

# *Current Concepts of* **Orthopaedic Physical Therapy**

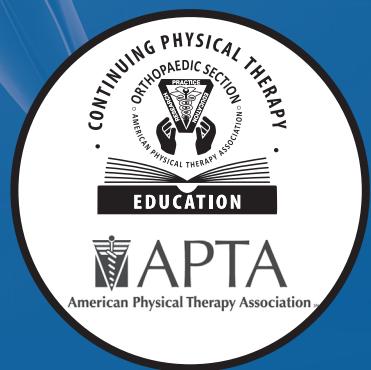
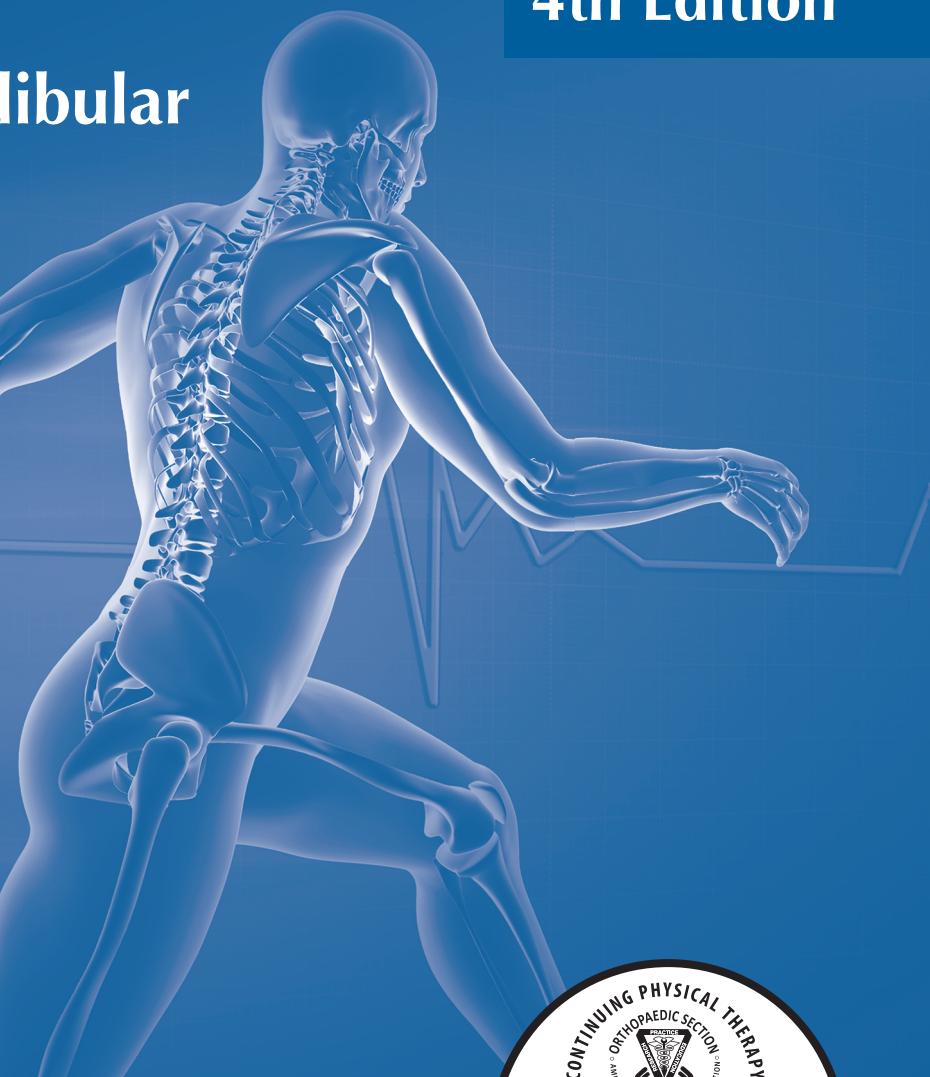
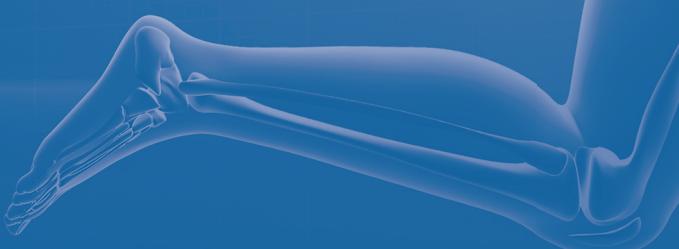
Independent Study Course 26.2.5

**4th Edition**

**The Temporomandibular  
Joint: Physical  
Therapy Patient  
Management  
Using Current  
Evidence**

Sally Ho, PT, DPT, MS, OCS  
University of Southern California  
Los Angeles, California

Ho Physical Therapy  
Beverly Hills, California



---

## REFERENCES

1. Ho S. Temporomandibular joint. In: Placzek, JD, Boyce, DA, eds. *Orthopedic Physical Therapy Secrets*. 2nd ed. St Louis, MO: Mosby Elsevier; 2006:496-502.
2. Anastassi A, Magnusson T. Patients referred to a specialist clinic because of suspected temporomandibular disorders: a survey of 3194 patients in respect of diagnoses, treatments, and treatment outcome. *Acta Odontol Scand*. 2004;62(4):183-192.
3. Gremillion HA. The prevalence and etiology of temporomandibular disorders and orofacial pain. *Tex Dent J*. 2000;117(7):30-39.
4. Armijo Olivo S, Magee DJ, Parfitt M, Major P, Thie NM. The association between the cervical spine, the stomatognathic system, and craniofacial pain: a critical review. *J Orofac Pain*. 2006;20(4):271-287.
5. Isong U, Gansky SA, Plesh O. Temporomandibular joint and muscle disorder-type pain in U.S. adults: the National Health Interview Survey. *J Orofac Pain*. 2008;22(4):317-322.
6. Magnusson T, Egermark I, Carlsson GE. A longitudinal epidemiologic study of signs and symptoms of temporomandibular disorders from 15 to 35 years of age. *J Orofac Pain*. 2000;14(4):310-319.
7. de Leeuw R, Boering G, Stegenga B, de Bont LG. Symptoms of temporomandibular joint osteoarthritis and internal derangement 30 years after non-surgical treatment. *Cranio*. 1995;13(2):81-88.
8. Brown DT, Gaudet EL Jr. Outcome measurement for treated and untreated TMD patients using the TMJ scale. *Cranio*. 1994;12(4):216-222.
9. Gaudet EL Jr, Brown DT. Temporomandibular disorder treatment outcomes: first report of a large-scale prospective clinical study. *Cranio*. 2000;18(1):9-22.
10. Brown DT, Gaudet EL Jr. Temporomandibular disorder treatment outcomes: second report of a large-scale prospective clinical study. *Cranio*. 2002;20(4):244-253.
11. Ho S. The temporomandibular joint: functional anatomy and kinesiology. In: Shellock FG, Powers GM, eds. *Kinematic MRI of the Joints: Functional Anatomy, Kinesiology, and Clinical Applications*. Boca Raton, FL: CRC Press; 2001:261-276.
12. Neumann DA. Kinesiology of mastication. In: Neumann D, ed. *Kinesiology of the Musculoskeletal System: Foundations for Rehabilitation*. 2nd ed. St Louis, MO: Mosby Elsevier; 2010:423-455.
13. Heylings DJ, Nielsen IL, McNeill C. Lateral pterygoid muscle and the temporomandibular disc. *J Orofac Pain*. 1995;9(1):9-16.
14. Gray H. The temporomandibular region. In: Gray H. *Anatomy, Descriptive and Surgical*. Avneil, NJ: Crown Publishers Inc Gramercy Books; 1977: 310-313.
15. Huddleston Slater JJ, Lobbezoo F, Hofman N, Naeije M. Case report of a posterior disc displacement without and with reduction. *J Orofac Pain*. 2005;19(4):337-342.
16. Dawson PE. *Functional Occlusion: From TMJ to Smile Design*. St Louis, MO: Mosby; 2007.
17. McNeill C. *Temporomandibular Disorders for Evaluation, Diagnosis, and Management*. Chicago, IL: Quintessence; 1993.
18. de Bont LG, Dijkgraaf LC, Stegenga B. Epidemiology and natural progression of articular temporomandibular disorders. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 1997;83(1):72-76.
19. Katzberg RW, Westesson PL, Tallents RH, Drake CM. Anatomic disorders of the temporomandibular joint disc in asymptomatic subjects. *J Oral Maxillofac Surg*. 1996;54(2):147-153; discussion 153-155.
20. McNeill C. Management of temporomandibular disorders: concepts and controversies. *J Prosthet Dent*. 1997;77(5):510-522.
21. Kraus S. Physical therapy management of TMD. In: Kraus S, ed. *Clinics in Physical Therapy: Temporomandibular Disorders*. 2nd ed. New York, NY: Churchill Livingstone; 1994:161-215.
22. Friction J. Myogenous temporomandibular disorders: diagnostic and management considerations. *Dent Clin North Am*. 2007;51(1):61-83.
23. Travell JG, Simons DG, Simons LS. *Myofascial Pain and Dysfunction: The Trigger Point Manual*. Vol 1, 2nd ed. Baltimore, MD: William and Wilkins; 1999.
24. Ballegaard V, Thede-Schmidt-Hansen P, Svensson P & Jensen R. Are headache and temporomandibular disorders related? A blinded study. *Cephalgia*. 2008;28(8):832-841. doi: 10.1111/j.1468-2982.2008.01597.x. Epub 2008 May 21.
25. Svensson P. Muscle pain in the head: overlap between temporomandibular disorders and tension-type headaches. *Curr Opin Neurol*. 2007;20(3):320-325.
26. Gonçalves DA, Bigal ME, Jales LC, Camparis CM, Speciali JG. Headache and symptoms of temporomandibular disorder: an epidemiological study. *Headache*. 2010;50(2):231-241. doi: 10.1111/j.1526-4610.2009.01511.x. Epub 2009 Sep 14.
27. von Piekartz H, Lüdtke K. Effect of treatment of temporomandibular disorders (TMD) in patients

- with cervicogenic headache: a single-blind, randomized controlled study. *Cranio*. 2011;29:43-56.
28. Rugh JD, Harlan J. Nocturnal bruxism and temporomandibular disorders. *Adv Neurol*. 1988;49:329-341.
  29. Ahlberg J, Rantala M, Savolainen A, Suvinen T, Nissinen M, Sarna S, Lindholm H, Könönen M. Reported bruxism and stress experience. *Community Dent Oral Epidemiol*. 2002;30(6):405-408.
  30. Magnusson T, Egermark I, Carlsson GE. A prospective investigation over two decades on signs and symptoms of temporomandibular disorders and associated variables. A final summary. *Acta Odontol Scand*. 2005;63(2):99-109.
  31. Anastassaki Köhler A, Hugoson A, Magnusson T. Prevalence of symptoms indicative of temporomandibular disorders in adults: cross-sectional epidemiological investigations covering two decades. *Acta Odontol Scand*. 2012;70(3):213-223. doi: 10.3109/00016357.2011.634832. Epub 2011 Nov 30.
  32. Graff-Radford SB. Chronic headache. *Tex Dent J*. 2006;123(3):254-263.
  33. Tuz HH, Onder EM, Kisanici RS. Prevalence of otologic complaints in patients with temporomandibular disorder. *Am J Orthod Dentofacial Orthop*. 2003;123(6):620-623.
  34. Calderon Pdos S, Hilgenberg PB, Rossetti LM, Laurenti JV, Conti PC. Influence of tinnitus on pain severity and quality of life in patients with temporomandibular disorders. *J Appl Oral Sci*. 2012;20(2):170-173.
  35. Piovesan EJ, Kowacs PA, Tatsui CE, Lange MC, Ribas LC, Werneck LC. Referred pain after painful stimulation of the greater occipital nerve in humans: evidence of convergence of cervical afferences on trigeminal nuclei. *Cephalgia*. 2001;21(2):107-109.
  36. de Leeuw, Reny and Klasser, Gary D. *Orofacial Pain: Guidelines for Assessment, Diagnosis, and Management*. 5th ed. Quintessence Publishing; 2013.
  37. Salvetti G, Manfredini D, Barsotti S, Bosco M. Otologic symptoms in temporomandibular disorders patients: is there evidence of an association-relationship? *Minerva Stomatol*. 2006;55(11-12):627-637.
  38. Jaber JJ, Leonetti JP, Lawrason AE, Feustel PJ. Cervical spine causes for referred otalgia. *Otolaryngol Head Neck Surg*. 2008;138(4):479-485. doi: 10.1016/j.otohns.2007.12.043.
  39. Chole RA, Parker WS. Tinnitus and vertigo in patients with temporomandibular disorder. *Arch Otolaryngol Head Neck Surg*. 1992;118(8):817-821.
  40. Bjorne A, Agerberg G. Symptom relief after treatment of temporomandibular and cervical spine disorders in patients with Meniere's disease: a three-year follow-up. *Cranio*. 2003;21(1):50-60.
  41. Bjorne A. Assessment of temporomandibular and cervical spine disorders in tinnitus patients. *Prog Brain Res*. 2007;166:215-219.
  42. Minakuchi H, Kuboki T, Matsuka Y, Maekawa K, Yatani H, Yamashita A. Randomized controlled evaluation of non-surgical treatments for temporomandibular joint anterior disk displacement without reduction. *J Dent Res*. 2001;80:924-928.
  43. Harrison AL, Thorp JN, Ritzline PD. A proposed diagnostic classification of patients with temporomandibular disorders: implications for physical therapists. *J Orthop Sports Phys Ther*. 2014;44(3):182-197. doi: 10.2519/jospt.2014.4847.
  44. de Wijer A, Steenks MH, Bosman F, Helders PJ, Faber J. Symptoms of the stomatognathic system in temporomandibular and cervical spine disorders. *J Oral Rehabil*. 1996;23(11):733-741.
  45. Rocabado M, Johnston BE Jr, Blakney MG. Physical therapy and dentistry: an overview. *J Craniomandibular Pract*. 1982;1(1):46-49.
  46. Rocabado M, Iglarsh ZA. *Musculoskeletal Approach to Maxillofacial Pain*. Philadelphia, PA: JB Lippincott Company; 1991.
  47. Valentino B, Fabozzo A, Melito F. The functional relationship between the occlusal plane and the plantar arches. An EMG study. *Surg Radiol Anat*. 1991;13(3):171-174.
  48. Golden WW. Physical therapy: general implications for the treatment of temporomandibular joint problems. *Basal Facts*. 1980;4(2):47-49.
  49. Nicolakis P, Nicolakis M, Piehslinger E, et al. Relationship between craniomandibular disorders and poor posture. *Cranio*. 2000;18(2):106-112.
  50. Nicolakis P, Erdogan B, Kopf A, et al. Effectiveness of exercise therapy in patients with internal derangement of the temporomandibular joint. *J Oral Rehabil*. 2001;28(12):1158-1164.
  51. De Laat A, Horvath M, Bossuyt M, Fossion E, Baert AL. Myogenous or arthrogenous limitation of mouth opening: correlations between clinical findings, MRI, and clinical outcome. *J Orofac Pain*. 1993;7(2):150-155.
  52. Shellock FG. Kinematic MRI of the temporomandibular joint. In: Shellock FG, Powers GM, eds. *Kinematic MRI of the Joints: Functional Anatomy, Kinesiology, and Clinical Applications*. Boca Raton, FL: CRC Press; 2001:277-295.
  53. Atos Medical. TheraBite Range of Motion Scale. [www.atosmedical.com](http://www.atosmedical.com). Accessed November 2, 2015.
  54. Furto ES, Cleland JA, Whitman JM, Olson KA. Manual physical therapy interventions and exercise for patients with temporomandibular disorders. *Cranio*. 2006;24(4):283-291.
  55. Turp JC, Minagi S. Palpation of the lateral pterygoid region in TMD—where is the evidence? *J Dent*. 2001;29(7):475-483.

56. Rocabado M. *Joint Pain Map: Differential Diagnosis of the Synovial Temporomandibular Joint*. Santiago, Chile: CEDIME Publications; 2010.
57. Nicolakis P, Erdoganmus B, Kopf A, Djaber-Ansari A, Piehslinger E, Fialka-Moser V. Exercise therapy for craniomandibular disorders. *Arch Phys Med Rehabil*. 2000;81(9):1137-1142.
58. Kraus S. Temporomandibular disorders, head and orofacial pain: cervical spine considerations. *Dent Clin North Am*. 2007;51(1):161-193, vii.
59. De Laat A, Meuleman H, Stevens A, Verbeke G. Correlation between cervical spine and temporomandibular disorders. *Clin Oral Investig*. 1998;2(2):54-57.
60. Hoppenfeld S. *Physical Examination of the Spine and Extremities*. New York, NY: Appleton-Century-Crofts; 1976:132.
61. Kundu H, Basavaraj P, Kote S, Singla A, Singh S. Assessment of TMJ disorders using ultrasound as a diagnostic tool: a review. *J Clin Diagn Res*. 2013;7(12):3116-3120. doi: 10.7860/JCDR/2013/6678.3874. Epub 2013 Dec 15.
62. Bas B, Yilmaz N, Gokce E, Akan H. Diagnostic value of ultrasonography in temporomandibular disorders. *J Oral Maxillofac Surg*. 2011;69(5):1304-1310. doi: 10.1016/j.joms.2010.07.012. Epub 2011 Jan 21.
63. Elias FM, Birman EG, Matsuda CK, Oliveira IR, Jorge WA. Ultrasonographic findings in normal temporomandibular joints. *Braz Oral Res*. 2006;20(1):25-32. Epub 2006 May 22.
64. Manfredini D, Tognini F, Melchiorre D, Zampa V, Bosco M. Ultrasound assessment of increased capsular width as a predictor of temporomandibular joint effusion. *Dentomaxillofac Radiol*. 2003;32(6):359-364.
65. Hayashi T, Ito J, Koyama J, Yamada K. The accuracy of sonography for evaluation of internal derangement of the temporomandibular joint in asymptomatic elementary school children: comparison with MR and CT. *AJR Am J Neuroradiol*. 2001;22(4):728-734.
66. Habashi H, Eran A, Blumenfeld I, Gaitini D. Dynamic high-resolution sonography compared to magnetic resonance imaging for diagnosis of temporomandibular joint disk displacement. *J Ultrasound Med*. 2015;34(1):75-82. doi: 10.7863/ultra.34.1.75.
67. Ho K, Ho S. Physical therapy for ankylosis of the temporomandibular joint. Poster Presentation. *Combined Sections Meeting, Indianapolis, IN*. Feb 22, 2015.
68. Ho K, Ho S. Ultrasound imaging for a case with ankylosis of the temporomandibular joint. *J Orthop Sports Phys Ther*. In press.
69. Ho S. Differential diagnosis of temporomandibular disorder. In: Davenport D, ed. *Diagnosis in Physical Therapy: A Symptom-Based Approach*. F. A. Davis Publishing CO. June 2012.
70. Ciancaglini R, Testa M, Radaelli G. Association of neck pain with symptoms of temporomandibular dysfunction in the general adult population. *Scand J Rehabil Med*. 1999;31(1):17-22.
71. Higbie EJ, Seidel-Cobb D, Taylor LF, Cummings GS. Effect of head position on vertical mandibular opening. *J Orthop Sports Phys Ther*. 1999;29(2):127-130.
72. Clark GT, Browne PA, Nakano M, Yang Q. Co-activation of sternocleidomastoid muscles during maximum clenching. *J Dent Res*. 1993;72(11):1499-1502.
73. Visscher CM, De Boer W, Lobbezoo F, Habets LL, Naeije M. Is there a relationship between head posture and craniomandibular pain? *J Oral Rehabil*. 2002;29(11):1030-1036.
74. Olivo SA, Bravo J, Magee DJ, Thie NM, Major PW, Flores-Mir C. The association between head and cervical posture and temporomandibular disorders: a systematic review. *J Orofac Pain*. 2006;20(1):9-23.
75. La Touche R, Fernandez-de-las-Penas C, Fernandez-Carnero J, et al. The effects of manual therapy and exercise directed at the cervical spine on pain and pressure pain sensitivity in patients with myofascial temporomandibular disorders. *J Oral Rehabil*. 2009;36(9):644-652. doi: 10.1111/j.1365-2842.2009.01980.x. Epub 2009 Jul 14.
76. La Touche R, París-Alemany A, von Piekartz H, Mannheimer JS, Fernández-Carnero J, Rocabado M. The influence of cranio-cervical posture on maximal mouth opening and pressure pain threshold in patients with myofascial temporomandibular pain disorders. *Clin J Pain*. 2011;27(1):48-55. doi: 10.1097/AJP.0b013e3181edc157.
77. Komiyama O, Kawara M, Arai M, Asano T, Kobayashi K. Posture correction as part of behavioural therapy in treatment of myofascial pain with limited opening. *J Oral Rehabil*. 1999;26(5):428-435.
78. Jerjes W, Upile T, Abbas S, et al. Muscle disorders and dentition-related aspects in temporomandibular disorders: controversies in the most commonly used treatment modalities. *Int Arch Med*. 2008;1(1):23. doi: 10.1186/1755-7682-1-23.
79. Dostalová T, Hlináková P, Kasparová M, Rehacek A, Vavricková L, Navrátil L. Effectiveness of physiotherapy and GaAlAs laser in the management of temporomandibular joint disorders. *Photomed Laser Surg*. 2012;30(5):275-280. doi: 10.1089/pho.2011.3171.
80. Maia ML, Bonjardim LR, Quintans Jde S, Ribeiro MA, Maia LG, Conti PC. Effect of low-level laser therapy on pain levels in patients with temporomandibular disorders: a systematic review. *J Appl Oral Sci*. 2012;20(6):594-602.

81. Shaffer SM, Brismée JM, Sizer PS, Courtney CA. Temporomandibular disorders. Part 2: conservative management. *J Man Manip Ther.* 2014;22(1):13-23. doi: 10.1179/2042618613Y.0000000061.
82. Foster ME, Gray RJ, Davies SJ, Macfarlane TV. Therapeutic manipulation of the temporomandibular joint. *Br J Oral Maxillofac Surg.* 2000;38(6):641-644.
83. Gorchynski J, Karabidian E, Sanchez M. The "syringe" technique: a hands-free approach for the reduction of acute nontraumatic temporomandibular dislocations in the emergency department. *J Emerg Med.* 2014;47(6):676-681. doi: 10.1016/j.jemermed.2014.06.050. Epub 2014 Sep 30.
84. Mansilla-Ferragut P, Fernandez-de-Las Penas C, Alburquerque-Sendin F, Cleland JA, Bosca-Gandia JJ. Immediate effects of atlanto-occipital joint manipulation on active mouth opening and pressure pain sensitivity in women with mechanical neck pain. *J Manipulative Physiol Ther.* 2009;32(2):101-106. doi: 10.1016/j.jmpt.2008.12.003.
85. Oliveira-Campelo NM, Rubens-Rebelatto J, Marti FJ, Alburquerque-Sendi NF, Fernandez-de-Las-Penas C. The immediate effects of atlanto-occipital joint manipulation and suboccipital muscle inhibition technique on active mouth opening and pressure pain sensitivity over latent myofascial trigger points in the masticatory muscles. *J Orthop Sports Phys Ther.* 2010;40(5):310-317. doi: 10.2519/jospt.2010.3257.
86. Gonzalez-Perez LM, Infante-Cossio P, Granados-Nuñez M, Urresti-Lopez FJ. Treatment of temporomandibular myofascial pain with deep dry needling. *Med Oral Patol Oral Cir Bucal.* 2012;17(5):e781-785.
87. Gonzalez-Perez LM, Infante-Cossio P, Granados-Nunez M, Urresti-Lopez FJ, Lopez-Martos R, Ruiz-Canela-Mendez P. Deep dry needling of trigger points located in the lateral pterygoid muscle: Efficacy and safety of treatment for management of myofascial pain and temporomandibular dysfunction. *Med Oral Patol Oral Cir Bucal.* 2015;20:e326-333.
88. Fernández-Carnero J, La Touche R, Ortega-Santiago R, Galan-del-Rio F, Pesquera J, Ge HY, Fernández-de-Las-Peñas C. Short-term effects of dry needling of active myofascial trigger points in the masseter muscle in patients with temporomandibular disorders. *J Orofac Pain.* 2010;24(1):106-112.
89. Martini G, Martini M, Carano A. MRI study of a physiotherapeutic protocol in anterior disk displacement without reduction. *Cranio.* 1996;14(3):216-224.
90. Mongini F. A modified extraoral technique of mandibular manipulation in disk displacement without reduction. *Cranio.* 1995;13(1):22-25.
91. Mongini F, Ibertis F, Manfredi A. Long-term results in patients with disk displacement with-out reduction treated conservatively. *Cranio.* 1996;14(4):301-305.
92. Minagi S, Nozaki S, Sato T, Tsuru H. A manipulation technique for treatment of anterior disk displacement without reduction. *J Prosthet Dent.* 1991;65(5):686-691.
93. Gonai S, Doi K, Noguchi K, et al. Extraoral autoreduction of temporomandibular joint dislocation: a preliminary clinical study. *Am J Emerg Med.* 2015;33(4):588-589. doi: 10.1016/j.ajem.2015.01.011. Epub 2015 Jan 16.
94. Gorchynski J, Karabidian E, Sanchez M. The "syringe" technique: a hands-free approach for the reduction of acute nontraumatic temporomandibular dislocations in the emergency department. *J Emerg Med.* 2014;47(6):676-681. doi: 10.1016/j.jemermed.2014.06.050. Epub 2014 Sep 30.
95. Foster ME, Gray RJ, Davies SJ, Macfarlane TV. Therapeutic manipulation of the temporomandibular joint. *Br J Oral Maxillofac Surg.* 2000;38(6):641-644.
96. Rocabado M. *Advanced Management of the Craniofacial Disorder.* Course notes. St Augustine, FL: University of St Augustine; 2005.
97. Cleland J, Palmer J. Effectiveness of manual physical therapy, therapeutic exercise, and patient education on bilateral disc displacement without reduction of the temporomandibular joint: a single-case design. *J Orthop Sports Phys Ther.* 2004;34(9):535-548.
98. Yoda T, Sakamoto I, Imai H, et al. A randomized controlled trial of therapeutic exercise for clicking due to disk anterior displacement with reduction in the temporomandibular joint. *Cranio.* 2003;21(1):10-16.
99. Saxen MA. Myofascial pain syndrome: characteristics, diagnosis, and treatment. *J Indiana Dent Assoc.* 1998;77(3):9-12.
100. Atos Medical. TheraBite Jaw Motion Rehabilitation System. [www.atosmedical.com](http://www.atosmedical.com). Accessed October 4, 2015.
101. Oh DW, Kim KS, Lee GW. The effect of physiotherapy on post-temporomandibular joint surgery patients. *J Oral Rehabil.* 2002;29(5):441-446.
102. Wright EF, Syms CA 3rd, Bifano SL. Tinnitus, dizziness, and nonotologic otalgia improvement through temporomandibular disorder therapy. *Mil Med.* 2000;165(10):733-736.
103. Kafas P, Kalfas S, Leeson R. Chronic temporomandibular joint dysfunction: a condition for a multidisciplinary approach. *J Med Sci.* 2007;7:492-502.
104. Ziegler CM, Haag C, Muhling J. Treatment of recurrent temporomandibular joint dislocation with intramuscular botulinum toxin injection. *Clin Oral Investig.* 2003;7(1):52-55. Epub 2003 Jan 25.
105. Nixdorf DR, Heo G, Major PW. Randomized controlled trial of botulinum toxin A for chronic myogenous orofacial pain. *Pain.* 2002;99(3):465-473.

106. Gerwin R. Botulinum toxin treatment of myofascial pain: a critical review of the literature. *Curr Pain Headache Rep.* 2012;16(5):413-422. doi: 10.1007/s11916-012-0287-6.
107. Winocur E, Gavish A, Halachmi M, Eli I, Gazit E. Topical application of capsaicin for the treatment of localized pain in the temporomandibular joint area. *J Orofac Pain.* 2000;14(1):31-36.
108. Shi Z, Guo C, Awad M. Hyaluronate for temporomandibular joint disorders (review). *Cochrane Database Syst Rev.* 2003;1:CD002970.
109. Wong YK, Cheng J. A case series of temporomandibular disorders treated with acupuncture, occlusal splint and point injection therapy. *Acupunct Med.* 2003;21(4):138-149.
110. Bu LX, Chen T, Chen X, Jing H, Li NY. Clinical observation of acupuncture and massage therapy for temporomandibular joint disorders. *Shanghai Kou Qiang Yi Xue.* 2011;20(3):292-295.
111. Jung A, Shin BC, Lee MS, Sim H, Ernst E. Acupuncture for treating temporomandibular joint disorders: a systematic review and meta-analysis of randomized, sham-controlled trials. *J Dent.* 2011;39(5):341-350. doi: 10.1016/j.jdent.2011.02.006. Epub 2011 Feb 25.
112. Itoh K, Asai S, Ohyabu H, Imai K, Kitakoji H. Effects of trigger point acupuncture treatment on temporomandibular disorders: a preliminary randomized clinical trial. *J Acupunct Meridian Stud.* 2012;5(2):57-62. doi: 10.1016/j.jams.2012.01.013. Epub 2012 Feb 19.
113. Koh H, Robinson PG. Occlusal adjustment for treating and preventing temporomandibular joint disorders. *J Oral Rehabil.* 2004;31(4):287-292.
114. Koh H, Robinson PG. Occlusal adjustment for treating and preventing temporomandibular joint disorders. *Cochrane Database Syst Rev.* 2003;1:CD003812.
115. Pettengill CA, Growney MR, Schoff R, Kenworthy CR. A pilot study comparing the efficacy of hard and soft stabilizing appliances in treating patients with temporomandibular disorders. *J Prosthet Dent.* 1998;79(2):165-168.
116. Okeson JP. *Orofacial Pain: Guidelines for Assessment, Diagnosis, and Management.* The American Academy of Orofacial Pain. Chicago, IL: Quintessence Publishing Co Inc; 1996.
117. Clark GT, Lanham F, Flack VF. Treatment outcome results for consecutive TMJ clinic patients. *J Craniomandib Disord.* 1988;2(2):87-95.
118. Gray RJ, Davies SJ. Occlusal splints and temporomandibular disorders: why, when, how? *Dent Update.* 2001;28(4):194-199.
119. Al-Ani MZ, Davies SJ, Gray RJ, Sloan P, Glenny AM. Stabilization splint therapy for temporomandibular pain dysfunction syndrome. *Cochrane Database Syst Rev.* 2004;CD002778.
120. Simmons HC 3rd, Gibbs SJ. Initial TMJ disk recapture with anterior repositioning appliances and relation to dental history. *Cranio.* 1997;15(4):281-295.
121. Turp JC, Komine F, Hugger A. Efficacy of stabilization splints for the management of patients with masticatory muscle pain: a qualitative systematic review. *Clin Oral Investig.* 2004;8(4):179-195. Epub 2004 Jun 4.
122. Niemelä K, Korpela M, Raustia A, Ylöstalo P, Sipilä K. Efficacy of stabilisation splint treatment on temporomandibular disorders. *J Oral Rehabil.* 2012;39(11):799-804. doi: 10.1111/j.1365-2842.2012.02335.x. Epub 2012 Jul 19.
123. Stapelmann H, Turp JC. The NTI-tss device for the therapy of bruxism, -temporomandibular disorders, and headache - where do we stand? A qualitative systematic review of the literature. *BMC Oral Health.* 2008;8:22. doi: 10.1186/1472-6831-8-22.
124. Abrahamsson C, Ekberg E, Henrikson T, Bonemark L. Alterations of temporomandibular disorders before and after orthognathic surgery: a systematic review. *Angle Orthod.* 2007;77(4):729-734.
125. Kim MR, Gruber TM, Viana MA. Orthodontics and temporomandibular disorder: a meta-analysis. *Am J Orthod Dentofacial Orthop.* 2002;121(5):438-446.
126. De Boever JA, Carlsson GE, Klineberg IJ. Need for occlusal therapy and prosthodontic treatment in the management of temporomandibular disorders. Part I. Occlusal interferences and occlusal adjustment. *J Oral Rehabil.* 2000;27(5):367-379.
127. Magnusson T, Egermarki I, Carlsson GE. A prospective investigation over two decades on signs and symptoms of temporomandibular disorders and associated variables. A final summary. *Acta Odontol Scand.* 2005;63(2):99-109.
128. Diracoglu D, Saral IB, Keklik B, et al. Arthrocentesis versus nonsurgical methods in the treatment of temporomandibular disc displacement without reduction. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2009;108(1):3-8. doi: 10.1016/j.tripleo.2009.01.005. Epub 2009 Mar 9.
129. Godden DR, Robertson JM. The value of patient feedback in the audit of TMJ arthroscopy. *Br Dent J.* 2000;188(1):37-39.
130. Dolwick MF, Dimitroulis G. Is there a role for temporomandibular joint surgery? *Br J Oral Maxillofac Surg.* 1994;32(5):307-313.
131. Reston JT, Turkelson CM. Meta-analysis of surgical treatments for temporomandibular articular disorders. *J Oral Maxillofac Surg.* 2003;61(1):3-10; discussion 10-12.
132. Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorders: review,

- criteria, examinations and specifications, critique. *J Craniomandib Disord.* 1992;6(4):301-355.
133. Dworkin SF. Perspectives on the interaction of biological, psychological and social factors in TMD. *J Am Dent Assoc.* 1994;125(7):856-863.
  134. Suvinen TI, Hanes KR, Reade PC. Outcome of therapy in the conservative management of temporomandibular pain dysfunction disorder. *J Oral Rehabil.* 1997;24(10):718-724.
  135. Oakley ME, McCreary CP, Clark GT, Holston S, Glover D, Kashima K. A cognitive-behavioral approach to temporomandibular dysfunction treatment failures: a controlled comparison. *J Orofac Pain.* 1994;8(4):397-401.
  136. Michelotti A, Steenks MH, Farella M, Parisini F, Cimino R, Martina R. The additional value of a home physical therapy regimen versus patient education only for the treatment of myofascial pain of the jaw muscles: short-term results of a randomized clinical trial. *J Orofac Pain.* 2004;18(2):114-125.
  137. Dworkin SF, Turner JA, Mancl L, et al. A randomized clinical trial of a tailored comprehensive care treatment program for temporomandibular disorders. *J Orofac Pain.* 2002;16(4):259-276.
  138. Wexler GB, McKinney MW. Assessing treatment outcomes in two temporomandibular disorder diagnostic categories employing a validated psychometric test. *Cranio.* 1995;13(4):256-263.
  139. Dworkin SF, Huggins KH, Wilson L, et al. A randomized clinical trial using research diagnostic criteria for temporomandibular disorders-axis II to target clinic cases for a tailored self-care TMD treatment program. *J Orofac Pain.* 2002;16:48-63.
  140. Garefis P, Grigoriadou E, Zarifi A, Koidis PT. Effectiveness of conservative treatment for craniomandibular disorders: a 2-year longitudinal study. *J Orofac Pain.* 1994;8(3):309-314.
  141. Murakami K, Hosaka H, Moriya Y, Segami N, Iizuka T. Short-term treatment outcome study for the management of temporomandibular joint closed lock. A comparison of arthrocentesis to nonsurgical therapy and arthroscopic lysis and lavage. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1995;80(3):253-257.
  142. Murakami K, Kaneshita S, Kanoh C, Yamamura I. Ten-year outcome of nonsurgical treatment for the internal derangement of the temporomandibular joint with closed lock. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2002;94(5):572-575.
  143. Feine JS, Lund JP. An assessment of the efficacy of physical therapy and physical modalities for the control of chronic musculoskeletal pain. *Pain.* 1997;71(1):5-23.
  144. Nicolakis P, Burak EC, Kollmitzer J, et al. An investigation of the effectiveness of exercise and manual therapy in treating symptoms of TMJ osteoarthritis. *Cranio.* 2001;19(1):26-32.
  145. Nicolakis P, Erdogan CB, Kollmitzer J, et al. Long-term outcome after treatment of temporomandibular joint osteoarthritis with exercise and manual therapy. *Cranio.* 2002;20(1):23-27.
  146. Stiesch-Scholz M, Fink M, Tschenitschek H, Rossbach A. Medical and physical therapy of temporomandibular joint disk displacement without reduction. *Cranio.* 2002;20(2):85-90.
  147. Michelotti A, de Wijer A, Steenks M, Farella M. Home-exercise regimes for the management of non-specific temporomandibular disorders. *J Oral Rehabil.* 2005;32(11):779-785.
  148. McNeely ML, Armijo Olivo S, Magee DJ. A systematic review of the effectiveness of physical therapy interventions for temporomandibular disorders. *Phys Ther.* 2006;86(5):710-725.
  149. Medlicott MS, Harris SR. A systematic review of the effectiveness of exercise, manual therapy, electrotherapy, relaxation training, and biofeedback in the management of temporomandibular disorder. *Phys Ther.* 2006;86(7):955-973.
  150. Schiffman EL, Look JO, Hodges JS, et al. Randomized effectiveness study of four therapeutic strategies for TMJ closed lock. *J Dent Res.* 2007;86(1):58-63.
  151. List T, Axelsson S. Management of TMD: evidence from systematic reviews and meta-analyses. *J Oral Rehabil.* 2010;37(6):430-451. doi: 10.1111/j.1365-2842.2010.02089.x. Epub 2010 Apr 20.
  152. Craane B, Dijkstra PU, Stappaerts K, De Laat A. One-year evaluation of the effect of physical therapy for masticatory muscle pain: a randomized controlled trial. *Eur J Pain.* 2012;16(5):737-747. doi: 10.1002/j.1532-2149.2011.00038.x. Epub 2011 Dec 19.
  153. Craane B, Dijkstra PU, Stappaerts K, De Laat A. Randomized controlled trial on physical therapy for TMJ closed lock. *J Dent Res.* 2012;91(4):364-369. doi: 10.1177/0022034512438275. Epub 2012 Feb 8.
  154. Hoffmann RG, Kotchen JM, Kotchen TA, Cowley T, Dasgupta M, Cowley AW Jr. Temporomandibular disorders and associated clinical comorbidities. *Clin J Pain.* 2011;27(3):268-274. doi: 10.1097/AJP.0b013e31820215f5.
  155. Manfredini D. No significant differences between conservative interventions and surgical interventions for TMJ disc displacement without reduction. *Evid Based Dent.* 2014;15:90-91. doi: 10.1038/sj.ebd.6401049.
  156. Tuncer AB, Ergun N, Tuncer AH, Karahan S. Effectiveness of manual therapy and home physical therapy in patients with temporomandibular disorders: A randomized controlled trial. *J Bodyw Mov Ther.* 2013;17(3):302-308. doi: 10.1016/j.jbmt.2012.10.006. Epub 2012 Nov 16.

157. Durham J. Oral surgery: part 3. Temporomandibular disorders. *Br Dent J.* 2013;215:331-337. doi: 10.1038/sj.bdj.2013.950.
158. Di Fabio RP. Physical therapy for patients with TMD: a descriptive study of treatment, disability, and health status. *J Orofac Pain.* 1998;12(2):124-135.
159. Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. *J Craniomandib Disord.* 1992;6(4):301-355.
160. Dworkin RH, Turk DC, Farrar JT, et al. Core outcome measures for chronic pain clinical trials: IMMPACT recommendations. *Pain.* 2005;113(1-2):9-19.
161. Dworkin SF, Huggins KH, Wilson L, et al. A randomized clinical trial using research diagnostic criteria for temporomandibular disorders-axis II to target clinic cases for a tailored self-care TMD treatment program. *J Orofac Pain.* 2002;16(1):48-63.
162. Manfredini D, Guarda-Nardini L, Winocur E, Piscottti F, Ahlberg J, Lobbezoo F. Research diagnostic criteria for temporomandibular disorders: a systematic review of axis I epidemiologic findings. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2011;112(4):453-462. doi: 10.1016/j.tripleo.2011.04.021. Epub 2011 Aug 11.