Annals of Clinical Case Reports

Case Report
Published: 27 Jan, 2022

Acceleration of Distal Movement in Adult Patient by Digitally Guided Micro-Osteoperforation: A Case Report

Alkasaby AA, Shamaa MS and Abdelnaby YL*

Department of Orthodontic, University of Mansoura, Egypt

Abstract

This case shows that digitally guided Micro-osteoperforations can be used to accelerate the distal movement of maxillary first molars, despite the presence of second and third molars. First, mini-screws supported fast back distalizer was used to create space for relief of the crowding in the upper arch. Micro-osteoperforations were done using 3D printed guide, before the appliance was cemented. Then, treatment was finished using multi bracket fixed appliance, and after 1.3 years, skeletal class I as well as dental class I canine and molar relationships were achieved.

Keywords: Micro-osteoperforation; Acceleration; Distalization; Fast back appliance

Introduction

Maxillary molar distalization is one of the non extraction treatment modalities to correct minor skeletal class II discrepancy, molar relationship, and gain space in the arch [1]. The use of mini-screws supported, non-compliance appliances for distal movement of molars would minimize the need for co-operation of the patients and maximize the predictability of the results [2,3]. Adults might have a lower rate of tooth movement when compared with adolescents [4]. Micro-Osteoperforation (MOP) has been introduced as one of the least invasive, flapless surgical methods of acceleration [5]. In this case report, MOPs were used to accelerate the distal movement of the mini-screws supported Fast Back appliance in an adult female patient.

Case Presentation

18-year-old female patient with a chief complaint of mal-aligned teeth presented for treatment. Extraoral examination revealed oval and symmetrical face. Lip competence was present at rest, and upon smiling, there was normal exposure of the incisors (Figure 1). Intraoral examination revealed anterior crowding in the upper and lower arch, and a dental midline deviation toward the left in both arches (Figure 2). Cephalometric data (Table 1), confirmed a skeletal class I, and normal growth pattern of the vertical dimension.

The primary aim of the treatment was to correct the dental class II malocclusion, and create enough space to relief the crowding. The treatment plan was to distalize the first molars as a first phase of treatment, and then fixed appliance was used to align the teeth in the created spaces. Three MOPs were planned to be done distal to the upper first molar to enhance the movement. Two self-drilling 1.8 mm × 8 mm mini-screws were inserted at 3 mm aside of the midpalatal suture, and implant supported fast back appliance was constructed according to manufacturer instructions and cemented in position (Figure 3) [6]. Medium field-of-view Cone-Beam Computed Tomography

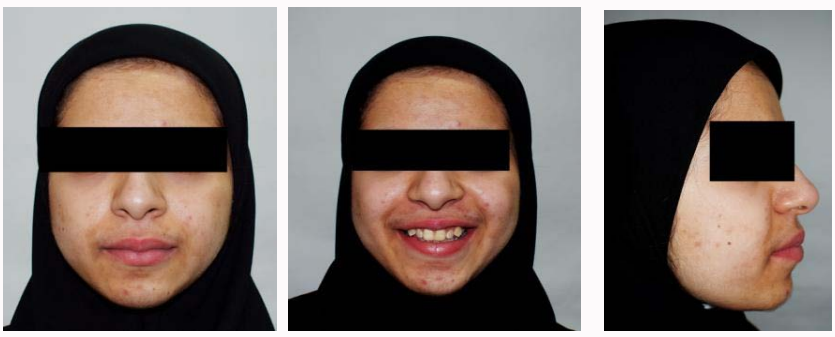

Figure 1: Extraoral photographs at the beginning of treatment.

OPEN ACCESS

Correspondence:
Alaa A Alkasaby, Department of Orthodontic, University of Mansoura, 35516, Egypt,
E-mail: alaa.kasaby@gmail.com

Received Date: *18 Dec 2021*
Accepted Date: *03 Jan 2022*
Published Date: *27 Jan 2022*

Citation:
Alkasaby AA, Shamaa MS, Abdelnaby YL. Acceleration of Distal Movement in Adult Patient by Digitally Guided Micro-Osteoperforation: A Case Report. Ann Clin Case Rep. 2022; 7: 2112.

ISSN: 2474-1655

Copyright *© 2022 Alkasaby AA. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.*

Figure 2: Intraoral photographs at the beginning of treatment.

Figure 3: Mini-screws supported Fast Back distalizer.

Figure 4: 3D guide for MOPs.

(CBCT) image of the maxilla were taken and 3D guide was printed for both right and left sides (Figure 4). The first, second, and third MOPs' were 3 mm, 6 mm, 9 mm respectively from the crest of the bone and all of them were 5 mm in depth starting from the cortical plate [7]. Consequently, the distalizer was cemented and activated. Follow up visits were scheduled every 4 weeks to reactivate the fast back appliance to produce the preset force of 300 gm. At the end of the fifth month, sufficient space had been created, and the appliance

Table 1: Cephalometric evaluation of Pre- and Post-treatment variables.

Variable	Initial	Final
SNA	82.6	81.9
SNB	80.4	79.8
ANB	2.2	2.1
FMA	28	30
U1/SN	105	101
IMPA	92	95

was adjusted to act as a retainer. Then, fixed appliances were bonded to the upper arch, achieving alignment and leveling by means of 0.016, 0.018, 0.016 × 0.022-inch nickel-titanium archwires, followed by a 0.019 × 0.025-inch nickel-titanium archwire, and 0.019 × 0.025-inch stainless-steel archwire for finishing. After 1.3 years, skeletal class I as well as dental class I canine and molar relationships were achieved (Figure 5). The cephalometric changes included increase in vertical face height (Table 1).

Discussion

Several authors have demonstrated that the palatal vault is a safe and suitable site for placement of miniscrews [8]. Many of distalization appliances have been anchored to mini-screws as it is more hygienic, and preserves the anchorage [9,10]. MOPs increased the expression of cytokines and chemokines known to recruit osteoclast precursors and stimulate osteoclast differentiation, resulting in faster movement of teeth [11]. Since MOPs were done using TADs and placed in interradicular areas, insertion guide proved to be a significant aid in terms of treatment management, allowing successful placement of MOPs.

Figure 5: Intraoral photographs at the end of treatment.

Conclusion

Correction of dental class II was successfully, safely, and reliably achieved without anterior anchorage loss using mini-screws supported fast back appliance. Placement of MOPs using insertion guide, enabled faster distal movement of molars, reducing the total treatment time.

References

1. Ram Nanda TD, Nanda R. Nonextraction Class II correction. In: Nanda R, editor. Esthetics and biomechanics in orthodontics. St Louis, Missouri: Elsevier. 2015.
2. Bellini-Pereira SA, Pupulim DC, Aliaga-Del Castillo A, Henriques JFC, Janson G. Time of maxillary molar distalization with non-compliance intraoral distalizing appliances: A meta-analysis. Eur J Orthod. 2019;41(6):652-60.
3. Keles A, Erverdi N, Sezen S. Bodily distalization of molars with absolute anchorage. Angle Orthod. 2003;73(4):471-82.
4. Alikhani M, Chou MY, Khoo E, Alansari S, Kwal R, Elfersi T, et al. Age-dependent biologic response to orthodontic forces. Am J Orthod Dentofacial Orthop. 2018;153(5):632-44.
5. Alikhani M, Raptis M, Zoldan B, Sangsuwon C, Lee YB, Alyami B, et al. Effect of micro-osteoperforations on the rate of tooth movement. Am J Orthod Dentofacial Orthop. 2013;144(5):639-48.
6. Huanca Ghislanzoni LT, Piepoli C. Upper molar distalization on palatal miniscrews: An easy to manage palatal appliance. Prog Orthod. 2012;13(1):78-83.
7. Alikhani M. Clinical guide to accelerated orthodontics with a focus on micro-osteoperforations. Boston: Springer International Publishing; 2017.
8. Becker K, Unland J, Wilmes B, Tarraf NE, Drescher D. Is there an ideal insertion angle and position for orthodontic mini-implants in the anterior palate? A CBCT study in humans. Am J Orthod Dentofacial Orthop. 2019;156(3):345-54.
9. Kircelli BH, Pektaş ZO, Kircelli C. Maxillary molar distalization with a bone-anchored pendulum appliance. Angle Orthod. 2006;76(4):650-9.
10. Cozzani M, Pasini M, Zallio F, Ritucci R, Mutinelli S, Mazzotta L, et al. Comparison of maxillary molar distalization with an implant-supported distal jet and a traditional tooth-supported distal jet appliance. Int J Dent. 2014;2014:937059.
11. Sugimori T, Yamaguchi M, Shimizu M, Kikuta J, Hikida T, Hikida M, et al. Micro-osteoperforations accelerate orthodontic tooth movement by stimulating periodontal ligament cell cycles. Am J Orthod Dentofacial Orthop. 2018;154(6):788-96.