures were given and periodontal dressing was placed (Fig. 5). The patient was advised to avoid hot and spicy food for a week. Antibiotic for 5 days and analgesic SOS was prescribed to the patient. Healing was assessed after a week and was found to be uneventful. The patient did not report any discomfort.

DISCUSSION
In an orthodontic treatment, tooth movement requires the combination of well-planned orthodontic forces and an alveolar bone that offers less resistance to movement.
that is less dense and with increased bone metabolism. It is believed that the bone blocks which are created or prepared by the corticotomy procedure are only connected through bone marrow as the superficial cortical bone is removed in the corticated sites, so these bone blocks are easier to move when the orthodontic forces are applied.

The biological principle of this method is based on the temporary reduction of medullary bone density (transitory osteopenia) within a 3- to 4-month window, which allows more physiological tooth movement inside the alveolar bone (less hyalinization period of periodontal ligament). The regional acceleratory phenomenon is a local response of tissues to noxious stimuli by which tissue regenerates faster than normal in a regional regeneration or remodeling process. This is an intensified bone response (increased osteoclastic and osteoblastic activity, and increased levels of local and systemic inflammation markers) in the areas around cuts that extend to the marrow. This response varies directly in size, duration, and intensity with the magnitude of the stimulus, and it is considered a physiological “emergency” mechanism, which accelerates the healing of injuries that could affect survival. The duration of this depends on the type of tissue and usually lasts around 4 months in human bone. It causes bone healing to occur 10 to 50 times faster than the normal bone turnover. Clinically, alveolar bone exposure after reflection of soft tissue flaps is known to cause some degree of bone resorption, mainly around teeth or dental implants. This phenomenon has not only been observed after corticotomy of the alveolar bone but even after full thickness mucoperiosteal flap refection without touching the bone. Surgical injury causes transient osteopenia, which reduces the biomechanical resistance and enables rapid tooth movement throughout the trabecular bone.

Certain advantages of corticotomy-assisted orthodontics are less root resorption due to decreased resistance of cortical bone, more bone surrounding teeth due to the addition of bone graft, less and slower relapse, and less need for extraoral appliances and orthognathic procedures. With the various advantages of corticotomy, there are also certain limitations: It should be avoided in cases of patients showing any sign of active periodontal disease, individuals with inadequately treated endodontic problems, patients making prolonged use of corticosteroids, persons who are taking any medications that slow down...
bone metabolism, such as bisphosphonates and non-steroidal anti-inflammatory drugs.

CONCLUSION

Corticotomy-assisted orthodontics can reduce the orthodontic treatment time by accelerating the orthodontic tooth movement. Hence, it can be useful in cases where the patient wants early orthodontic treatment.

REFERENCES