



BÖLÜM 16

ÜST ÇENE GENİŞLETME TEDAVİSİNİN FONKSİYONEL ETKİSİ

Nilüfer DARENDELİLER¹
Tuba TORTOP²

Posterior çapraz kapanış süt, karma ve daimî dentisyon döneminde oldukça sık rastlanan bir malokluzyondur. Çapraz kapanış tedavisinde uygulanan üst çene genişletme uygulamasının stomognatik sistem dokular ve fonksiyonlarına etkisini aşağıdaki kriterlere göre değerlendirebiliriz.

- Kondil Pozisyonu ve Temporomandibular Ekleme Etkisi
- Çiğneme Yolu ve Kas Aktivitesine Etkisi
- Isırma Kuvveti ve Okluzal Kuvvet Dağılımına Etkisi

a. Üst Çene genişletilmesinin kondil pozisyonu ve temporomandibular ekleme etkisi:

Posterior çapraz kapanışa sahip bireylerin kondil konumlarının değerlendirilmesinde en önemli kriter, okluzyondaki bozukluğun sebep olduğu prematür kontaktların yarattığı mandibular kaymanın olup olmadığıdır. Çapraz kapanış tedavisinde prematür kontaktların yarattığı mandibular kaymanın maksiller genişletme uygulanması ile elimine edilmesi ve tedavi sonunda glenoid fossa içerisinde kondil konumunun tedavi başındaki konumuna göre değerlendirilmesi gerekir. Posterior çapraz kapanış görülen bireylerde, fonksiyonel çapraz kapanış görülme olasılığı yüksektir. Fonksiyonel unilateral çapraz kapanışın ayırıcı en önemli tanısı sentrik ilişki sentrik okluzyon arasında sapma olmasıdır. Mandibulada transversal yönde fonksiyonel kayma görülen hastalarda asimetrik kondil pozisyonu tespit edildiğinde ve düzeltilmediğinde büyüme ile morfolojik asimetri gelişecektir. Posterior

¹ Prof. Dr., Gazi Üniversitesi Diş Hekimliği Fakültesi, Ortodonti AD., darende@gazi.edu.tr

² Prof. Dr., Gazi Üniversitesi Diş Hekimliği Fakültesi, Ortodonti AD., tubatortop@gazi.edu.tr



KAYNAKLAR

1. Okeson J.F *Management of Temporomandibular Disorders and Occlusion* 7th ed. Elsevier Inc. St Lois, Missouri, 2013, ch 5, (p.73-84) (ISBN 978-0-323-08220-4)
2. Egermark I, Magnusson T, Carlsson GE. A 20-year follow-up of signs and symptoms of temporomandibular disorders and malocclusions in subjects with and without orthodontic treatment in childhood. *Angle Orthod.* 2003;73(2):109-15. doi: 10.1043/0003-3219(2003)73<109:AYFOSA>2.0.CO;2.
3. Pinto AS, Buschang PH, Throckmorton GS, Chen P. Morphological and positional asymmetries of young children with functional unilateral posterior crossbite. *Am J Orthod Dentofacial Orthop.* 2001;120(5):513-20. doi: 10.1067/mod.2001.118627a.
4. Arat FE, Arat ZM, Acar M, Beyazova M, Tompson B. Muscular and condylar response to rapid maxillary expansion. Part 1: electromyographic study of anterior temporal and superficial masseter muscles. *Am J Orthod Dentofacial Orthop.* 2008;133(6):815-22. doi: 10.1016/j.ajodo.2006.07.028.
5. Fastuca, R.; Turiaco, H.; Assandri, F.; Zecca, P.A.; Levrini, L.; Caprioglio, A. Condylar Changes in Children with Posterior Crossbite after Maxillary Expansion: Tridimensional Evaluation. *Children* 2021, 8, 38. <https://doi.org/10.3390/children8010038>
6. Melgaço CA, Columbano Neto J, Jurach EM, Nojima Mda C, Nojima LI. Immediate changes in condylar position after rapid maxillary expansion. *Am J Orthod Dentofacial Orthop.* 2014;145(6):771-9. doi: 10.1016/j.ajodo.2014.01.024. PMID: 24880848,
7. Leonardi R, Caltabiano M, Cavallini C, Sicurezza E, Barbato E, Spampinato C, Giordano D. Condyle fossa relationship associated with functional posterior crossbite, before and after rapid maxillary expansion. *Angle Orthod.* 2012;82(6):1040-6. doi: 10.2319/112211-725.1.
8. Ghoussoub, M.S.; Garcia, R.; Sleilat, G.; Rifai, K. Effect of rapid maxillary expansion on condyle-fossa relationship in growing patients. *J. Contemp. Dent. Pract.* 2018, 19, 1189–1198
9. Lam PH, Sadowsky C, Omerza F. Mandibular asymmetry and condylar position in children with unilateral posterior crossbite. *Am J Orthod Dentofacial Orthop.* 1999;115(5):569-75. doi: 10.1016/s0889-5406(99)70282-9.
10. Veli I, Uysal T, Ozer T, Ucar FI, Eruz M. Mandibular asymmetry in unilateral and bilateral posterior crossbite patients using cone-beam computed tomography. *Angle Orthod.* 2011;81(6):966-74. doi: 10.2319/022011-122.1.
11. Myers DR, Barenie JT, Bell RA, Williamson EH. Condylar position in children with functional posterior crossbites: before and after crossbite correction. *Ped Dent* 1980; 2:190-4.
12. Hesse KL, Artun J, Joondeph DR, Kennedy DB. Changes in condylar position and occlusion associated with maxillary expansion for correction of functional unilateral posterior crossbite. *Am J Orthod Dentofacial Orthop.* 1997;111(4):410-8. doi: 10.1016/s0889-5406(97)80023-6.
13. Evangelista K, Ferrari-Piloni C, Barros LAN, Avelino MAG, Helena Soares Cevidanés L, Ruellas ACO, Valladares-Neto J, Silva MAG. Three-dimensional assessment of craniofacial asymmetry in children with transverse maxillary deficiency after rapid maxillary expansion: A prospective study. *Orthod Craniofac Res.* 2020;23(3):300-312. doi: 10.1111/ocr.12370.
14. Ben-Bassat Y, Yaffe A, Brin I, Freeman J, Ehrlich Y. Functional and morphological-occlusal aspects in children treated for unilateral posterior cross-bite. *Eur J Orthod.* 1993;15(1):57-63. doi: 10.1093/ejo/15.1.57.
15. Fuentes MA, Opperman LA, Buschang P, Bellinger LL, Carlson DS, Hinton RJ. Lateral functional shift of the mandible: Part I. Effects on condylar cartilage thickness and proliferation. *Am J Orthod Dentofacial Orthop.* 2003;123(2):153-9. doi: 10.1067/mod.2003.5.
16. Fuentes MA, Opperman LA, Buschang P, Bellinger LL, Carlson DS, Hinton RJ. Lateral functional shift of the mandible: Part II. Effects on gene expression in condylar cartilage. *Am J Orthod Dentofacial Orthop.* 2003;123(2):160-6. doi: 10.1067/mod.2003.6.
17. McNeill, C. *Science and Practice of Occlusion* Quintessence Publishing Co, Illinois, 1997. ch 9 (p.115-124). (ISBN 0-86715-304-0)



18. Kecik D, Kocadereli I, Saatci I. Evaluation of the treatment changes of functional posterior crossbite in the mixed dentition. *Am J Orthod Dentofacial Orthop.* 2007;131(2):202-15. doi: 10.1016/j.ajodo.2005.03.030.
19. Takada J, Miyamoto JJ, Yokota T, Ono T, Moriyama K. Comparison of the mandibular hinge axis in adult patients with facial asymmetry with and without posterior unilateral crossbite. *Eur J Orthod.* 2015;37(1):22-7. doi: 10.1093/ejo/cju009.
20. Matta, E.N.R.; Sousa, M.M.G.; Sant'anna, E.F.; Silvia, S.C. Evaluation with helicoidal computed tomography of rapid maxillary expansion effects in the condylar position of patients with functional posterior crossbite. *Dent. Press Ortodon. Ortop. Facial* 2009; 14:161–169.
21. McLeod L, Hernández IA, Heo G, Lagravère MO. Condylar positional changes in rapid maxillary expansion assessed with cone-beam computer tomography. *Int Orthod.* 2016;14(3):342-56. doi: 10.1016/j.ortho.2016.07.006.
22. Arat FE, Arat ZM, Tompson B, Tanju S. Muscular and condylar response to rapid maxillary expansion. Part 3: magnetic resonance assessment of condyle-disc relationship. *Am J Orthod Dentofacial Orthop.* 2008;133(6):830-6. doi: 10.1016/j.ajodo.2007.03.026.
23. Arat FE, Arat ZM, Tompson B, Tanju S, Erden I. Muscular and condylar response to rapid maxillary expansion. Part 2: magnetic resonance imaging study of the temporomandibular joint. *Am J Orthod Dentofacial Orthop.* 2008;133(6):823-9. doi: 10.1016/j.ajodo.2006.07.029.
24. Caprioglio A, Bergamini C, Franchi L, Vercellini N, Zecca PA, Nucera R, Fastuca R. Prediction of Class II improvement after rapid maxillary expansion in early mixed dentition. *Prog Orthod.* 2017 Dec;18(1):9. doi: 10.1186/s40510-017-0163-3.
25. Guest SS, McNamara JA Jr, Baccetti T, Franchi L. Improving Class II malocclusion as a side-effect of rapid maxillary expansion: a prospective clinical study. *Am J Orthod Dentofacial Orthop.* 2010 Nov;138(5):582-91. doi: 10.1016/j.ajodo.2008.12.026.
26. Lima Filho RM, Lima AC, de Oliveira Ruellas AC. Spontaneous correction of Class II malocclusion after rapid palatal expansion. *Angle Orthod.* 2003 Dec;73(6):745-52. doi: 10.1043/0003-3219(2003)073<0745:SCOCIM>2.0.CO;2.
27. Lippold C, Hoppe G, Moiseenko T, Ehmer U, Danesh G. Analysis of condylar differences in functional unilateral posterior crossbite during early treatment—a randomized clinical study. *J Orofac Orthop.* 2008;69(4):283-96. doi: 10.1007/s00056-008-0803-9.
28. Ellabban MT, Abdul-Aziz AI, Fayed MMS, AboulFotouh MH, Elkattan ES, Dahaba MM. Positional and dimensional temporomandibular joint changes after correction of posterior crossbite in growing patients: A systematic review. *Angle Orthod.* 2018;88(5):638-648. doi: 10.2319/110217-749.1.
29. Torres D, Lopes J, Magno MB, Cople Maia L, Normando D, Leão PB. Effects of rapid maxillary expansion on temporomandibular joints. *Angle Orthod.* 2020;90(3):442-456. doi: 10.2319/080619-517.1.
30. Brin I, Ben-Bassat Y, Blustein Y, Ehrlich J, Hochman N, Marmary Y, Yaffe A. Skeletal and functional effects of treatment for unilateral posterior crossbite. *Am J Orthod Dentofacial Orthop.* 1996;109(2):173-9. doi: 10.1016/s0889-5406(96)70178-6.
31. Throckmorton GS, Buschang PH, Hayasaki H, Pinto AS. Changes in the masticatory cycle following treatment of posterior unilateral crossbite in children. *Am J Orthod Dentofacial Orthop.* 2001;120(5):521-9. doi: 10.1067/mod.2001.118626.
32. Piancino MG, Talpone F, Dalmaso P, Debernardi C, Lewin A, Bracco P. Reverse-sequencing chewing patterns before and after treatment of children with a unilateral posterior crossbite. *Eur J Orthod.* 2006;28(5):480-4. doi: 10.1093/ejo/cjl014.
33. Sever E, Marion L, Ovsenik M. Relationship between masticatory cycle morphology and unilateral crossbite in the primary dentition. *Eur J Orthod.* 2011 Dec;33(6):620-7. doi: 10.1093/ejo/cjq070.
34. Martin C, Palma JC, Alamán JM, Lopez-Quiñones JM, Alarcón JA. Longitudinal evaluation of sEMG of masticatory muscles and kinematics of mandible changes in children treated for unilateral cross-bite. *J Electromyogr Kinesiol.* 2012;22(4):620-8. doi: 10.1016/j.jelekin.2012.01.002.



35. Alarcón JA, Martín C, Palma JC. Effect of unilateral posterior crossbite on the electromyographic activity of human masticatory muscles. *Am J Orthod Dentofacial Orthop.* 2000 Sep;118(3):328-34. doi: 10.1067/mod.2000.103252.
36. Piancino MG, Farina D, Talpone F, Merlo A, Bracco P. Muscular activation during reverse and non-reverse chewing cycles in unilateral posterior crossbite. *Eur J Oral Sci.* 2009;117(2):122-8. doi: 10.1111/j.1600-0722.2008.00601.x.
37. Castelo PM, Gavião MB, Pereira LJ, Bonjardim LR. Masticatory muscle thickness, bite force, and occlusal contacts in young children with unilateral posterior crossbite. *Eur J Orthod.* 2007;29(2):149-56. doi: 10.1093/ejo/cjl089.
38. Kiliaridis S, Mahboubi PH, Raadsheer MC, Katsaros C. Ultrasonographic thickness of the masseter muscle in growing individuals with unilateral crossbite. *Angle Orthod.* 2007;77(4):607-11. doi: 10.2319/101105-360.
39. De Rossi M, De Rossi A, Hallak JE, Vitti M, Regalo SC. Electromyographic evaluation in children having rapid maxillary expansion. *Am J Orthod Dentofacial Orthop.* 2009;136(3):355-60. doi: 10.1016/j.ajodo.2007.08.027.
40. Spolaor F, Mason M, De Stefani A, Bruno G, Surace O, Guiotto A, Gracco A, Sawacha Z. Effects of Rapid Palatal Expansion on Chewing Biomechanics in Children with Malocclusion: A Surface Electromyography Study. *Sensors (Basel).* 2020;20(7):2086. Doi: 10.3390/s20072086.
41. Maffei C, Garcia P, de Biase NG, de Souza Camargo E, Vianna-Lara MS, Grégio AM, Azevedo-Alanis LR. Orthodontic intervention combined with myofunctional therapy increases electromyographic activity of masticatory muscles in patients with skeletal unilateral posterior crossbite. *Acta Odontol Scand.* 2014;72(4):298-303. doi: 10.3109/00016357.2013.824606.
42. Piancino MG, Falla D, Merlo A, Vallelonga T, de Biase C, Dalessandri D, Debernardi C. Effects of therapy on masseter activity and chewing kinematics in patients with unilateral posterior crossbite. *Arch Oral Biol.* 2016;67:61-7. doi: 10.1016/j.archoralbio.2016.03.013.
43. Michelotti A, Rongo R, Valentino R, D'Antò V, Bucci R, Danzi G, Cioffi I. Evaluation of masticatory muscle activity in patients with unilateral posterior crossbite before and after rapid maxillary expansion. *Eur J Orthod.* 2019;41(1):46-53. Doi: 10.1093/ejo/cjy019.
44. Sonnesen L, Bakke M, Solow B. Bite force in pre-orthodontic children with unilateral crossbite. *Eur J Orthod.* 2001;23: 741–749
45. Sonnesen L, Bakke M. Bite force in children with unilateral crossbite before and after orthodontic treatment. A prospective longitudinal study. *Eur J Orthod.* 2007 Jun;29(3):310-3. doi: 10.1093/ejo/cjl082. doi: 10.1093/ejo/23.6.741.
46. Uzuner FD, Odabasi H, Acar S, Tortop T, Darendeliler N. Evaluation of the effects of modified bonded rapid maxillary expansion on occlusal force distribution: A pilot study. *Eur J Dent.* 2016;10(1):103-108. doi: 10.4103/1305-7456.175695.
47. Sonnesen L, Bakke M, Solow B. Malocclusion traits and symptoms and signs of temporomandibular disorders in children with severe malocclusion. *Eur J Orthod.* 1998;20: 543–559. doi: 10.1093/ejo/20.5.543.
48. Vanderas AP, Papagiannoulis L. Multifactorial analysis of the aetiology of craniomandibular dysfunction in children. *Int J Paediatr Dent.* 2002;12:336–346. doi: 10.1046/j.1365-263x.2002.00380.x.