

## BÖLÜM 5

# ORTOGNATİK CERRAHİ TEDAVİ SONUÇLARININ BİLGİSAYAR DESTEKLİ PROGRAMLARLA ÖNGÖRÜLMESİ

Canan AKSU KIZILDAĞ<sup>1</sup>  
Serpil ÇOKAKOĞLU<sup>2</sup>

### GİRİŞ

Ortognatik cerrahi dentofasiyal şekil bozukluklarını düzeltmek, okluzal, solunum ve eklem anomalilerini içeren hem estetik hem de fonksiyonel bozuklukları iyileştirmek için ortaya çıkan bir tedavidir. Büyüme ve gelişimini tamamlamış şiddetli iskeletsel malokluzyonu olan hastalarda uygulanmaktadır. Bu tedavilerin başarılı bir şekilde gerçekleştirilebilmesi için planlama aşaması oldukça önemlidir. Cerrahi sonuçların doğru bir şekilde öngörülebilmesi, dentofasiyal deformitelerin tedavisinde anahtar bir faktördür.

Ameliyat öncesinde hastaların tedavi sonundaki muhtemel durum hakkında fikir sahibi olmak istemeleri ve hekimin doğru tedavi planlaması yapabilmesi açısından sonuca en yakın öngörüü sağlayacak tekniğin kullanılması önemlidir.

Cerrahi öngörünün amacı; dentoiskeletsel kompleksin çeşitli bileşenlerinin doğrusal hareketlerini elde etmek ve nihai sonuç için gerekli açısız ve konumsal değişikliklerin gerçekçi bir şekilde elde edilip edilemeyeceğini değerlendirmektir.<sup>1</sup> Ameliyat sonrası iskeletsel yapı ve yumuşak dokuda oluşacak olan değişiklikler konvansiyonel sefalometrik çizimler veya bilgisayar destekli yazılımlar yardımıyla öngörülebilmektedir.

Cohen 1965 yılında, kes yapıştır yöntemi olarak adlandırılan teknik ile lateral sefalometrik çizimlerin yapıldığı asetat kağıdında cerrahi hareketi istenilen bölgeleri yeniden konumlandırarak öngörü çizimi oluşturmuştur.<sup>2</sup>

McNeil ve arkadaşları tarafından öngörü tekniği 4 aşamada ele alınmıştır.<sup>3</sup> Birinci aşamada hastanın alçı modelleri bir artikülatöre alınarak istenilen konuşma getirilmiştir. İkinci adımda, hareketi planlanmayan dokuların sefalometrik

<sup>1</sup> Doktora öđr, Pamukkale Üniversitesi Diş Hekimliği Fakültesi, cennaksu@hotmail.com

<sup>2</sup> Dr Öğr Üyesi, Pamukkale Üniversitesi Diş Hekimliği Fakültesi, scokakoglu@pau.edu.tr

## KAYNAKLAR

1. Naini FB, Gill DS. (2017). *Orthognathic surgery: principles, planning and practice*. John Wiley & Sons.
2. Cohen MI. Mandibular prognathism. *Am J Orthod*. 1965;51(5):368-379.
3. McNeill RW, Proffit WR, White RP. Cephalometric prediction for orthodontic surgery. *Angle Orthod*. 1972;42(2):154-164.
4. Friede H, Kahnberg K-E, Adell R, et al. Accuracy of cephalometric prediction in orthognathic surgery. *J Oral Maxillofac Surg*. 1987;45(9):754-760.
5. Pospisil OA. Reliability and feasibility of prediction tracing in orthognathic surgery. *J Cranio-maxillofac Surg*. 1987;15:79-83.
6. Proffit WR, White RP, Sarver DM. (2003). *Contemporary treatment of dentofacial deformity*, Mosby St. Louis.
7. Kolokitha O-E, Topouzelis N. Cephalometric methods of prediction in orthognathic surgery. *J Oral Maxillofac Surg*. 2011;10(3):236-245.
8. Kaipatur N, Al-Thomali Y, Flores-Mir C. Accuracy of computer programs in predicting orthognathic surgery hard tissue response. *J Oral Maxillofac Surg*. 2009;67(8):1628-1639.
9. Peterman RJ, Jiang S, Johe R, et al. Accuracy of Dolphin visual treatment objective (VTO) prediction software on class III patients treated with maxillary advancement and mandibular setback. *Prog Orthod*. 2016;17(1):19-27.
10. Cszaszar GR, Brüker-Cszaszar B, Niederdellmann H. Prediction of soft tissue profiles in orthodontic surgery with the Dentofacial Planner. *Int J Adult Orthodon Orthognath Surg*. 1999;14(4):285-290.
11. Kaipatur NR, Flores-Mir C. Accuracy of computer programs in predicting orthognathic surgery soft tissue response. *J Oral Maxillofac Surg*. 2009;67(4):751-759.
12. Zhang X, Mei L, Yan X, et al. Accuracy of computer-aided prediction in soft tissue changes after orthodontic treatment. *Am J Orthod Dentofacial Orthop*. 2019;156(6):823-831.
13. Tikku T, Khanna R, Maurya R, et al. Comparative evaluation of cephalometric measurements of monitor-displayed images by Nemoceph software and its hard copy by manual tracing. *J Oral Biol Craniofac Res*. 2014;4(1):35-41.
14. Legal S, Moralis A, Waiss W, et al. Accuracy in orthognathic surgery comparison of preoperative plan and postoperative outcome using computer-assisted two-dimensional cephalometry by the Onyx Ceph® system. *J Craniomaxillofac Surg*. 2018;46(10):1793-1799.
15. Akhoundi MA, Shirani G, Arshad M, et al. Comparison of an imaging software and manual prediction of soft tissue changes after orthognathic surgery. *J Dent (Tehran)*. 2012;9(3):178.
16. Arslan C, Altuğ AT, Memikoğlu TUT, et al. comparison of the accuracy of manual and digital cephalometric prediction methods in orthognathic surgical planning: a pilot study. *turk j orthod*. 2018;31(4):133.
17. van Twisk P-H, Tenhagen M, Gül A, et al. How accurate is the soft tissue prediction of Dolphin Imaging for orthognathic surgery? *Int Orthod*. 2019;17(3):488-496.
18. Yamashita AL, Iwaki LCV, de Souza Pinto GN, et al. Accuracy of two-dimensional pharyngeal airway space prediction for bimaxillary orthognathic surgery. *Oral Maxillofac Surg*. 2018;22(2):197-202.
19. Magro-Filho O, Magro-Érnica N, Queiroz TP, et al. Comparative study of 2 software programs for predicting profile changes in Class III patients having double-jaw orthognathic surgery. *Am J Orthod Dentofacial Orthop*. 2010;137(4):452. e451-452. e455.
20. Van Hemelen G, Van Genechten M, Renier L, et al. Three-dimensional virtual planning in orthognathic surgery enhances the accuracy of soft tissue prediction. *J Craniomaxillofac Surg*. 2015;43(6):918-925.
21. Holoğlu F, Akbulut S, Soylu E, et al. Ortognatik Cerrahide Üç Boyutlu Dijital Planlama. *Turkiye Klinikleri J Oral Maxillofac Surg-Special Topics*. 2016;2(2):18-25.
22. Farronato G, Galbiati G, Esposito L, et al. Three-dimensional virtual treatment planning: Pre-surgical evaluation. *J Craniofac Surg*. 2018;29(5):e433-e437.

23. Kokuryo S, Habu M, Miyamoto I, et al. Predictability and accuracy of maxillary repositioning during bimaxillary surgery using a three-dimensional positioning technique. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2014;118(2):187-193.
24. Wang RH, Ho C-T, Lin H-H, et al. Three-dimensional cephalometry for orthognathic planning: Normative data and analyses. *J Formos Med Assoc.* 2020;119(1):191-203.
25. Maal T, Plooij J, Rangel F, et al. The accuracy of matching three-dimensional photographs with skin surfaces derived from cone-beam computed tomography. *Int J Oral Maxillofac Surg.* 2008;37(7):641-646.
26. Resnick CM, Daniels KM, Vlahos M. Does the Andrews Facial Analysis Predict Esthetic Sagittal Maxillary Position? *J Oral Maxillofac Surg.* 2017;75(10):e351.
27. Gennaro P, Chisci G, Aboh IV, et al. Comparative Study in Orthognathic Surgery Between Dolphin Imaging Software and Manual Prediction. *J Craniofac Surg.* 2014;25(4):1577-1578.
28. Abe N, Kuroda S, Furutani M, et al. Data-based prediction of soft tissue changes after orthognathic surgery: clinical assessment of new simulation software. *Int J Oral Max Surg.* 2015;44(1):90-96.
29. Kim D, Ho DCY, Mai H, et al. A clinically validated prediction method for facial soft-tissue changes following double-jaw surgery. *Med Phys.* 2017;44(8):4252-4261.
30. Knoops P, Borghi A, Breakey R, et al. Three-dimensional soft tissue prediction in orthognathic surgery: a clinical comparison of Dolphin, ProPlan CMF, and probabilistic finite element modelling. *Int J Oral Maxillofac Surg.* 2019;48(4):511-518.
31. Wan Y, Jackson T, Chung C, et al. Comparison of condylar position in orthognathic surgery cases treated with virtual surgical planning vs. conventional model planning. *Orthod Craniofac Res.* 2019;22:142-148.
32. Bengtsson M, Wall G, Greiff L, et al. Treatment outcome in orthognathic surgery—a prospective randomized blinded case-controlled comparison of planning accuracy in computer-assisted two-and three-dimensional planning techniques (part II). *J Craniomaxillofac Surg.* 2017;45(9):1419-1424.
33. Bengtsson M, Wall G, Becktor JP, et al. A comparison of cost-effectiveness of computer-assisted 2-and 3-dimensional planning techniques in orthognathic surgery. *Br J Oral Maxillofac Surg.* 2019;57(4):352-358.
34. Hammoudeh JA, Howell LK, Boutros S, et al. Current status of surgical planning for orthognathic surgery: traditional methods versus 3D surgical planning. *Plast Reconstr Surg.* 2015;3(2).
35. Steinhuber T, Brunold S, Gärtner C, et al. Is virtual surgical planning in orthognathic surgery faster than conventional planning? A time and workflow analysis of an office-based workflow for single-and double-jaw surgery. *J Oral Maxillofac Surg.* 2018;76(2):397-407.
36. Park S-Y, Hwang D-S, Song J-M, et al. Comparison of time and cost between conventional surgical planning and virtual surgical planning in orthognathic surgery in Korea. *Maxillofac Plast Reconstr Surg.* 2019;41(1):35-41.
37. Wrzosek M, Peacock Z, Laviv A, et al. Comparison of time required for traditional versus virtual orthognathic surgery treatment planning. *Int J Oral Maxillofac Surg.* 2016;45(9):1065-1069.
38. Chang Y-J, Ruellas AC, Yatabe MS, et al. Soft tissue changes measured with three-dimensional software provides new insights for surgical predictions. *J Oral Maxillofac Surg.* 2017;75(10):2191-2201.
39. Chang Y-J, Lai J-P, Tsai C-Y, et al. Accuracy assessment of computer-aided three-dimensional simulation and navigation in orthognathic surgery (CASNOS). *J Formos Med Assoc.* 2019;119(3):701-711.
40. Elshebiny T, Morcos S, Mohammad A, et al. Accuracy of Three-Dimensional Soft Tissue Prediction in Orthognathic Cases Using Dolphin Three-Dimensional Software. *J Craniofac Surg.* 2019;30(2):525-528.
41. Wiedemeyer V, Berger M, Martini M, et al. Predictability of pharyngeal airway space dimension changes after orthognathic surgery in class II patients: A mathematical approach. *J Cranio-maxillofac Surg.* 2019;47(10):1504-1509.
42. Bailey LTJ, Cevidan LH, Proffit WR. Stability and predictability of orthognathic surgery. *Am J Orthod Dentofacial Orthop.* 2004;126(3):273-277.