

## BÖLÜM 8

### TEMPOROMANDİBULER EKLEME CERRAHİ BAKIŞ

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#### GİRİŞ

Temporomandibuler eklem (TME), insan vücudunda en kompleks yapıdaki eklerden biri olup, dental oklüzyon ve nöromusküler sistemde önemli bir role sahiptir (1). Temporomandibuler ekleme ait düzensizlikler (TMD), hastaların günlük aktivite ve fonksiyonlarını önemli ölçüde sınırlayabilecek ağrı ve kısıtlı ağız açıklığı ile ortaya çıkabilmektedir. Literatürde bildirilen TMD prevalansı bakımından epidemiyolojik çalışmalar arasında anlamlı farklılıklar bulunmakla birlikte, genel popülasyonun yaklaşık %70 kadardında en az bir adet TMD belirtisinin mevcut olduğu düşünülmektedir (2). Bir meta-analiz çalışmasında, musküler bozuklukların %45, disk düzensizliklerinin %41 ve eklem ağrısı bozukluklarının %34 prevalansa sahip olduğu bildirilmiştir (3).

TMD tedavisinin temel amacı ağrının önlenmesi/azaltılması ve normal mandibuler fonksiyonun sağlanabilmesidir. En etkili sonucun elde edilmesinde, TMD'ye zemin hazırlayan stres, depresyon, oral parafonksiyonel alışkanlıklar gibi faktörlerin belirlenerek tedavi stratejisinin oluşturulması büyük önem arz etmektedir (4). TMD tedavisi, cerrahi olmayan ve cerrahi yaklaşımlar olarak iki temel kategoride incelenmektedir. Bu bölümün amacı, TMD tedavisinde uygulanan cerrahi yaklaşımlara güncel literatür desteğiyle genel bir bakış sağlamaktır.

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## KAYNAKLAR

1. Granados JI. The influence of the loss of teeth and attrition on the articular eminence. *The Journal of Prosthetic Dentistry*. 1979;42(1): 78-85.
2. Dimitroulis G. Temporomandibular disorders: a clinical update. *Bmj*. 1998;317(7152): 190-194.
3. Chang CL, Wang DH, Yang MC, et al. Functional disorders of the temporomandibular joints: Internal derangement of the temporomandibular joint. *The Kaohsiung journal of medical sciences*. 2018;34(4):223-230.
4. Dimitroulis G. Temporomandibular joint surgery: what does it mean to the dental practitioner? *Australian dental journal*. 2011;56(3): 257-264.
5. Kotiranta U, Suvinen T, Forssell H. Tailored treatments in temporomandibular disorders: where are we now? A systematic qualitative literature review. *Journal of Oral & Facial Pain & Headache*. 2014;28(1): 28-37.
6. Dimitroulis G. The role of surgery in the management of disorders of the Temporomandibular Joint: a critical review of the literature Part 1. *International Journal of Oral and Maxillofacial Surgery*. 2005;34(2): 107-13.
7. Dolwick M, Dimitroulis G. Is there a role for temporomandibular joint surgery? *British Journal of Oral and Maxillofacial Surgery*. 1994;32(5): 307-313.
8. Dimitroulis G. A new surgical classification for temporomandibular joint disorders. *International Journal of Oral and Maxillofacial Surgery*. 2013;42(2): 218-222.
9. Wilkes CH. Internal derangements of the temporomandibular joint: pathological variations. *Archives of Otolaryngology-Head & Neck Surgery*. 1989;115(4): 469-477.
10. Murakami K-i, Matsuki M, Iizuka T, et al. Recapturing the Persistent Anteriorly Displaced Disk by Mandibular Manipulation after Pumping and Hydraulic Pressure to the Upper JointCavity of the Temporomandibular Joint. *CRANIO®*. 1987;5(1): 17-24.
11. Nitzan DW, Dolwick MF, Martinez GA. Temporomandibular joint arthrocentesis: a simplified treatment for severe, limited mouth opening. *Journal of Oral and Maxillofacial Surgery*. 1991;49(11): 1163-1167.
12. Al-Belasy F, Dolwick M. Arthrocentesis for the treatment of temporomandibular joint closed lock: a review article. *International Journal of Oral and Maxillofacial Surgery*. 2007;36(9): 773-782.
13. Haskin CL, Milam SB, Cameron IL. Pathogenesis of degenerative joint disease in the human temporomandibular joint. *Critical Reviews in Oral Biology & Medicine*. 1995;6(3): 248-277.
14. Nitzan DW. Arthrocentesis—incitatives for using this minimally invasive approach for temporomandibular disorders. *Oral and Maxillofacial Surgery Clinics*. 2006;18(3): 311-328.
15. Zardeneta G, Milam SB, Schmitz JP. Elution of proteins by continuous temporomandibular joint arthrocentesis. *Journal of Oral and Maxillofacial Surgery*. 1997;55(7):709-716.
16. Zhu P, Lin H, Zhou Q, et al. Dynamic evaluation of lavage efficacy in upper compartment of the temporomandibular joint. *Journal of Oral and Maxillofacial Surgery*. 2017;75(2): 276-283.
17. Laskin DM. Needle placement for arthrocentesis. *Journal of Oral and Maxillofacial Surgery: Official Journal of the American Association of Oral and Maxillofacial Surgeons*. 1998;56(7): 907.
18. Alkan A, Etöz OA. A new anatomical landmark to simplify temporomandibular joint arthrocentesis. *British Journal of Oral and Maxillofacial Surgery*. 2010;48(4): 310-311.
19. Guarda-Nardini L, Ferronato G, Manfredini D. Two-needle vs. single-needle technique for TMJ arthrocentesis plus hyaluronic acid injections: a comparative trial over a six-month follow up. *International Journal of Oral and Maxillofacial Surgery*. 2012;41(4): 506-513.
20. Guarda-Nardini L, Manfredini D, Ferronato G. Arthrocentesis of the temporomandibular joint: a proposal for a single-needle technique. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*. 2008;106(4): 483-486.
21. Grossmann E. Arthrocentesis techniques applied to arthrogenic temporomandibular joint disorders. *Revista Dor*. 2012;13: 374-381.

22. Dolwick MF, Widmer CG. Temporomandibular joint arthrocentesis: an evidence-based review. *Frontiers of Oral and Maxillofacial Medicine*. 2020;2: 26.
23. Şentürk M, Yıldırım D, Bilgir E, et al. Long-term evaluation of single-puncture temporomandibular joint arthrocentesis in patients with unilateral temporomandibular disorders. *International Journal of Oral and Maxillofacial Surgery*. 2018;47(1): 98-102.
24. Şentürk MF, Tüzünler-Öncül AM, Cambazoğlu M. Prospective short term comparison of outcomes after single or double puncture arthrocentesis of the temporomandibular joint. *British Journal of Oral and Maxillofacial Surgery*. 2016;54(1): 26-29.
25. Sindel A, Uzuner F, Sindel M, et al. Comparison of the efficiency of irrigation of single and double-needle techniques of temporomandibular joint arthrocentesis: A cadaver study. *Cranio*. 2017;35(6): 405-409.
26. Alkan A, Baş B. The use of double-needle canula method for temporomandibular joint arthrocentesis: clinical report. *European Journal of Dentistry*. 2007;1(03): 179-182.
27. Alkan A, Kılıç E. A new approach to arthrocentesis of the temporomandibular joint. *International Journal of Oral and Maxillofacial Surgery*. 2009;38(1): 85-86.
28. Öreroğlu AR, Özkaia Ö, Öztürk MB, et al. Concentric-needle cannula method for single-puncture arthrocentesis in temporomandibular joint disease: an inexpensive and feasible technique. *Journal of Oral and Maxillofacial Surgery*. 2011;69(9): 2334-2338.
29. Talaat W, Ghoneim MM, Elsholkamy M. Single-needle arthrocentesis (Shepard cannula) vs. double-needle arthrocentesis for treating disc displacement without reduction. *CRANIO*. 2016;34(5): 296-302.
30. Antony P, Sebastian A, Annapoorani D, et al. Comparison of clinical outcomes of treatment of dysfunction of the temporomandibular joint between conventional and ultrasound-guided arthrocentesis. *British Journal of Oral and Maxillofacial Surgery*. 2019;57(1): 62-66.
31. Bhargava D, Thomas S, Pawar P, et al. Ultrasound-guided arthrocentesis using single-puncture, double-lumen, single-barrel needle for patients with temporomandibular joint acute closed lock internal derangement. *Oral and Maxillofacial Surgery*. 2019;23(2): 159-165.
32. Sivri MB, Ozkan Y, Pekiner FN, et al. Comparison of ultrasound-guided and conventional arthrocentesis of the temporomandibular joint. *British Journal of Oral and Maxillofacial Surgery*. 2016;54(6): 677-681.
33. Laskin DM, Greene CS, Hylander WL (eds). *Temporomandibular disorders: an evidence-based approach to diagnosis and treatment*. Hanover Park, IL 60133: Quintessence Publishing Co Inc; 2006.
34. Kılıç SC, Güngörmiş M, Sümbüllü MA. Is arthrocentesis plus platelet-rich plasma superior to arthrocentesis alone in the treatment of temporomandibular joint osteoarthritis? A randomized clinical trial. *Journal of Oral and Maxillofacial Surgery*. 2015;73(8): 1473-1483.
35. Toameh MH, Alkhouri I, Karman MA. Management of patients with disk displacement without reduction of the temporomandibular joint by arthrocentesis alone, plus hyaluronic acid or plus platelet-rich plasma. *Dental and Medical Problems*. 2019;56(3): 265-272.
36. Tvrdy P, Heinz P, Pink R. Arthrocentesis of the temporomandibular joint: a review. *Biomedical Papers of the Medical Faculty of the University Palacky Olomouc Czechoslovakia*. 2015;159(1): 31-34.
37. Vaira LA, Raho MT, Soma D, et al. Complications and post-operative sequelae of temporomandibular joint arthrocentesis. *CRANIO*. 2018;36(4): 264-267.
38. González-García R, Rodríguez-Campo FJ, Escorial-Hernández V, et al. Complications of temporomandibular joint arthroscopy: a retrospective analytic study of 670 arthroscopic procedures. *Journal of Oral and Maxillofacial Surgery*. 2006;64(11): 1587-1591.
39. McCain JP, Sanders B, Koslin MG, et al. Temporomandibular joint arthroscopy: a 6-year multi-center retrospective study of 4,831 joints. *Journal of Oral and Maxillofacial Surgery*. 1992;50(9): 926-930.
40. Soni A. Arthrocentesis of temporomandibular joint-bridging the gap between non-surgical and surgical treatment. *Annals of Maxillofacial Surgery*. 2019;9(1): 158.

41. Tozoglu S, Al-Belasy FA, Dolwick MF. A review of techniques of lysis and lavage of the TMJ. *British Journal of Oral and Maxillofacial Surgery*. 2011;49(4): 302-309.
42. Murakami K. Rationale of arthroscopic surgery of the temporomandibular joint. *Journal of Oral Biology and Craniofacial Research*. 2013;3(3): 126-134.
43. Onishi M. [Arthroscopy of the temporomandibular joint (author's transl)]. Kokubyo Gakkai zasshi *The Journal of the Stomatological Society, Japan*. 1975;42(2): 207-213.
44. González-García R. Arthroscopic myotomy of the lateral pterygoid muscle with coblation for the treatment of temporomandibular joint anterior disc displacement without reduction. *Journal of Oral and Maxillofacial Surgery*. 2009;67(12): 2699-2701.
45. Koslin MG, Martin JC. The use of the holmium laser for temporomandibular joint arthroscopic surgery. *Journal of Oral and Maxillofacial Surgery: Official Journal of the American Association of Oral and Maxillofacial Surgeons*. 1993;51(2): 122-123.
46. Ohnishi M. Arthroscopic laser surgery and suturing for temporomandibular joint disorders: technique and clinical results. *Arthroscopy: The Journal of Arthroscopic & Related Surgery*. 1991;7(2): 212-220.
47. Quinn JH. Arthroscopic management of temporomandibular joint disc perforations and associated advanced chondromalacia by discoplasty and abrasion arthroplasty: Preliminary results. *Journal of Oral and Maxillofacial Surgery*. 1994;52(8): 800-806.
48. Ahmed N, Sidebottom A, O'Connor M, et al. Prospective outcome assessment of the therapeutic benefits of arthroscopy and arthrocentesis of the temporomandibular joint. *British Journal of Oral and Maxillofacial Surgery*. 2012;50(8): 745-748.
49. Goudot P, Jaquetin AR, Hugonnet S, et al. Improvement of pain and function after arthroscopy and arthrocentesis of the temporomandibular joint: a comparative study. *Journal of Crani-o-Maxillofacial Surgery*. 2000;28(1): 39-43.
50. Muñoz-Guerra MF, Rodríguez-Campo FJ, Hernández VE, et al. Temporomandibular joint disc perforation: long-term results after operative arthroscopy. *Journal of Oral and Maxillofacial Surgery*. 2013;71(4): 667-676.
51. Reston JT, Turkelson CM. Meta-analysis of surgical treatments for temporomandibular articular disorders. *Journal of Oral and Maxillofacial Surgery*. 2003;61(1): 3-10.
52. Undt G, Murakami K-I, Rasse M, Ewers R. Open versus arthroscopic surgery for internal derangement of the temporomandibular joint: A retrospective study comparing two centres' results using the Jaw Pain and Function Questionnaire. *Journal of Crano-Maxillofacial Surgery*. 2006;34(4): 234-241.
53. Zeiter D. A retrospective study comparing arthroscopic surgery with arthrotomy and disc repositioning. *Advances in Diagnostic and Surgical Arthroscopy of the Temporomandibular Joint*. 1993: 47-60.
54. Holmlund AB, Axelsson S, Gynther GW. A comparison of discectomy and arthroscopic lysis and lavage for the treatment of chronic closed lock of the temporomandibular joint: a randomized outcome study. *Journal of Oral and Maxillofacial Surgery*. 2001;59(9): 972-977.
55. Jayavelu P, Riaz R, Salam AT, et al. Difficulties encountered in preauricular approach over retromandibular approach in condylar fracture. *Journal of Pharmacy & Bioallied Sciences*. 2016;8(Suppl 1): S175.
56. Santos GS, Nogueira LM, Sonoda CK, et al. Using endaural approach for temporomandibular joint access. *Journal of Craniofacial Surgery*. 2014;25(3): 1142-1143.
57. Richards AT. Surgical Exposures for the Nerves of the Neck. In: Tubbs RS, Rizk E, Shoja M, Loukas M, Barbaro N, Spinner R (eds) *Nerves and Nerve Injuries*. Elsevier; 2015. p. 201-213.
58. Li B, Sun H, Zhang L, et al. Simple way of facilitating intraoral condylectomy and securing the excised condyle. *British Journal of Oral and Maxillofacial Surgery*. 2013;51(8): e305-e306.
59. McCarty WL, Farrar WB. Surgery for internal derangements of the temporomandibular joint. *The Journal of Prosthetic Dentistry*. 1979;42(2): 191-196.
60. Anderson DM, Sinclair PM, McBride KM. A clinical evaluation of temporomandibular joint disk plication surgery. *American Journal of Orthodontics and Dentofacial Orthopedics*. 1991;100(2): 156-162.

61. Dolwick MF. Temporomandibular joint surgery for internal derangement. *Dental Clinics*. 2007;51(1): 195-208.
62. Gonçalves JR, Cassano DS, Rezende L, et al. Disc repositioning: does it really work? *Oral and Maxillofacial Surgery Clinics*. 2015;27(1): 85-107.
63. Lee B-K, Hong JH. Temporomandibular joint disc plication with MITEK mini anchors: surgical outcome of 65 consecutive joint cases using a minimally invasive approach. *Maxillofacial Plastic and Reconstructive Surgery*. 2020;42(1): 1-11.
64. Moon S-Y, Chung H. Ultra-thin Rigid diagnostic and therapeutic arthroscopy during arthrocentesis: Development and preliminary clinical findings. *Maxillofacial Plastic and Reconstructive Surgery*. 2015;37(1): 1-5.
65. Al-Moraissi E. Open versus arthroscopic surgery for the management of internal derangement of the temporomandibular joint: a meta-analysis of the literature. *International Journal of Oral and Maxillofacial Surgery*. 2015;44(6): 763-770.
66. Dolwick MF. Intra-articular disc displacement part I: Its questionable role in temporomandibular joint pathology. *Journal of Oral and Maxillofacial Surgery*. 1995;53(9): 1069-1072.
67. Dolwick MF. Disc preservation surgery for the treatment of internal derangements of the temporomandibular joint. *Journal of Oral and Maxillofacial Surgery*. 2001;59(9): 1047-1050.
68. Mehra P, Wolford L. The Mitek mini anchor for TMJ disc repositioning: surgical technique and results. *International Journal of Oral and Maxillofacial Surgery*. 2001;30(6): 497-503.
69. Silver CM. Long-term results of meniscectomy of the temporomandibular joint. *CRANIO*. 1985;3(1): 46-57.
70. Eriksson L, Westesson P-L. Long-term evaluation of meniscectomy of the temporomandibular joint. *Journal of Oral and Maxillofacial Surgery*. 1985;43(4): 263-269.
71. Holmlund AB, Gynther G, Axelsson S. Diskectomy in treatment of internal derangement of the temporomandibular joint: Follow-up at 1, 3, and 5 years. *Oral Surgery, Oral Medicine, Oral Pathology*. 1993;76(3): 266-271.
72. Hinton R. Alterations in rat condylar cartilage following discectomy. *Journal of Dental Research*. 1992;71(6): 1292-1297.
73. Widmark G, Dahlström L, Kahnberg KE, Lindvall AM. Diskectomy in temporomandibular joints with internal derangement: a follow-up study. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*. 1997;83(3): 314-320.
74. Agerberg G, Lundberg M. Changes in the temporomandibular joint after surgical treatment: a radiologic follow-up study. *Oral Surgery, Oral Medicine, Oral Pathology*. 1971;32(6): 865-875.
75. Hansson LG, Eriksson L, Westesson PL. Magnetic resonance evaluation after temporomandibular joint diskectomy. *Oral surgery, oral medicine, oral pathology*. 1992;74(6):801-10.
76. Westesson P-L, Eriksson L. Diskectomy of the temporomandibular joint: a double-contrast arthrotomographic follow-up study. *Oral Surgery, Oral Medicine, Oral Pathology*. 1985;59(5): 435-440.
77. Dimitroulis G. Condylar morphology after temporomandibular joint discectomy with interpositional abdominal dermis-fat graft. *Journal of Oral and Maxillofacial Surgery*. 2011;69(2): 439-446.
78. Takaku S, Toyoda T. Long-term evaluation of discectomy of the temporomandibular joint. *Journal of Oral and Maxillofacial Surgery*. 1994;52(7): 722-726.
79. Boman K. Temporomandibular joint arthrosis and its treatment by extirpation of the disc. *Acta Chirurgica Scandinavica*. 1947;95:1.
80. Laskin DM (ed). Surgical management of internal derangements. In: *Temporomandibular disorders: an evidence-based approach to diagnosis and treatment*. Hanover Park, IL 60133: Quintessence Publishing Co Inc; 2006. p.476.
81. Dolwick MF, Aufdemorte TB. Silicone-induced foreign body reaction and lymphadenopathy after temporomandibular joint arthroplasty. *Oral Surgery, Oral Medicine, Oral Pathology*. 1985;59(5): 449-452.

82. Hansen WC, Deshazo B. Silastic reconstruction of temporo-mandibular joint meniscus. *Plastic and Reconstructive Surgery*. 1969;43(4): 388-391.
83. Heffez L, Mafee MF, Rosenberg H, et al. CT evaluation of TMJ disc replacement with a Proplast-Teflon laminate. *Journal of Oral and Maxillofacial Surgery*. 1987;45(8): 657-665.
84. Kiersch T (ed). The use of Proplast-Teflon implants for meniscectomy and disc repair in the temporomandibular joint. *AAOMS Clinical Congress on Reconstruction with Biomaterials*; 1984.
85. Feinberg S. Use of composite temporalis muscle flaps for disc replacement. *Oral Maxillofacial Surgery Clinics of North America*. 1994;6: 335.
86. Smith JA, Sandler NA, Ozaki WH, et al. Subjective and objective assessment of the temporalis myofascial flap in previously operated temporomandibular joints. *Journal of Oral and Maxillofacial Surgery* 1999;57(9): 1058-1065.
87. Sandler NA, Macmillan C, Buckley MJ, et al. Histologic and histochemical changes in failed auricular cartilage grafts used for a temporomandibular joint disc replacement: a report of three cases and review of the literature. *Journal of Oral and Maxillofacial Surgery*. 1997;55(9): 1014-1019.
88. Tucker MR, Kennedy MC, Jacoway JR. Autogenous auricular cartilage implantation following discectomy in the primate temporomandibular joint. *Journal of Oral and Maxillofacial Surgery*. 1990;48(1): 38-44.
89. Dimitroulis G. The interpositional dermis-fat graft in the management of temporomandibular joint ankylosis. *International Journal of Oral and Maxillofacial Surgery*. 2004;33(8): 755-760.
90. Dimitroulis G, McCullough M, Morrison W. Quality of life survey of patients prior to and following temporomandibular joint discectomy. *Journal of Oral and Maxillofacial Surgery*. 2010;68(1): 101-106.
91. Candirli C, Demirkol M, Yilmaz O, et al. Retrospective evaluation of three different joint surgeries for internal derangements of the temporomandibular joint. *Journal of Cranio-Maxillofacial Surgery*. 2017;45(5): 775-780.
92. Kramer A, Lee J, Beirne O. Meta-analysis of TMJ discectomy with or without autogenous/alloplastic interpositional materials: Comparative analysis of function outcome. *Journal of Oral and Maxillofacial Surgery*. 2004;62: 49-50.
93. Myrhaug H. A new method of operation for habitual dislocation of the mandible.—Review of former methods of treatment. *Acta Odontologica Scandinavica*. 1951;9(3-4): 247-261.
94. Undt G, Kermér C, Rasse M. Treatment of recurrent mandibular dislocation, Part II: Eminectomy. *International Journal of Oral and Maxillofacial Surgery*. 1997;26(2): 98-102.
95. Cascone P, Ungari C, Paparo F, et al. A new surgical approach for the treatment of chronic recurrent temporomandibular joint dislocation. *Journal of Craniofacial Surgery*. 2008;19(2): 510-512.
96. Okamoto T, Kaibuchi N, Sasaki R, et al. Eminectomy with restraint of the joint capsule to treat chronic and recurrent dislocation of the temporomandibular joint. *British Journal of Oral and Maxillofacial Surgery*. 2020;58(3): 366-368.
97. Paegle D, Holmlund A, Hjerpe A. Expression of proteoglycan mRNA in patients with painful clicking and chronic closed lock of the temporomandibular joint. *International Journal of Oral and Maxillofacial Surgery*. 2005;34(6): 656-658.
98. Williamson EH. The interrelationship of internal derangements of the temporomandibular joint, headache, vertigo, and tinnitus: A survey of 25 patients. *CRANIO*. 1990;8(4): 301-306.
99. Hall MB. Meniscoplasty of the displaced temporomandibular joint meniscus without violating the inferior joint space. *Journal of Oral and Maxillofacial Surgery* 1984;42(12): 788-792.
100. Baheerathan N, Sayan A, Demir E, et al. Outcome of eminectomy combined with discectomy and silastic interpositional graft for temporomandibular joint dysfunction: a retrospective study of 20 years. *British Journal of Oral and Maxillofacial Surgery*. 2020;58(7): 854-860.
101. Miloglu O, Yilmaz A, Yildirim E, et al. Pneumatization of the articular eminence on cone beam computed tomography: prevalence, characteristics and a review of the literature. *Dentomaxillofacial Radiology*. 2011;40(2): 110-114.

102. Vasconcelos B, Porto GG, Neto J, et al. Treatment of chronic mandibular dislocations by eminectomy: follow-up of 10 cases and literature review. *Medicina Oral, Patología Oral y Cirugía Bucal*. 2009;14(11): e593-596.
103. Rahman Z, Chand M, Breeze J, et al. Success rates and complications of eminectomies: a retrospective case series. *Oral Surgery*. 2018;11(1): 28-32.
104. LeClerc G. Un nouveau procede de butee dans le traitement chirurgical de la luxation recidivante de la ma choire inferieure. Mémoires de l'Académie nationale de chirurgie. 1943;69: 457-459.
105. Gosserez M, Dautrey J. Osteoplastic bearing for the treatment of temporo-mandibular luxations. *Transactions of the International Conference on Oral Surgery*. 1967: 261-264.
106. Sahoo NK, Bhardwaj PK. Radiographic assessment of changes in articular tubercle after Dautrey's procedure. *Journal of Oral and Maxillofacial Surgery*. 2013;71(2): 249-254.
107. de Freitas Silva L, Ribeiro NRB, Faverani LP, et al. Treatment of chronic recurrent temporomandibular joint dislocation. *Journal of Craniofacial Surgery*. 2016;27(3): 815.
108. Ihab R, Mounir R, Mounir M. Patient-specific titanium onlay eminoplasty: A novel protocol for treatment of recurrent temporomandibular joint dislocation. *The International Journal of Medical Robotics and Computer Assisted Surgery*. 2020;16(4): e2114.
109. Riaz N, Mahmood S, ul Haq E. Management of temporomandibular joint dislocation at mayo hospital Lahore. *Pakistan Oral & Dental Journal*. 2018;38(2): 191-194.
110. Tocaci S, McCullough M, Dimitroulis G. Surgical management of recurrent TMJ dislocation—a systematic review. *Oral and Maxillofacial Surgery*. 2019;23(1):35-45.
111. Guarda-Nardini L, Palumbo B, Manfredini D, et al. Surgical treatment of chronic temporomandibular joint dislocation: a case report. *Oral and Maxillofacial Surgery*. 2008;12(1): 43-46.
112. Güven O. A clinical study on treatment of temporomandibular joint chronic recurrent dislocations by a modified eminoplasty technique. *Journal of Craniofacial Surgery*. 2008;19(5): 1275-1280.
113. Kahveci R, Simsek ME, Akın S, et al. Treatment of recurrent temporomandibular joint dislocation. *Journal of Oral and Maxillofacial Surgery* 2013;12(4): 379-381.
114. Ying B, Hu J, Zhu S. Modified Leclerc blocking procedure with miniplates and temporal fascial flap for recurrent temporomandibular joint dislocation. *Journal of Craniofacial Surgery*. 2013;24(3): 740-742.
115. Long X, Li X, Cheng Y, et al. Preservation of disc for treatment of traumatic temporomandibular joint ankylosis. *Journal of Oral and Maxillofacial Surgery*. 2005;63(7): 897-902.
116. El-Sheikh M, Medra A, Warda M. Bird face deformity secondary to bilateral temporomandibular joint ankylosis. *Journal of Crano-Maxillofacial Surgery*. 1996;24(2): 96-103.
117. Chidzonga M. Temporomandibular joint ankylosis: review of thirty-two cases. *British Journal of Oral and Maxillofacial Surgery*. 1999;37(2): 123-126.
118. Obiechina A, Arotiba I, Fasola A. Temporomandibular joint ankylosis in south western Nigeria. *East African Medical Journal*. 1999;76(12):683-6.
119. Balaji S. Modified temporalis anchorage in craniomandibular reankylosis. *International Journal of Oral and Maxillofacial Surgery*. 2003;32(5): 480-485.
120. Ma J, Jiang H, Liang L. Interpositional arthroplasty versus reconstruction arthroplasty for temporomandibular joint ankylosis: a systematic review and meta-analysis. *Journal of Craniomaxillofacial Surgery*. 2015;43(7): 1202-1207.
121. Humphry GM. Addenbrooke's Hospital, Cambridge. Excision of the Condyle of the Lower Jaw. *Association Medical Journal*. 1856;4(160): 61.
122. Jain G, Kumar S, Rana AS, et al. Temporomandibular joint ankylosis: a review of 44 cases. *Oral and Maxillofacial Surgery*. 2008;12(2): 61-66.
123. Topazian RG. Gap versus interposition arthroplasty for ankylosis of the temporomandibular joint. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontics*. 2001;91(4): 388-389.

124. Güven O. A clinical study on temporomandibular joint ankylosis. *Auris Nasus Larynx*. 2000;27(1): 27-33.
125. Roychoudhury A, Parkash H, Trikha A. Functional restoration by gap arthroplasty in temporomandibular joint ankylosis: a report of 50 cases. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*. 1999;87(2): 166-169.
126. Abdelrahman TF, Takahashi K, Bessho K. Posttraumatic temporomandibular joint ankylosis in adults: is it mandatory to perform interposition arthroplasty? *Journal of Craniofacial Surgery*. 2010;21(4): 1301-1304.
127. Raveh J, Vuillemin T, Lädrach K, et al. Temporomandibular joint ankylosis: surgical treatment and long-term results. *Journal of Oral and Maxillofacial Surgery*. 1989;47(9): 900-906.
128. Danda AK, Ramkumar S, Chinnaswami R. Comparison of gap arthroplasty with and without a temporalis muscle flap for the treatment of ankylosis. *Journal of Oral and Maxillofacial Surgery*. 2009;67(7): 1425-1431.
129. Bayat M, Badri A, Moharamnejad N. Treatment of temporomandibular joint ankylosis: gap and interpositional arthroplasty with temporalis muscle flap. *Oral and Maxillofacial Surgery*. 2009;13(4): 207-212.
130. Akhtar MU, Abbas I, Shah AA. Use of silastic as interpositional material in the management of unilateral temporomandibular joint ankylosis. *Journal of Ayub Medical College Abbottabad*. 2006;18(2): 73-76.
131. Thangavelu A, Kumar KS, Vaidhyanathan A, et al. Versatility of full thickness skin-subcutaneous fat grafts as interpositional material in the management of temporomandibular joint ankylosis. *International Journal of Oral and Maxillofacial Surgery*. 2011;40(1): 50-56.
132. Kaban LB, Perrott DH, Fisher K. A protocol for management of temporomandibular joint ankylosis. *Journal of Oral and Maxillofacial Surgery*. 1990;48(11): 1145-1151.
133. Chossegros C, Guyot L, Cheynet F, et al. Comparison of different materials for interposition arthroplasty in treatment of temporomandibular joint ankylosis surgery: long-term follow-up in 25 cases. *British Journal of Oral and Maxillofacial Surgery*. 1997;35(3): 157-160.
134. Huang IY, Lai ST, Shen Y-H, et al. Interpositional arthroplasty using autogenous costal cartilage graft for temporomandibular joint ankylosis in adults. *International Journal of Oral and Maxillofacial Surgery*. 2007;36(10): 909-915.
135. Pogrel M, Perrott D, Kaban L. Bicoronal flap approach to the temporomandibular joints. *International Journal of Oral and Maxillofacial Surgery*. 1991;20(4): 219-222.
136. Pogrel M, Kaban L. The role of a temporalis fascia and muscle flap in temporomandibular joint surgery. *Journal of Oral and Maxillofacial Surgery*. 1990;48(1): 14-19.
137. Stucki-McCormick SU. Reconstruction of the mandibular condyle using transport distraction osteogenesis. *The Journal of Craniofacial Surgery*. 1997;8(1): 48-52.
138. Zhang W, Yang X, Zhang Y, et al. The sequential treatment of temporomandibular joint ankylosis with secondary deformities by distraction osteogenesis and arthroplasty or TMJ reconstruction. *International Journal of Oral and Maxillofacial Surgery*. 2018;47(8): 1052-1059.
139. Cheung LK, Lo J. The long-term effect of transport distraction in the management of temporomandibular joint ankylosis. *Plastic and Reconstructive Surgery*. 2007;119(3): 1003-1009.
140. Anchlia S, Vyas SM, Dayatar RG, et al. Guidelines for single-stage correction of TMJ ankylosis, facial asymmetry and OSA in adults. *Journal of Maxillofacial and Oral Surgery*. 2019;18(3): 419-427.
141. Fariña R, Canto L, Gunckel R, et al. Temporomandibular joint ankylosis: algorithm of treatment. *Journal of Craniofacial Surgery*. 2018;29(2): 427-431.
142. Gabbay JS, Heller JB, Song YY, et al. Temporomandibular joint bony ankylosis: comparison of treatment with transport distraction osteogenesis or the matthews device arthroplasty. *Journal of Craniofacial Surgery*. 2006;17(3): 516-522.
143. Xiao E, Zhang Y, An J, et al. Long-term evaluation of the stability of reconstructed condyles by transport distraction osteogenesis. *International Journal of Oral and Maxillofacial Surgery*. 2012;41(12): 1490-1494.

144. Chugh A, Mehrotra D, Yadav PK. A systematic review on the outcome of distraction osteogenesis in TMJ ankylosis. *Journal of Oral Biology and Craniofacial Research*. 2021;11(4): 581-595.
145. Yadav R, Bhutia O, Shukla G, et al. Distraction osteogenesis for management of obstructive sleep apnoea in temporomandibular joint ankylosis patients before the release of joint. *Journal of Craniomaxillofacial Surgery*. 2014;42(5): 588-594.
146. Zhu S, Li J, Luo E, et al. Two-stage treatment protocol for management of temporomandibular joint ankylosis with secondary deformities in adults: our institution's experience. *Journal of Oral and Maxillofacial Surgery*. 2011;69(12): e565-e572.
147. Cohen SR, Ross DA, Burstein FD, et al. Skeletal expansion combined with soft-tissue reduction in the treatment of obstructive sleep apnea in children: physiologic results. *Otolaryngology—Head and Neck Surgery*. 1998;119(5): 476-485.
148. Singh H, Mishra S, Srivastava D, et al. Staged therapeutic approach for rehabilitation of severe asymmetric Class II dentofacial deformity secondary to long standing unilateral temporomandibular joint ankylosis. *International Orthodontics*. 2019;17(3): 580-595.
149. Xia L, Zhang Y, An J, et al. Evaluating the remodeling of condyles reconstructed by transport distraction osteogenesis in the treatment of temporomandibular joint ankylosis. *Journal of Craniomaxillofacial Surgery*. 2020;48(5): 494-500.
150. Shehata EA, Medra AM. Modified bimaxillary distraction osteogenesis: a technique to correct facial asymmetry. *British Journal of Oral and Maxillofacial Surgery*. 2007;45(6): 471-477.
151. Mehrotra D, Vishwakarma K, Chellapa A, et al. Pre-arthroplasty simultaneous maxillomandibular distraction osteogenesis for the correction of post-ankylotic dentofacial deformities. *International Journal of Oral and Maxillofacial Surgery*. 2016;45(7): 820-827.
152. Hassan SAE-H, Mohamed FI. Distraction osteogenesis in the management of mandibular hypoplasia secondary to temporomandibular joint ankylosis. Long term follow up. *Journal of Craniomaxillofacial Surgery*. 2019;47(10): 1510-1520.
153. Kaban LB, Bouchard C, Troulis MJ. A protocol for management of temporomandibular joint ankylosis in children. *Journal of Oral and Maxillofacial Surgery*. 2009;67(9): 1966-1978.
154. Mercuri LG. Total joint reconstruction—autologous or alloplastic. *Oral and Maxillofacial Surgery Clinics*. 2006;18(3): 399-410.
155. Potter JK, Dierks EJ, editors. Vascularized options for reconstruction of the mandibular condyle. *Seminars in Plastic Surgery*; 2008: © Thieme Medical Publishers.
156. Vega LG, González-García R, Louis PJ. Reconstruction of acquired temporomandibular joint defects. *Oral and Maxillofacial Surgery Clinics*. 2013;25(2): 251-269.
157. Gillies HD. Plastic surgery of the face: Based on selected cases of war injuries of the face including burns: *Frowde*; 1920.
158. Chen CT, Lai JP, Chen YR. Costochondral graft in acute mandibular condylar fracture. *Plastic and Reconstructive Surgery*. 1997;100(5): 1234-1239.
159. Ko EWC, Huang CS, Chen YR. Temporomandibular joint reconstruction in children using costochondral grafts. *Journal of Oral and Maxillofacial Surgery*. 1999;57(7): 789-798.
160. MacIntosh RB. The use of autogenous tissues for temporomandibular joint reconstruction. *Journal of Oral and Maxillofacial Surgery*. 2000;58(1): 63-69.
161. Baek RM, Song YT. Overgrowth of a costochondral graft in reconstruction of the temporomandibular joint. *Scandinavian Journal of Plastic and Reconstructive Surgery and Hand Surgery*. 2006;40(3): 179-185.
162. Guyuron B, Lasa Jr CI. Unpredictable growth pattern of costochondral graft. *Plastic and Reconstructive Surgery*. 1992;90(5): 880-886.
163. Saeed N, Kent J. A retrospective study of the costochondral graft in TMJ reconstruction. *International Journal of Oral and Maxillofacial Surgery*. 2003;32(6): 606-609.
164. Guyot L, Richard O, Layoun W, et al. Long-term radiological findings following reconstruction of the condyle with fibular free flaps. *Journal of Craniomaxillofacial Surgery*. 2004;32(2): 98-102.

165. Hidalgo DA. Condyle transplantation in free flap mandible reconstruction. *Plastic and Reconstructive Surgery*. 1994;93(4): 770-781.
166. Driemel O, Braun S, Müller-Richter U, et al. Historical development of alloplastic temporomandibular joint replacement after 1945 and state of the art. *International Journal of Oral and Maxillofacial Surgery*. 2009;38(9): 909-920.
167. Kent JN, Block MS, Homsy CA, et al. Experience with a polymer glenoid fossa prosthesis for partial or total temporomandibular joint reconstruction. *Journal of Oral and Maxillofacial Surgery: Official Journal of the American Association of Oral and Maxillofacial Surgeons*. 1986;44(7): 520-533.
168. Wolford LM, Dingwerth DJ, Talwar RM, et al. Comparison of 2 temporomandibular joint total joint prosthesis systems. *Journal of Oral and Maxillofacial Surgery*. 2003;61(6): 685-690.
169. Mercuri LG, Edibam NR, Giobbie-Hurder A. Fourteen-year follow-up of a patient-fitted total temporomandibular joint reconstruction system. *Journal of Oral and Maxillofacial Surgery*. 2007;65(6): 1140-1148.
170. Westermark A. Total reconstruction of the temporomandibular joint. Up to 8 years of follow-up of patients treated with Biomet® total joint prostheses. *International Journal of Oral and Maxillofacial Surgery*. 2010;39(10): 951-955.
171. Wolford L, Pitta M, Reiche-Fischel O, et al. TMJ Concepts/Techmedica custom-made TMJ total joint prosthesis: 5-year follow-up study. *International Journal of Oral and Maxillofacial Surgery*. 2003;32(3): 268-274.
172. Shen P, Zhang SY, Yang C, et al. Stability study of total temporomandibular joint replacement on sheep. *Journal of Cranio-Maxillofacial Surgery*. 2014;42(7): 1265-1270.
173. Mercuri LG. Avoiding and managing temporomandibular joint total joint replacement surgical site infections. *Journal of Oral and Maxillofacial Surgery*. 2012;70(10): 2280-2289.
174. Wolford LM, Rodrigues DB, McPhillips A. Management of the infected temporomandibular joint total joint prosthesis. *Journal of Oral and Maxillofacial Surgery* 2010;68(11): 2810-2823.
175. Mercuri LG, Ali FA, Woolson R. Outcomes of total alloplastic replacement with periarticular autogenous fat grafting for management of reankylosis of the temporomandibular joint. *Journal of Oral and Maxillofacial Surgery*. 2008;66(9): 1794-1803.
176. Jensen AW, Viozzi CF, Foote RL. Long-term results of radiation prophylaxis for heterotopic ossification in the temporomandibular joint. *Journal of Oral and Maxillofacial Surgery*. 2010;68(5): 1100-1105.
177. Niedzielska I, Tomczyk-Wiątek A, Borowski B. Fractures of the mandibular condylar processes—literature review. *Open Medicine*. 2013;8(2): 244-249.
178. Zachariades N, Mezitis M, Mourouzis C, et al. Fractures of the mandibular condyle: a review of 466 cases. Literature review, reflections on treatment and proposals. *Journal of Cranio-Maxillofacial Surgery*. 2006;34(7): 421-432.
179. Sriraam KG, Vignesh KRA. Diagnosis and Management of Mandibular Condyle Fractures. *Oral and Maxillofacial Surgery*. 2021.
180. Ochs M, Chung W, Powers D. Trauma Surgery. *Journal of Oral and Maxillofacial Surgery*. 2017;75(8S): e151-e194.
181. Bischoff EL, Carmichael R, Reddy LV. Plating options for fixation of condylar neck and base fractures. *Atlas of the Oral and Maxillofacial Surgery Clinics of North America*. 2017;25(1): 69-73.
182. Bhowmick RS, Bhowal K, Ghosh S. Plating systems for 3D stability of subcondylar fracture: A research article with review of literature. *International Journal of Orthopaedics*. 2019;5(2): 681-683.
183. Kallela I, Söderholm A-L, Paukku P, et al. Lag-screw osteosynthesis of mandibular condyle fractures: a clinical and radiological study. *Journal of Oral and Maxillofacial Surgery*. 1995;53(12): 1397-1404.
184. Park JM, Jang YW, Kim SG, Pet al. Comparative study of the prognosis of an extracorporeal reduction and a closed treatment in mandibular condyle head and/or neck fractures. *Journal of Oral and Maxillofacial Surgery*. 2010;68(12): 2986-2993.