

## Bölüm 11

# AĞIZ İÇİ MOLAR DİSTALİZASYON YÖNTEMLERİ

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### GİRİŞ

Sınıf II kapanış bozuklukları, ortodonti pratiğinde klinisyenlerin yaygın olarak karşılaştıkları iskeletsel ve/veya dental nedenlerden kaynaklanan uyumsuzluklardır. Bishara dişsel Sınıf II kapanış bozukluğunun etiolojisini, dentoalveolar bir uyumsuzluğa bağlı olarak maksiller dişlerin önde konumlanması veya süt dişinin konjenital eksikliği ya da erken kaybı nedeniyle maksiller birinci büyük azı dişlerinin daha fazla meziale doğru hareket etmesinden kaynaklandığını belirtmektedir. İskeletsel uyumsuzluğu olmayan dental Sınıf II kapanış bozukluğu olan bireylerde tedavi, üst posterior dişlerin distalizasyonu veya diş çekimli bir tedaviyi içermektedir. Günümüz ortodontik tedavi pratiğinde eğilim, diş çekimli ortodontik tedaviden diş çekimi içermeyen ortodontik tedavilere doğru evrilmekte, bu doğrultuda yeni tedavi modelleri geliştirilmektedir.

Molar distalizasyon yöntemlerinden ilki, Kingsley ve Angle tarafından kullanılan headgearlerdir. Ağız dışı distalizasyon aparatlarının en önemli sınırlılıkları hasta uyumu gerektirmeleri, estetik olmayan görüntüleri, kuvvetin aralıklı olması nedeniyle diş hareketinin daha yavaş olması ve distalizasyonun daha uzun sürede gerçekleşmesidir. Bu olumsuz faktörler nedeniyle hasta uyumu gerektirmeyen, sürekli kuvvet uygulayan, kısa sürede distalizasyon sağlayan ağız içi distalizasyon yöntemleri gün geçtikçe daha çok ön plana çıkmaktadır.

İntraoral molar distalizasyon yöntemlerinde temel prensip bir bölgeden ankraj sağlanarak hedef bölgedeki dişleri hareket ettirmektir. Ancak üst molar dişlerin distalizasyonu sırasında bazı istenmeyen sonuçlar meydana gelmiş, bunları ortadan kaldırmak için de birbirini takip eden yeni uygulamalar ortodonti literatürüne kazandırılmıştır. Kitabımızın bu bölümünde mevcut literatür

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#### **4.3.9. Zigomatik Mini Vida/Mini Plak Destekli Molar Distalizasyonu**

Maksillada mini vida ve mini plak yerleştirmek amacıyla tavsiye edilen en stabilitesi yüksek ve anatomik olarak güvenli alanlardan biri zigomatik buttress bölgesidir. Karma dişlenme döneminde olan hastalarda süren dişleri zararlı olmayacak konumda ve kortikal kemik yapısının kalın olması sebebiyle ankraj almak için tercih edilebilir. Fakat zigomatik bölgeye mini vida veya mini plak uygulamalarının gerektirdiği cerrahi prosedür, anatomik lokasyonun zor olması nedeniyle, tercihi kısıtlıdır.

Mostafa ve ark. (110) araştırmalarında, 20 hastaya Zigomatik Buttress'e mini vida uygulamış ve büyük azıların distal hareketini gerçekleştirmişlerdir. Üst dişlere kalın köşeli ve devamlı ark teli uygulaması yapılmıştır. Arkın üzerine lateralin distali ve moların mesiali arasına jig bükülmüştür. Mini vida ve jik arasına close coil asılmıştır ve 300 gram distal kuvvet elde edilmiştir. Tedavi sonucuna göre molar dişlerde 2,92 mm distale hareket ve üst keserlerde 1,89 mm vertikal gömülme gözlenmiştir. Ayrıca maksillada 2,08° saat yönünün tersine rotasyon görülmüştür.

### **SONUÇ**

Ağız dışı distalizasyon yöntemlerinin estetik olmaması ve hasta uyumu gerektirmesi ağız içi distalizasyon yöntemlerinin gelişmesine yönlendirmiştir. Ağız içi molar distalizasyon yöntemleri estetik sorun yaratmaması, hasta uyumu gerektirmemesi, sürekli kuvvet uygulayarak tedavi süresini kısaltması gibi avantajlara sahiptir. Bunun yanında vaka seçiminde göz önünde bulundurulması gereken bazı dezavantajları da mevcuttur. Maksiler molar dişlerde rotasyon ve distale devrilme, ankraj alınan küçük azılarda mezial hareket ve tipping, kesicilerde protrüzyon, overjet artışı ve overbite azalması, premolar ve molar dişlerde ekstrüzyon; ankraj için alt arktan destek alındığında alt dişlerde mezializasyon ve protrüzyon oluşmaktadır. Bu dezavantajların önüne geçmek için son yıllarda minivida destekli ağız içi distalizasyon aygıtları popüler olmuştur. En isabetli tedavi yöntemi seçimi, vakanın ihtiyaçları göz önünde bulundurularak yapılan tedavi olacaktır.

### **KAYNAKLAR**

1. Angle EH. Classification of malocclusion. Dent Cosmos. 1899;41:350-75.
2. Angle EH. Treatment of Malocclusion of the Teeth: Angle's System. Greatly Enl. and Entirely Rewritten, with Six Hundred and Forty-One Illustrations: SS White dental manufacturing Company; 1907.

3. Katz MI. Angle classification revisited 2: a modified Angle classification. *American Journal of Orthodontics and Dentofacial Orthopedics*. 1992;102(3):277-84.
4. Ackerman JL, Proffit WR. The characteristics of malocclusion: a modern approach to classification and diagnosis. *American journal of orthodontics*. 1969;56(5):443-54.
5. Jarabak JR, Fizzell JA. *Technique and treatment with light-wire edgewise appliances*: CV Mosby Company; 1972.
6. Moyers RE, Riolo ML, Guire KE, Wainright RL, Bookstein FL. Differential diagnosis of Class II malocclusions: Part 1. Facial types associated with Class II malocclusions. *American journal of orthodontics*. 1980;78(5):477-94.
7. Bishara SE. *Textbook of orthodontics*: Universitas Muhammadiyah Semarang; 2001.
8. McNamara Jr JA. Components of Class II malocclusion in children 8–10 years of age. *The Angle Orthodontist*. 1981;51(3):177-202.
9. Proffit WR, Fields Jr HW, Sarver DM. *Contemporary orthodontics*: Elsevier Health Sciences; 2006.
10. Coben SE. Growth and Class II treatment. *American Journal of Orthodontics*. 1966;52(1):5-26.
11. Bowman SJ, Johnston Jr LE. The esthetic impact of extraction and nonextraction treatments on Caucasian patients. *The Angle Orthodontist*. 2000;70(1):3-10.
12. Zierhut EC, Joondeph DR, Artun J, Little RM. Long-term profile changes associated with successfully treated extraction and nonextraction Class II Division 1 malocclusions. *The Angle Orthodontist*. 2000;70(3):208-19.
13. Kinzinger GS, Eren M, Diedrich PR. Treatment effects of intraoral appliances with conventional anchorage designs for non-compliance maxillary molar distalization. A literature review. *The European Journal of Orthodontics*. 2008;30(6):558-71.
14. Kingsley NW. *A treatise on oral deformities as a branch of mechanical surgery*: D. Appleton; 1880.
15. Angle E. *Malocclusion of the Teeth and Fractures of the Maxillae*. Philadelphia, PA: The SS White Dental Manufacturing Company. 1900.
16. Oppenheim A. Biologic orthodontic therapy and reality. *The Angle Orthodontist*. 1936;6(2):69-116.
17. Kloehn SJ. Guiding alveolar growth and eruption of teeth to reduce treatment time and produce a more balanced denture and face. *The Angle Orthodontist*. 1947;17(1):10-33.
18. Ülgen M. *Ortodonti; Anomaliler, Sefolometri, Etiyoloji, Büyüme ve Gelişim, Tanı*. 2000.
19. Armstrong MM. Controlling the magnitude, direction, and duration of extraoral force. *American journal of orthodontics*. 1971;59(3):217-43.
20. Melsen B. Effects of cervical anchorage during and after treatment: an implant study. *American Journal of Orthodontics*. 1978;73(5):526-40.
21. Firouz M, Zernik J, Nanda R. Dental and orthopedic effects of high-pull headgear in treatment of Class II, division 1 malocclusion. *American Journal of Orthodontics and Dentofacial Orthopedics*. 1992;102(3):197-205.
22. Üçem T'T, Yükselb S. Effects of different vectors of forces applied by combined headgear. *American journal of orthodontics and dentofacial orthopedics*. 1998;113(3):316-23.
23. Samuels RH, Jones ML. Orthodontic facebow injuries and safety equipment. *The European Journal of Orthodontics*. 1994;16(5):385-94.

24. Holland GN, Wallace DA, Mondino BJ, Cole SH, Ryan SJ. Severe ocular injuries from orthodontic headgear. *Archives of ophthalmology*. 1985;103(5):649-51.
25. Nanda R. *Biomechanics and esthetic strategies in clinical orthodontics*: Elsevier Health Sciences; 2005.
26. Poulton DR. The influence of extraoral traction. *American journal of orthodontics*. 1967;53(1):8-18.
27. Jeckel N, Rakosi T. Molar distalization by intra-oral force application. *The European Journal of Orthodontics*. 1991;13(1):43-6.
28. Cetlin NM. Nonextraction treatment. *J Clin Orthod*. 1983;17:396-413.
29. Akin E, Gurton AU, Sagdic D. Effects of a segmented removable appliance in molar distalization. *The European Journal of Orthodontics*. 2006;28(1):65-73.
30. Keles A, Pamukcu B, Tokmak EC. Bilateral Maxillary Molar Distalization with Sliding Mechanics: Keles Slider. *World Journal of Orthodontics*. 2002;3(1).
31. Gianelly AA, Vaitaa AS, Thomas WM. The use of magnets to move molars distally. *American Journal of Orthodontics and Dentofacial Orthopedics*. 1989;96(2):161-7.
32. Hilgers JJ. The pendulum appliance for Class II non-compliance therapy. *J Clin orthod*. 1992;26:706-14.
33. Bondemark L, Kurol J. Distalization of maxillary first and second molars simultaneously with repelling magnets. *The European Journal of Orthodontics*. 1992;14(4):264-72.
34. Blechman AM, Smiley H. Magnetic force in orthodontics. *American Journal of Orthodontics*. 1978;74(4):435-43.
35. Blechman AM. Magnetic force systems in orthodontics: clinical results of a pilot study. *American Journal of Orthodontics*. 1985;87(3):201-10.
36. Itoh T, Tokuda T, Kiyosue S, Hirose T, Matsumoto M, Chaconas S. Molar distalization with repelling magnets. *Journal of Clinical Orthodontics: JCO*. 1991;25(10):611-7.
37. Erverdi N, Koyutürk Ö, Küçükkeles N. Nickel-titanium coil springs and repelling magnets: a comparison of two different intra-oral molar distalization techniques. *British Journal of orthodontics*. 1997;24(1):47-53.
38. Gianelly AA, Bednar J, Dietz VS. Japanese NiTi coils used to move molars distally. *American Journal of Orthodontics and Dentofacial Orthopedics: Official Publication of the American Association of Orthodontists, its Constituent Societies, and the American Board of Orthodontics*. 1991;99(6):564-6.
39. Pieringer M, Droschl H, Permann R. Distalization with a Nance appliance and coil springs. *Journal of clinical orthodontics: JCO*. 1997;31(5):321-6.
40. Miura F, Mogi M, Ohura Y, Karibe M. The super-elastic Japanese NiTi alloy wire for use in orthodontics part III. Studies on the Japanese NiTi alloy coil springs. *American Journal of Orthodontics and Dentofacial Orthopedics*. 1988;94(2):89-96.
41. Bondemark L, Kurol J, Bernhold M. Repelling magnets versus superelastic nickel-titanium coils in simultaneous distal movement of maxillary first and second molars. *The Angle Orthodontist*. 1994;64(3):189-98.
42. Gündüz E, Crismani A, Bantleon H, Hönigl KD, Zachrisson BU. An improved transpalatal bar design. Part II. Clinical upper molar derotation—case report. *The Angle Orthodontist*. 2003;73(3):244-8.
43. Gündüz E, Zachrisson BU, Hönigl KD, Crismani A, Bantleon H. An improved transpalatal bar design. Part I. Comparison of moments and forces delivered by two bar

- designs for symmetrical molar derotation. *The Angle Orthodontist*. 2003;73(3):239-43.
44. Haas SE, Cisneros GJ, editors. *The goshgarian transpalatal bar: A clinical and an experimental investigation*. Seminars in Orthodontics; 2000: Elsevier.
  45. Byloff FK, Darendeliler MA. Distal molar movement using the pendulum appliance. Part 1: clinical and radiological evaluation. *The Angle Orthodontist*. 1997;67(4):249-60.
  46. Reiner TJ. Modified Nance appliance for unilateral molar distalization. *Journal of Clinical Orthodontics: JCO*. 1992;26(7):402-4.
  47. Ghosh J, Nanda RS. Evaluation of an intraoral maxillary molar distalization technique. *American Journal of Orthodontics and Dentofacial Orthopedics*. 1996;110(6):639-46.
  48. Byloff FK, Darendeliler MA, Clar E, Darendeliler A. Distal molar movement using the pendulum appliance. Part 2: the effects of maxillary molar root uprighting bends. *The Angle Orthodontist*. 1997;67(4):261-70.
  49. Bussick TJ, McNamara Jr JA. Dentoalveolar and skeletal changes associated with the pendulum appliance. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2000;117(3):333-43.
  50. Toroğlu M, Uzel I, Cam O, Hancioğlu Z. Cephalometric evaluation of the effects of pendulum appliance on various vertical growth patterns and of the changes during short-term stabilization. *Clinical Orthodontics and Research*. 2001;4(1):15-27.
  51. Taner TU, Yukay F, Pehlivanoglu M, Çakırer B. A comparative analysis of maxillary tooth movement produced by cervical headgear and pend-x appliance. *The Angle Orthodontist*. 2003;73(6):686-91.
  52. Shashidhar NR, Reddy SRK, Rachala MR. Comparison of K-loop molar distalization with that of pendulum appliance-a prospective comparative study. *Journal of Clinical and Diagnostic Research: JCDR*. 2016;10(6):ZC20.
  53. Hilgers JJ, Tracey SG. The mini-distalizing appliance: the third dimension in maxillary expansion. *Journal of clinical orthodontics: JCO*. 2003;37(9):467-75.
  54. Kinzinger GS, Fritz UB, Sander F-G, Diedrich PR. Efficiency of a pendulum appliance for molar distalization related to second and third molar eruption stage. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2004;125(1):8-23.
  55. Chiu PP, McNamara Jr JA, Franchi L. A comparison of two intraoral molar distalization appliances: distal jet versus pendulum. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2005;128(3):353-65.
  56. Fuziy A, de Almeida RR, Janson G, Angelieri F, Pinzan A. Sagittal, vertical, and transverse changes consequent to maxillary molar distalization with the pendulum appliance. *American journal of orthodontics and dentofacial orthopedics*. 2006;130(4):502-10.
  57. Patel MP, Janson G, Henriques JFC, de Almeida RR, de Freitas MR, Pinzan A, et al. Comparative distalization effects of Jones jig and pendulum appliances. *American journal of orthodontics and dentofacial orthopedics*. 2009;135(3):336-42.
  58. Acar AG, Gürsoy S, Dinçer M. Molar distalization with a pendulum appliance K-loop combination. *The European Journal of Orthodontics*. 2010;32(4):459-65.
  59. Caprioglio A, Beretta M, Lanteri C. Maxillary molar distalization: Pendulum and Fast-Back, comparison between two approaches for Class II malocclusion. *Progress in orthodontics*. 2011;12(1):8-16.

60. Locatelli R. Molar distalization with superelastic Ni-Ti wire. *J Clin Orthod.* 1992;26:277-9.
61. Giancotti A, Cozza P. Nickel titanium double-loop system for simultaneous distalization of first and second molars. *Journal of clinical orthodontics: JCO.* 1998;32(4):255-60.
62. Gianelly AA. Distal movement of the maxillary molars. *American Journal of Orthodontics and Dentofacial Orthopedics.* 1998;114(1):66-72.
63. Jones R, White J. Rapid Class II molar correction with an open-coil jig. *Journal of clinical orthodontics: JCO.* 1992;26(10):661-4.
64. Gulati S, Kharbanda O, Parkash H. Dental and skeletal changes after intraoral molar distalization with sectional jig assembly. *American journal of orthodontics and dentofacial orthopedics.* 1998;114(3):319-27.
65. Runge ME, Martin JT, Bukai F. Analysis of rapid maxillary molar distal movement without patient cooperation. *American journal of orthodontics and dentofacial orthopedics.* 1999;115(2):153-7.
66. Haydar S, Üner O. Comparison of Jones jig molar distalization appliance with extraoral traction. *American Journal of Orthodontics and Dentofacial Orthopedics.* 2000;117(1):49-53.
67. Brickman CD, Sinha PK, Nanda RS. Evaluation of the Jones jig appliance for distal molar movement. *American journal of orthodontics and dentofacial orthopedics.* 2000;118(5):526-34.
68. Kalra V. The K-loop molar distalizing appliance. *Journal of clinical orthodontics: JCO.* 1995;29(5):298-301.
69. Greenfield RL. Fixed piston appliance for rapid Class II correction. *J Clin Orthod.* 1995;29:174-83.
70. Carano A. The distal jet for upper molar distalization. *J Clin Orthod.* 1996;30:374-80.
71. Ngantung V, Nanda RS, Bowman SJ. Posttreatment evaluation of the distal jet appliance. *American journal of orthodontics and dentofacial orthopedics.* 2001;120(2):178-85.
72. Bolla E, Muratore F, Carano A, Bowman SJ. Evaluation of maxillary molar distalization with the distal jet: a comparison with other contemporary methods. *The angle orthodontist.* 2002;72(5):481-94.
73. Fortini A, Lupoli M, Parri M. The first class appliance for rapid molar distalization. *Journal of clinical orthodontics: JCO.* 1999;33(6):322-8.
74. Kırçelli B. First Class apareyinin etkilerinin Pendulum apareyi ile karşılaştırılması. Çukurova Üniversitesi Sağlık Bilimleri Enstitüsü Ortodonti Anabilim Dalı: Doktora tezi, Adana; 2003.
75. Fortini A, Lupoli M, Giuntoli F, Franchi L. Dentoskeletal effects induced by rapid molar distalization with the first class appliance. *American Journal of Orthodontics and Dentofacial Orthopedics.* 2004;125(6):697-704.
76. Papadopoulos MA, Melkos AB, Athanasiou AE. Noncompliance maxillary molar distalization with the first class appliance: a randomized controlled trial. *American Journal of Orthodontics and Dentofacial Orthopedics.* 2010;137(5):586. e1-. e13.
77. Keles A, Sayinsu K. A new approach in maxillary molar distalization: intraoral bodily molar distalizer. *American Journal of Orthodontics and Dentofacial Orthopedics.* 2000;117(1):39-48.

78. Scott M. Molar distalization: more ammunition for your operator. *Oral Health*. 1996;86(9):7-10, 3.
79. Keles A. Maxillary unilateral molar distalization with sliding mechanics: a preliminary investigation. *The European Journal of Orthodontics*. 2001;23(5):507-15.
80. İkbâl A. Ağız içi molar distalizasyonunda kullanılan Keleş Slider ve Jones Jig aparatlarının karşılaştırılması. 2004.
81. Sayinsu K, Isik F, Allaf F, Arun T. Unilateral molar distalization with a modified slider. *The European Journal of Orthodontics*. 2006;28(4):361-5.
82. Mavropoulos A, Sayinsu K, Allaf F, Kiliaridis S, Papadopoulos MA, Keles AO. Non-compliance unilateral maxillary molar distalization: a three-dimensional tooth movement analysis. *The Angle Orthodontist*. 2006;76(3):382-7.
83. Veltri N, Veltri N, Baldini A. Slow sagittal and bilateral palatal expansion for the treatment of class II malocclusions. *Leone Bollettino International*. 2001;3:5-9.
84. Bacetti T. A new appliance for molar distalization. Reprinted from *Ortho News*. 2001;1:2-6.
85. Walde KC. The simplified molar distalizer. *Journal of Clinical Orthodontics: JCO*. 2003;37(11):616-9; quiz 26.
86. Bayram M, Nur M, Kilkis D. The frog appliance for upper molar distalization: a case report. *Korean Journal of Orthodontics*. 2010;40(1):50-60.
87. Wilson W, Wilson R. New treatment dimensions with first phase sectional and progressive edgewise mechanics. *Journal of clinical orthodontics: JCO*. 1980;14(9):607-27.
88. Wilson W, Wilson R. Multi-directional 3D functional Class II treatment. *Journal of clinical orthodontics: JCO*. 1987;21(3):186-9.
89. Kucukkeles N, Cakirer B, Mowafi M. Cephalometric evaluation of molar distalization by hyrax screw used in conjunction with a lip bumper. *World journal of orthodontics*. 2006;7(3).
90. Carano A, Velo S, Incurvati C, Poggio P. Clinical applications of the Mini-Screw-Anchorage-System (MAS) in the maxillary alveolar bone. *Progress in orthodontics*. 2004;5(2):212-35.
91. Takaki T, Tamura N, Yamamoto M, Takano N, Shibahara T, Yasumura T, et al. Clinical study of temporary anchorage devices for orthodontic treatment. *The Bulletin of Tokyo Dental College*. 2010;51(3):151-63.
92. Shapiro PA, Kokich VG. Uses of implants in orthodontics. *Dental Clinics of North America*. 1988;32(3):539-50.
93. Nienkemper M, Wilmes B, Pauls A, Yamaguchi S, Ludwig B, Drescher D. Treatment efficiency of mini-implant-borne distalization depending on age and second-molar eruption. Springer; 2014.
94. Ryu J-H, Park JH, Thu TVT, Bayome M, Kim Y, Kook Y-A. Palatal bone thickness compared with cone-beam computed tomography in adolescents and adults for mini-implant placement. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2012;142(2):207-12.
95. Wilmes B, Drescher D. A miniscrew system with interchangeable abutments. *Journal of clinical orthodontics: JCO*. 2008;42(10):574-95.
96. Wilmes B, Drescher D. Application and effectiveness of the Beneslider: a device to move molars distally. *World J Orthod*. 2010;11(4):331-40.
97. Ludwig B, Glasl B, Kinzinger G, Walde KC, Lisson JA. The skeletal frog appliance for



- maxillary molar distalization. *Journal of clinical orthodontics: JCO*. 2011;45(2):77-84; quiz 91.
98. Hourfar J, Ludwig B, Kanavakis G. An active, skeletally anchored transpalatal appliance for derotation, distalization and vertical control of maxillary first molars. *Journal of Orthodontics*. 2014;41(1\_suppl):s24-s32.
  99. Kinzinger GS, Gülден N, Yildizhan F, Diedrich PR. Efficiency of a skeletonized distal jet appliance supported by miniscrew anchorage for noncompliance maxillary molar distalization. *American journal of orthodontics and dentofacial orthopedics*. 2009;136(4):578-86.
  100. Gelgor IE, Karaman AI, Buyukyılmaz T. Use of the intraosseous screw for unilateral upper molar distalization and found well balanced occlusion. *Head & Face Medicine*. 2006;2(1):1-6.
  101. Ertugay E. Molar Dişlerin Distalizasyonu Sırasında Oluşturduğu Dişsel ve İskeletsel Etkilerin Karşılaştırılması Gazi Üniversitesi. 2002.
  102. Kaan E. Mikro-implant destekli modifiye lokar apareyinin ortodontik bölgeye etkisi. Gazi Üniversitesi Sağlık Bilimleri Enstitüsü Ortodonti Anabilim Dalı: Doktora tezi, Ankara; 2007.
  103. Kircelli BH, Pektaş Z, Kircelli C. Maxillary molar distalization with a bone-anchored pendulum appliance. *The Angle Orthodontist*. 2006;76(4):650-9.
  104. Escobar SA, Tellez PA, Moncada CA, Villegas CA, Latorre CM, Oberti G. Distalization of maxillary molars with the bone-supported pendulum: a clinical study. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2007;131(4):545-9.
  105. Keles A, Erverdi N, Sezen S. Bodily distalization of molars with absolute anchorage. *The Angle Orthodontist*. 2003;73(4):471-82.
  106. Papadopoulos MA. Orthodontic treatment of Class II malocclusion with miniscrew implants. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2008;134(5):604. e1-. e16.
  107. Yamada K, Kuroda S, Deguchi T, Takano-Yamamoto T, Yamashiro T. Distal movement of maxillary molars using miniscrew anchorage in the buccal interradicular region. *The Angle Orthodontist*. 2009;79(1):78-84.
  108. Lim S-M, Hong R-K. Distal movement of maxillary molars using a lever-arm and mini-implant system. *The Angle Orthodontist*. 2008;78(1):167-75.
  109. Oberti G, Villegas C, Ealo M, Palacio JC, Baccetti T. Maxillary molar distalization with the dual-force distalizer supported by mini-implants: a clinical study. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2009;135(3):282. e1-. e5.
  110. El-Dawlatly MM, Abou-EL-Ezz AM, El-Sharaby FA, Mostafa YA. Zygomatic mini-implant for Class II correction in growing patients. Springer; 2014.