

Bölüm 6

SABİT ORTODONTİK TEDAVİLERDE ANKRAJ KONTROLÜ

Güler Nur İBİŞOĞLU¹
Özge USLU AKÇAM²

GİRİŞ

Ortodontik diş hareketi, kontrollü mekanik kuvvetin dişlere ve periyodonsiyuma uygulanması sonucu ortaya çıkması ile karakterizedir. Ortodontik apareylerce uygulanan mekanik kuvvetler biyolojik aktiviteyi tetikleyerek diş hareketine neden olur. Mekanik kuvvetlere cevap, kemik remodelingi ve dişlerin repozisyonudur. Bu açıdan ortodontik tedavi, bir uyaran kuvvet sistemi ve kuvvete cevap modeli olarak değerlendirilebilir. Ortodonti pratiğinde, ankraj planlaması, tedavi planlaması içerisinde önemli bir yer tutmaktadır. Ortodontistler ankraj planlamasının öneminden dolayı, ankraj korunması adına; ağız içi ve/veya ağız dışı destek apareylerin kullanılması, bükümlerinin yapılması, ankraj kaybını azaltacak şekilde mekaniklerin hazırlanması, dişlerin tek tek hareket ettirilmesi gibi birçok yöntem denemişlerdir.

Ankraj kontrolü, istenilen tedavi etkilerini/cevabını sağlayan uygun kuvvet sistemlerini oluşturma yetisidir. Bunun için ortodontistler ankrajı korumak için çeşitli teknikler geliştirmişlerdir. Angle, Case, Tweed, Begg ve birçok klinisyen bu şekilde ortodontik mekanoterapinin gelişmesine katkıda bulunmuşlardır (1).

1. ANKRAJIN TANIMI

Literatürde ankraj için farklı tanımlamalar yapılmaktadır. 1923 yılında “ortodontik kuvvete karşı reaksiyon” tanımının, ileri yıllarda “istenmeyen diş hareketine karşı direnç” veya “diş hareketine karşı ankraj alınan ünitelerin istenilen miktarda hareketi” şeklinde gelişim gösterdiği görülmektedir (2). Ankraj, ortodontistin

¹ Arş. Gör., Ankara Yıldırım Beyazıt Üniversitesi, Diş Hekimliği Fakültesi, Ortodonti AD, gulernur16@gmail.com, ORCID iD 0000-0001-9127-7897

² Doç. Dr., Ankara Yıldırım Beyazıt Üniversitesi, Diş Hekimliği Fakültesi, Ortodonti AD, ozgeakcam@gmail.com, ORCID iD 0000-0002-4885-3657

mekaniklerinin dikkatli uygulanması tedavinin süresi, tedavinin sonucu ve tedavi sonuçlarının stabilitesi için önemlidir.

Güncel teknikler değerlendirilmeli, ihtiyaç duyulan dişsel ve iskeletsel ilişki için gerekli önlemler dikkatle alınmalıdır.

KAYNAKÇA

1. Kuhlberg AJ, Priebe DN. Space closure and anchorage control. *Seminars in Orthodontics* 2001; 7: 42-49.
2. Roberts-Harry D, Sandy J. Orthodontics. Part 9: anchorage control and distal movement. *British Dental Journal* 2004 Mar 13;196(5):255-263. doi: 10.1038/sj.bdj.4811031. PMID: 15017408.
3. Graber TM. Orthodontics principles and practice. 3rd edn. Mosby: W.B. Saunders Company. 1972.
4. Gardiner JH, Leighton BC, Luffingham JK, Valialhan A. Orthodontics for dental students. 4th edn. Delhi: Oxford: Oxford university press. 1998.
5. Lewis BRK. Anchorage planning. In Littlewood SJ, Mitchell L (edn). Introduction to orthodontics. 5th edn. Oxford: Oxford university press. 2019.
6. Angle EH (1900) Treatment of malocclusion of the teeth and fractures of the Maxillae, Angle's system. 6th edn The S.S. White Dental Manufacturing Company, Philadelphia, p 109-116
7. Moyers EM. Force systems and tissue responses to forces in orthodontics and facial orthopedics (Chapter 13) In Moyers EM 4th ed. Hand Book of Orthodontics Year Book Medical Publishers 1988: 309-311.
8. Moyers RE. Handbook of orthodontics. 4th ed. Chicago: Year book medical publishers. 1988.
9. Nanda R, Kuhlberg A. Biomechanical basis of extraction space closure (Chapter 9) In Nanda Red. Biomechanics in Clinical Orthodontics WB Saunders; 1996. p. 156-188.
4. Marcotte M.R. Spring Design (Chapter2) In Marcote M.Red. Biomechanics in Orthodontics BC Decker (Mosby) 1990: 39-43.
10. Begg Orthodontic Theory and Technique 1965 by W. B. Saunders Company. Press of W. B. Saunders Company. Library of Congress catalog card number 61-23786.
11. Sahafian AA, Heravi F, Oshagh M, Adab L. A comparative study of treatment outcomes between begg and edgewise orthodontic systems in class I cases. *Dental Research Journal (Isfahan)*. 2014 Sep;11(5):574-8. PMID: 25426149; PMCID: PMC4241611.
12. Baker RW, Guay AH, Peterson HW Jr. Current concepts of anchorage management. *Angle Orthodontics* 1972; 42: 129-138.
13. Ricketts RM. Mechanics sequence for extraction cases (Part9) In Ricketts RM ed. Bioprogressive Therapy.RMO; *Journal of Clinical Orthodontics* 1979: 147-169.
14. Urias D, Mustafa FIA. Anchorage control in bioprogressive straightwire treatment. *Angle Orthodontics* 2005; 75: 987-92. *Orthod* 1972; 42: 129-138.
15. Gianelly AA. Extraction Treatment (Chapter 4) In Gianelly AA ed. Bidimensional technique theory and practice. GAC International 2000: 148-153.
16. Bishara S. Treatment and treatment considerations (Section IV) In Bishara SE ed. Textbook of Orthodontics W.B.Saunders Company 2001: 354-359.

17. Burstone CJ. The segmented arch approach to space closure *American Journal of Orthodontics and Dentofacial Orthopedics* 1982; 82: 361-378.
18. Viecilli RF. Self-corrective T-loop design for differential space closure. *Am J Orthod Dentofacial Orthop* 2006; 129: 48-53.
19. Smith, R., and Storey, E.: The Importance of Force in Orthodontics, *Austral. J. Dent.* 291-304. 1952. Storey, E., and Smith, R.: Force in Orthodontics and its Relation to Tooth Movement, *Australian Dental Journal.* 56: 11-18, 1952.
20. Begg, P.R.: Differential force an orthodontic treatment, *American Journal of Orthodontics and Dentofacial Orthopedics* 1956;42: 481-510.
21. Tosun Y. Sabit Ortodontik Apareylerin Biyomekanik Prensipleri, Ege Üniversitesi Basımevi, İzmir, 1999.
22. Clocheret K, Willems G, Carels C, Celis JP. Dynamic frictional behaviour of orthodontic archwires and brackets. *European Journal Orthodontics* 2004;26:163-170.
23. Jones SP, Tan CC, Davies EH. The effects of reconditioning on the slot dimensions and static frictional resistance of stainless steel brackets. *European Journal Orthodontics* 2002;24:183-190.
24. Omana HM, Moore RN, Bagby MD. Frictional properties of metal and ceramic brackets. *Journal of Clinical Orthodontics* 1992;26:425-432.
25. Clocheret K, Willems G, Carels C, Celis JP. Dynamic frictional behaviour of orthodontic archwires and brackets. *European Journal Orthodontics* 2004;26:163-170.
26. Chimenti C, Franchi L, Giuseppe MG, Lucci M. Friction of orthodontic elastomeric ligatures with different dimensions. *American Journal of Orthodontics and Dentofacial Orthopedics* 75:421-425, 2005.
27. Sadowsky P, Rossouw PE. Friction introduction. *Seminars Orthodontics* 2003;9:217 Rossouw PE. Friction: an overview. *Seminars Orthodontics* 2003;9:218-222.
28. Lotzof LP, Fine HA, Cisneros GJ. Canine retraction: A comparison of two preadjusted bracket systems. *American Journal of Orthodontics and Dentofacial Orthopedics* 1996; 110: 191-196.
29. Angle EH The latest and best in orthodontic mechanism. *Dental Cosmos* 1929 70:260-268.
30. Andrews LF. The straight-wire appliance, origin, controversy, commentary. *Journal of clinical orthodontics* 1976;10(2):99-114
31. McLaughlin RP, Bennet JC, Trevisi HJ. A brief history and overview of treatment mechanics (Chapter 1) In McLaughlin RP, Bennet JC, Trevisi HJ ed. *Systemized orthodontic treatment mechanics*. Mosby 2001. p. 3-17.
32. Comparison of anchorage loss following initial leveling and aligning using ROTH and MBT Prescription- A clinical prospective study *Journal of International Oral Health* 2014;6(2):16-21.
33. Rinchuse DJ, Miles PG. Self-ligating brackets: present and future. *American Journal of Orthodontics and Dentofacial Orthopedics* 2007;132(2):216-222.
34. Pizzoni L, Ravnholt G, Melsen B. Frictional forces related to self-ligating brackets. *European Journal Orthodontics* 1998;20(3):283-291.
35. Sims AP, Waters NE, Birnie DJ, Pethybridge RJ. A comparison of the forces required to produce tooth movement in vitro using two self-ligating brackets and a pre-adjusted bracket employing two types of ligation. *European Journal Orthodontics* 993 Oct;15(5):377-85. doi: 10.1093/ejo/15.5.377. PMID: 8223972.

36. Thomas S, Sherriff M, Birnie D. A comparative in vitro study of the frictional characteristics of two types of self-ligating brackets and two types of preadjusted edgewise brackets tied with elastomeric ligatures. *European Journal Orthodontics* 1998;20(5):589-96.
37. Fleming PS, DiBiase AT, Lee RT. Randomized clinical trial of orthodontic treatment efficiency with self-ligating and conventional fixed orthodontic appliances. *American Journal of Orthodontics and Dentofacial Orthopedics* 2010;137:738-742.
38. Canine retraction and anchorage loss: Self-ligating versus conventional brackets in a randomized split-mouth study *Angle Orthodontist*. 2014 Sep; 84(5): 846-852.
39. Andrews LF. The six keys to normal occlusion, *American Journal of Orthodontics and Dentofacial Orthopedics* 1972;62:296-309.
40. Erikson, B.E.; Kaplan, H.; and Aisenberg, M.S.: A histological interpretation of repair phenomena following the removal of first premolars with retraction of the anterior segment, *American Journal of Orthodontics and Oral Surgery* 1945;31:1-20.
41. Irvine, R.; Power S.; and McDonald F.: The effectiveness of laceback ligatures: A randomized controlled clinical trial, *Journal of Orthodontics*. 2004;31:303-311.
42. Contemporary Orthodontics Sixth Edition William R. Proffit, DDS, PhD 265-266.
43. Orthodontics. Part 9: Anchorage control and distal movement D. Roberts-Harry1 and J. Sandy
44. Ülgen, M.: Diş Kavislerinin Diş Eksikliklerine Bağlı Boşluğunun Ortodontik Olarak Kapatılabileceği ve Kapatılmaması Gerektiği Vakalar. *İ.Ü. Diş Hek. Fakültesi Dergisi* 1978;12: 17-26.
45. Nanda RS, Tosun Y. Anchorage control. Biomechanics in Orthodontics: Principles and Practice (Bywaters LC, ed.) 1st edition. Hanover Park, Quintessence Publishing. 83-86, 2010
46. Effect of the transpalatal arch during extraction treatment Heather L Zablocki 1, James A McNamara Jr, Lorenzo Franchi, Tiziano Baccetti 2008 Jun;133(6):852-860.
47. Proffit WR, Fields HW, Sarver DM. The second stage of comprehensive treatment: correction of molar relationship and space closure. Contemporary Orthodontics (Dolan J, Nebel J, ed.). 4th edition. St. Louis, Mosby Elsevier. 585- 600
48. Glatzmaier J, Wehrbein H, Peter D. Biodegradable implants for orthodontic anchorage. A preliminary biomechanical study. *European Journal Orthodontics* 1996;18(5):465-469.
49. Melsen B, Verna C. Miniscrew implants: the Aarhus anchorage system. *Sem Orthod*. 2005;11:24-31. 73. Gainsforth BL, Higley L. A study of orthodontic anchorage possibilities in basal bone. *American Journal of Orthodontics and Oral Surgery* 1945;31(8):406-417.
50. Carano A, Velo S, Leone P, Siciliani G. Clinical applications of the miniscrew anchorage system. *Journal of clinical orthodontics* 2005;39(1):9-24.
51. Thiruvengkatachari B. Pavithranand A. Rajasigamani K, Kyung HM. Comparison and measurement of the amount of anchorage loss of the molars with and without the use of implant anchorage during canine retraction. *American Journal of Orthodontics and Dentofacial Orthopedics* 2006;129:551-554.
52. Park HS, Kwon TG, Kwon OW. Treatment of open bite with microscrew implant anchorage *American Journal of Orthodontics and Dentofacial Orthopedics* 2004; 126:627-636.

53. Jeon YJ, Kim YH, Son WS, Hans MG. Correction of a canted occlusal plane with miniscrews in a patient with facial asymmetry. *American Journal of Orthodontics and Dentofacial Orthopedics* 2006;130(2):244-52.
54. Sengupta J, Sharma SK, Sahu D. PG Canine Retraction Spring. *Medical Journal Armed Forces India* 2003 Oct;59(4):337-8. doi: 10.1016/S0377-1237(03)80149-1. Epub 2011 Jul 21. PMID: 27407557; PMCID: PMC4923545.
55. Greenfield RL. The greenfield lingual distalizer. *J clinical orthodontics* 2005; Sep: 548-56.
56. Bacetti T. A new appliance for molar distalization. Reprinted from Ortho News 2001; 1:2-6.
57. Kayalıoğlu M. Mushroom ve compaund retraction arklarının dentofasiyal yapılar üzerine etkilerinin karşılaştırılması, Doktora Tezi, Ç.Ü. 2006.