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Molar Intrusion with Miniscrew Skeletal Anchorage

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INTRODUCTION

Extruded molars due to the lack of an antagonist have always been a serious problem in patients' occlusal reconstruction [2].

Traditional treatment strategy for such cases has been aggressive reduction of teeth mostly followed by endodontic, periodontal and complicated restorative and prosthodontic treatments and all has been done to a tooth with no caries or pulpal involvement only to obtain favorable occlusal results, and occasionally destructive crown-root ratio and furcation involvement was obtained in such invasively treated molars. Achieving absolute anchorage has been a very important topic of interest in the field of orthodontics. The rule of action and reaction is applied in every orthodontic treatment. Intrusion of extruded teeth and distalization of anterior teeth, all cause undesired displacement of the adjacent teeth, hindering the required tooth movement. Orthodontists have always tried to prevent such side effects. As part of their effort, there has been much research on endosseous implants for absolute anchorage [3-6]. In 1984 Roberts [7] et al. investigated the tissue response from orthodontic force applied to endosseous implants. In the 1990s, case reports using these concepts were published [8-9].

The endosseous implants used in previous studies were mostly blade-type or conventional prosthodontic fixtures, which were difficult for orthodontists to use clinically because of the complex procedure involved and their high cost. Later, Kanomi and Costa et al. [10-11] introduced endosseous mini-implants that were more suitable for orthodontic purposes, with simplified implant procedures and lowered costs.

These mini-implants had several advantages; contrary to prosthodontic fixtures they had variable place of insertion broadening the range of
treatments, simple atraumatic insertion/removal, and increase

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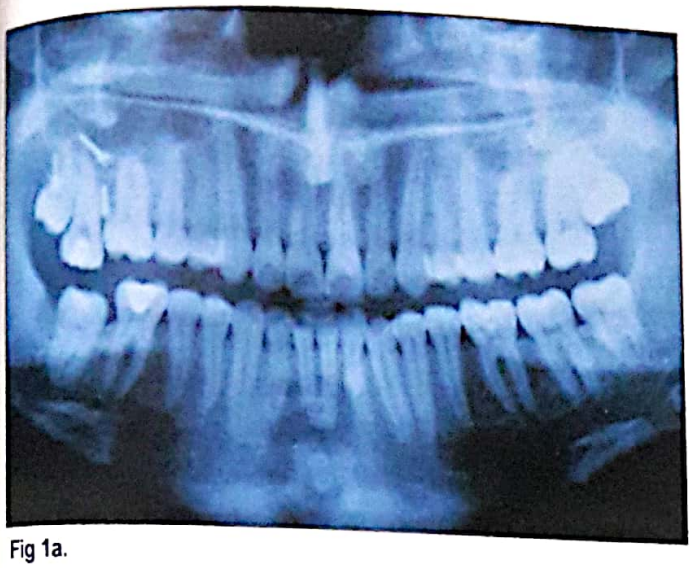

Fig 1a.

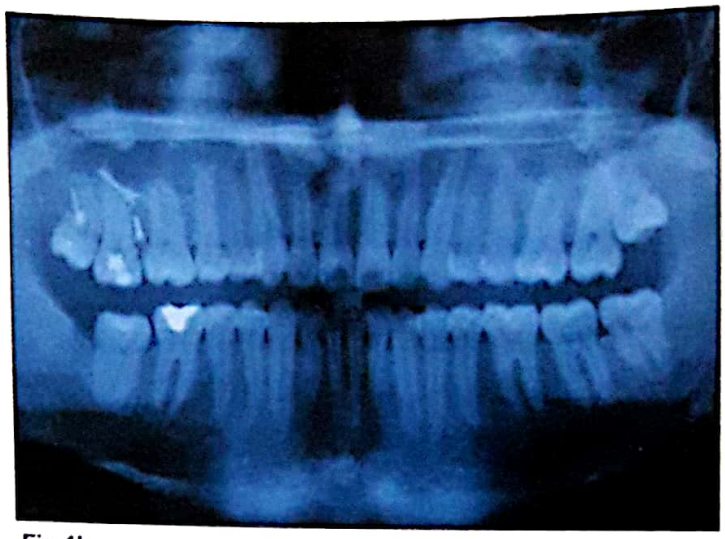

Fig 1b.

Fig.2a. Opposite moment senses

Fig.2a. Opposite moment senses

in patients'
comfort, immediate loading and ... made them advantageous in cost-benefit relation.

CASE

In this case we used an efficient method to intrude maxillary second molar with miniscrews in buccal and palatal areas.
A 23-year old male patient who complained from trauma and injured right lower gingivae because of supraeruption of upper right second molar due to early extraction of lower second molar at the same side, he had referred to a dentist who had reduced occlusal table but re-eruption of the tooth made him look for an efficient method of treatment. He referred to orthodontic department of Tehran dental school and intrusion was planned for his extruded molar. (fig.1 a, b)

Appliance fabrication: After radiographic evaluation, three miniscrews (Jeil Med Corp, South Korea) 1.4 mm in diameter and 8mm in length two were implanted buccally one mesiogingival to second molar between first and second molar roots, 3 mm from gingival margin and the other one distogingival to third molar 4 mm from gingival margin, in palatal area also 8 mm from gingival margin 45 degrees to palatal bone. Bracket and button were bonded on buccal and palatal surfaces of the tooth respectively and intrusive force of 10 gr. was applied from each miniscrew.
Treatment progress was monitored in patient's regular visits. However, it is not easy to obtain a vector sum that passes through the center of resistance due to the anatomy of the palatal and buccal alveolar bone. Therefore, monitoring is important to verify the torque and buccopalatal position of the molars being intruded. If the molar is tilted more to the palatal side during intrusion, the activation rate on the buccal side should be increased to obtain proper intrusion and vice versa. Precise control and light force resulted 3.5 mm intrusion in 3 mounths, (Fig.2 a, b)comparison of the panoramic radiographs shows successful intrusion at the end of treatment. Maxillary molar intrusion followed by spontaneous eruption of lower third molar which guaranties treatment stability.

Fig 3a.

Fig 3b.

DISCUSSION

Appropriate application of miniscrews can be a conservative and efficient solution for intrusion of maxillary molars. Bender et al. used miniscrew for intrusion of posterior extruded teeth and declared that miniscrews can be successfully applied for partially edentulous non-compliant patients [12]. Park et al used miniscrew for adult prosthodontic patients with extrusion of antagonist teeth and concluded that by implantation of simple miniscrews and force direction and magnitude control suitable intrusion can be achieved easily [13].

This approach is much more favorable for preservation of tooth vitality and periodontal health whereas reduction, conventional orthodontic methods or segmental surgery all have several complications. In prosthetic reduction approaches the risk of tooth devitalization and loss of tooth structure exists while in this case evaluation of P.A radiographs before and after treatment did not show any root resorption. Conventional orthodontic methods are also time-consuming and sometimes without favorable results many other teeth are involved and extraoral appliances (headgear, etc.) maybe required. Surgical methods are invasive.

Other interesting point in this case is lower third molar which was soft tissue impacted and as upper molar intrusion began, started eruption, considering third molar in other side that erupted 5 years ago we can find that PDL has preserved its eruption potential and as soon as mechanical barrier elimination; continuous eruption can be seen normally in the mouth acting as a permanent retainer for intrusive movement of upper second molar. (Fig.3a, b)

CONCLUSION

Miniscrews are powerful tools in modern orthodontics .Among many applications, it can be effectively used for intrusion of upper molars with reduced treatment time and enhanced patient comfort.

REFERNCES

1. Barbre RE, Sinclair PM :A cephalometric evaluation of anterior open bite correction with the magnetic active vertical corrector ,Angle Orthod 61:93-102,1994
2. Dawson P. evaluation, diagnosis and treatment of occlusal problems ;1974 Mosby
3. Gainsforth BL, Higley LB. A study of orthodontic anchorage possibilities in basal bone. Am J Orthod Oral Surg. 1945; 31:406-417.
4. Linkow LI. The endosseous blade implant and its use in orthodontics. Int J Orthod. 1969; 18:149-154.
5. Linkow LI. Implanto-orthodontics. J Clin Orthod. 1970; 4:685-705.
6. Creekmore TD, Eklund MK. Possibility of skeletal anchorage. J Clin Orthod. 1983; 17:266-267.
7. Roberts WE, Smith RK, Zilberman Y, Mozsary PG, Smith RS. Osseous adaptation to continuous loading of rigid endosseous implants. Am J Orthod Dentofacial Orthop. 1984; 86:95-111.
8. Roberts WE, Marshall KJ, Mozsary PL. Rigid endosseous implant utilized as anchorage to protract molars and close an atrophic extraction site. Angle Orthod. 1990; 60:135-152.
9. Roberts WE, Arbuckle GR, Analoui M. Rate of mesial translation of mandibular molars using implant-anchored mechanics. Angle Orthod. 1996; 66:331-337.
10. Kanomi R. Mini-implant for orthodontic anchorage. J Clin Orthod. 1997; 11:763-767.
11. Costa A, Raffaini M, Melsen B. Miniscrews as orthodontic anchorage: a preliminary report. Int J Adult Orthod Orthognath Surg. 1998; 13:201-207
12. Bender E, Maximilia PE, Saggy ME .Molar intrusion with skeletal anchorage; an efficient method for non-compliance patient. Euro Orthod J. 2003;71:516-521.
13. Park HS, Bae SM, Kyung HM ,Sung JH. Micro-implants used for intrusion in partially edentulous patients. Am J Orthod Dentofacial Orthp. 2003;124:373-378