Current Concepts of Orthopaedic Physical Therapy

Independent Study Course 26.2.2

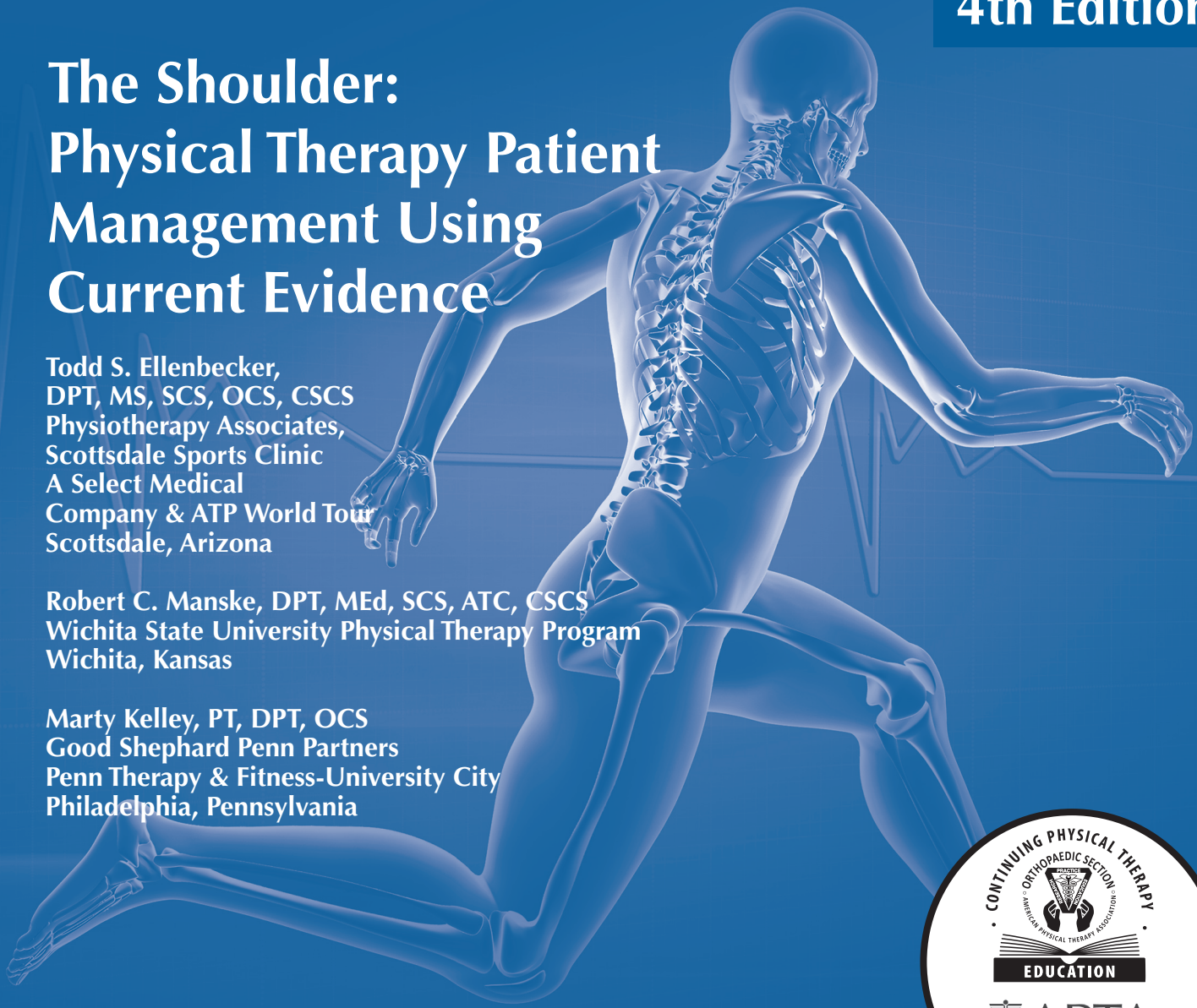
4th Edition

The Shoulder: Physical Therapy Patient Management Using Current Evidence

Todd S. Ellenbecker,
DPT, MS, SCS, OCS, CSCS
Physiotherapy Associates,
Scottsdale Sports Clinic
A Select Medical
Company & ATP World Tour
Scottsdale, Arizona

Robert C. Manske, DPT, MEd, SCS, ATC, CSCS
Wichita State University Physical Therapy Program
Wichita, Kansas

Marty Kelley, PT, DPT, OCS
Good Shephard Penn Partners
Penn Therapy & Fitness-University City
Philadelphia, Pennsylvania



CONTINUING PHYSICAL THERAPY
ORTHOPAEDIC SECTION
AMERICAN PHYSICAL THERAPY ASSOCIATION
EDUCATION
APTA
American Physical Therapy Association

REFERENCES

1. Halder AM, Itoi E, An Kn. Anatomy and biomechanics of the shoulder. *Orthop Clin N Am*. 2000;31(2):159-176.
2. Iannotti JP, Gabriel JP, Schneck SL, Evans BG, Misra S. The normal glenohumeral relationships. An anatomical study of one hundred and forty shoulders. *J Bone Joint Surg Am*. 1992;74(4):491-500.
3. Soslowsky LJ, Flatow EL, Bigliani LU, Pawluk RJ, Ateshian GA, Mow VC. Quantification of an in situ contact area at the glenohumeral joint: a biomechanical study. *J Orthop Res*. 1992;10:524-534.
4. Boileau P, Walch G. The three-dimensional geometry of the proximal humerus. Implications for surgical technique and prosthetic design. *J Bone Joint Surg Br*. 1997;79(5):857-865.
5. Basmajian JV, Bazant FJ. Factors preventing downward dislocation of the adducted shoulder joint. An electromyographic and morphological study. *J Bone Joint Surg Am*. 1959;4:1182-1186.
6. Saha AK. Dynamic stability of the glenohumeral joint. *Acta Orthop Scand*. 1971;42(6):491-505.
7. Saha AK. Mechanics of elevation of glenohumeral joint. Its application in rehabilitation of flail shoulder in upper brachial plexus injuries and poliomyelitis and in replacement of the upper humerus by prosthesis. *Acta Orthop Scand*. 1973;44(6):668-678.
8. Saha AK. The classic. Mechanism of shoulder movements and a plea for the recognition of "zero position" of the glenohumeral joint. *Clin Orthop Relat Res*. 1983;(173):3-10.
9. Bahk M, Keyurapan E, Tasaki A, Sauers EL, McFarland EG. Laxity testing of the shoulder: a review. *Am J Sports Med*. 2007;35:131-144. Epub 2006 Nov 27.
10. Habermeyer P, Schuller U, Wiedemann E. The intra-articular pressure of the shoulder: an experimental study on the role of the glenoid labrum in stabilizing the joint. *Arthroscopy*. 1992;8(2):166-172.
11. Schwartz E, Warren RF, O'Brien SJ, Fronek J. Posterior shoulder instability. *Orthop Clin N Am*. 1987;18(3):409-419.
12. Clark J, Sidles JA, Matsen FA. The relationship of the glenohumeral joint capsule to the rotator cuff. *Clin Orthop Relat Res*. 1990;(254):29-34.
13. Nimura A, Kato A, Yamaguchi K, et al. The superior capsule of the shoulder joint complements the insertion of the rotator cuff. *J Shoulder Elbow Surg*. 2012;21(7):867-872. doi: 10.1016/j.jse.2011.04.034. Epub 2011 Aug 4.
14. Ishihara Y, Mihata T, Tamboli M, et al. Role of the superior shoulder capsule in passive stability of the glenohumeral joint. *J Shoulder Elbow Surg*. 2014;23(5):642-648. doi: 10.1016/j.jse.2013.09.025. Epub 2013 Dec 31.
15. O'Brien SJ, Schwartz RS, Warren RF, Torzilli PA. Capsular restraints to anterior-posterior motion of the abducted shoulder: a biomechanical study. *J Shoulder Elbow Surg*. 1995;4(4):298-308.
16. Turkel SJ, Panio MW, Marshall JL, Girgis FG. Stabilizing mechanisms preventing anterior dislocation of the glenohumeral joint. *J Bone Joint Surg Am*. 1981;63(8):1208-1217.
17. O'Brien SJ, Neves MC, Arnoczky SP, et al. The anatomy and histology of the inferior glenohumeral ligament complex of the shoulder. *Am J Sports Med*. 1990;18(5):449-456.
18. Terry GC, Hammon D, France P, Norwood LA. The stabilizing function of passive shoulder restraints. *Am J Sports Med*. 1991;19(1):26-34.
19. Codman EA. *The Shoulder*. Boston, MA: Thomas Todd; 1934.
20. Saha AK. *Theory of Shoulder Mechanism: Descriptive and Applied*. Springfield, IL: Charles C. Thomas; 1961.
21. Terry GC, Chopp TM. Functional anatomy of the shoulder. *J Athlet Train*. 2000;35(3):248–255.
22. Peat M. Functional anatomy of the shoulder complex. *Phys Ther*. 1986;66(12):1855-1865.
23. Ludewig PM, Cook TM. Alterations in shoulder kinematics and associated muscle activity in people with symptoms of shoulder impingement. *Phys Ther*. 2000;80(3):276-291.
24. Frank RM, Ramirez J, Chalmers PN, McCormick FM, Romeo AA. Scapulothoracic anatomy and snapping scapular syndrome. *Anat Res Int*. 2013:635628. doi: 10.1155/2013/635628. Epub 2013 Nov 28.
25. Spencer EE, Kuhn JE, Huston LJ, Carpenter JE, Hughes RE. Ligamentous restraints to anterior and posterior translation of the sternoclavicular joint. *J Shoulder Elbow Surg*. 2002;11(1):43-47.
26. Diederichsen LP, Norregaard J, Krogsgaard M, Fischer-Rasmussen T, Dyhre-Poulsen P. Reflexes in the shoulder muscles elicited from human coracoacromial ligament. *J Orthop Res*. 2004;22(5):976-983.
27. Rockwood CA Jr, Williams GR, Young D. Disorders of the acromioclavicular joint. In: Rockwood CA Jr, Matsen F, eds. *The Shoulder*. Philadelphia, PA: Saunders; 1998;483-553.
28. Bontempo NA, Mazzocca AD. Biomechanics and treatment of acromioclavicular and sternoclavicular joint injuries. *Br J Sports Med*. 2010;44(5):361-369.
29. Fukuda K, Craig EV, An KN, Cofield RH, Chao EY. Biomechanical study of the ligamentous system of the acromioclavicular joint. *J Bone Joint Surg Am*. 1986;68(3):434-440.
30. Inman VT, Saunders JB, Abbott LC. Observations on the function of the shoulder joint. 1944. *Clin Orthop Relat Res*. 1996;(330):3-12.
31. Bagg SD, Forrest WJ. A biomechanical analysis of scapular rotation during arm abduction in the scapular plane. *Am J Phys Med Rehabil*. 1988;67(6):238-245.
32. Freedman L, Munro RR. Abduction of the arm in the scapular plane: scapular and glenohumeral movements. A roentgenographic study. *J Bone Joint Surg Am*. 1966;48(8):1503-1510.
33. Graichen H, Stammberger T, Bonel H, Karl-Hans Englmeier, Reiser M, Eckstein F. Glenohumeral translation during active and passive elevation of the shoulder – a 3D open-MRI study. *J Biomech*. 2000;33(5):609-613.
34. McQuade KJ, Dawson J, Smidt GL. Scapulothoracic muscle fatigue associated with alterations in scapulohumeral rhythm kinematics during maximum resistive shoulder elevation. *J Orthop Sports Phys Ther*. 1998;28(2):74-80.
35. McClure PW, Michener LA, Sennett BJ, Karduna AR. Direct 3-dimensional measurement of scapular kinematics during dynamic movements in vivo. *J Shoulder Elbow Surg*. 2001;10(3):269-277.
36. Poppen NK, Walker PS. Normal and abnormal motion of the shoulder. *J Bone Joint Surg Am*. 1976;58(2):195-201.
37. Labriola JE, Lee TQ, Debski RE, McMahon PJ. Stability and instability of the glenohumeral joint: the role of shoulder muscles. *J Shoulder Elbow Surg*. 2005;14(suppl S):32S-38S.
38. Wuelker N, Korell M, Thren K. Dynamic glenohumeral joint stability. *J Shoulder Elbow Surg*. 1998;7(1):43-52.
39. Kelley M, Clark W. *Orthopedic Therapy of the Shoulder*. Philadelphia, PA: Lippincott Williams & Wilkins; 1995.
40. Abboud JA, Soslowsky LJ. Interplay of the static and dynamic restraints in glenohumeral instability. *Clin Orthop Relat Res*. 2002;(400):48-57.
41. Ebaugh DD, McClure PW, Karduna AR. Three-dimensional scapulothoracic motion during active and passive arm elevation. *Clin Biomech*. 2005;20(7):700-709.
42. Cools AM, Witvrouw EE, Declercq GA, Danneels LA, Cambier DC. Scapular muscle recruitment patterns: trapezius muscle latency with and without impingement symptoms. *Am J Sports Med*. 2003;31(4):542-549.
43. Burkhart SS. Flouroscopic comparison of kinematic patterns in massive rotator cuff tears. A suspension bridge model. *Clin Orthop Rel Res*. 1992;(284):144-152
44. Perry J. Biomechanics. In: Rowe C, ed. *The Shoulder*. New York, NY: Churchill-Livingstone; 1988.
45. Ellenbecker TS, Cools A. Rehabilitation of shoulder impingement syndrome and rotator cuff injuries: an evidence based

review. *Br J Sports Med.* 2010;44(5):319-327. doi: 10.1136/bjsm.2009.058875..
46. Reuther KE, Thomas SJ, Tucker JJ, et al. Disruption of the anterior-posterior rotator cuff force balance alters joint function and leads to joint damage in a rat model. *J Orthop Res*. 2014;32(5):638-644. doi: 10.1002/jor.22586. Epub 2014 Jan 25.
47. Ellenbecker TS. *Clinical Examination of the Shoulder*. St Louis, MO: Elsevier Saunders; 2004.
48. Magee DJ. *Orthopaedic Physical Assessment*. 3rd ed. Philadelphia, PA: WB Saunders; 1997.
49. Priest JD, Nagel DA. Tennis shoulder. *Am J Sports Med*. 1976;4(1):28-42.
50. Piatt BE, Hawkins RJ, Fritz RC, Ho CP, Wolf E, Schickendantz M. Clinical evaluation and treatment of spinoglenoid notch ganglion cysts. *J Shoulder Elbow Surg*. 2002;11(6):600-604.
51. Ellenbecker TS. Rehabilitation of shoulder and elbow injuries in tennis players. *Clin Sports Med*. 1995;14(1):87-110.
52. Kibler WB. Role of the scapula in the overhead throwing motion. *Contemp Orthop*. 1991;22:525.
53. Kibler WB, Uhl TL, Maddux JW, Brooks PV, Zeller B, McMullen J. Qualitative clinical evaluation of scapular dysfunction: a reliability study. *J Shoulder Elbow Surg*. 2002;11(6):550-556.
54. Zeier FG. The treatment of winged scapula. *Clin Orthop Relat Res*. 1973;(91):128-133.
55. McClure P, Tate AR, Kareha S, Irwin D, Zlupko E. A clinical method for identifying scapular dyskinesis, part 1: reliability. *J Athl Train*. 2009;44(2)160-164. doi: 10.4085/1062-6050-44.2.160.
56. Uhl TL, Kibler WB, Gecewich B, Tripp BL. Evaluation of clinical assessment methods for scapular dyskinesis. *Arthroscopy*. 2009;25(11):1240-1248. doi: 10.1016/j.arthro.2009.06.007.
57. Kibler WB. The role of the scapula in athletic shoulder function. *Am J Sports Med*. 1998;26(2):325-337.
58. Rabin A, Irrgang JJ, Fitzgerald GK, Eubanks A. The intertester reliability of the Scapular Assistance Test. *J Orthop Sports Phys Ther*. 2006;36(9):653-660.
59. Kibler WB, Uhl TL, Cunningham TJ. The effect of the scapular assistance test on scapular kinematics in the clinical exam. *J Orthop Sports Phys Ther*. 2009;39(11):A12.
60. Uhl TL, Cunningham TJ, Kibler WB. Kinematic and neuromuscular actions during the scapular retraction test (SRT). *J Orthop Sports Phys Ther.* 2009;39(11):A12.
61. Mihata T, McGarry MH, Kinoshita M, Lee TQ. Excessive glenohumeral horizontal abduction as occurs during the late cocking phase of the throwing motion can be critical for internal impingement. *Am J Sports Med*. 2010;38(2):369-374. doi: 10.1177/0363546509346408. Epub 2009 Nov 13.
62. Kelley MJ, Kane TE, Leggin BG. Spinal accessory nerve palsy: associated signs and symptoms. *J Orthop Sports Phys Ther*. 2008;38(2):78-86. doi: 10.2519/jospt.2008.2454. Epub 2007 Sep 7.
63. Ellenbecker TS, Roetert EP, Piorkowski P. Shoulder internal and external rotation range of motion of elite junior tennis players: a comparison of two protocols (abstract). *J Orthop Sports Phys Ther*. 1993;17:A65.
64. Chandler TJ, Kibler WB, Uhl TL, Wooten B, Kiser A, Stone E. Flexibility comparisons of elite junior tennis players to other athletes. *Am J Sports Med*. 1990;18(2):134-136.
65. Ellenbecker TS, Roetert EP, Bailie DS, Davies GJ, Brown SW. Glenohumeral joint total rotation range of motion in elite tennis players and baseball pitchers. *Med Sci Sports Exerc*. 2002;34(12):2052-2056.
66. Wilk KE, Reinold MM, Macrina LC, et al. Glenohumeral internal rotation measurements differ depending on stabilization techniques. *Sports Health*. 2009;1(2):131-136.
67. Harryman DT 2nd, Sidles JA, Clark JM, McQuade KJ, Gibb TD, Matsen FA 3rd. Translation of the humeral head on the glenoid with passive glenohumeral motion. *J Bone Joint Surg Am*. 1990;72(9):1334-1343.
68. Matsen FA III, Artnz CT. Subacromial impingement. In: Rockwood CA Jr, Matsen FA III, eds. *The Shoulder*. Philadelphia, PA: WB Saunders; 1990.
69. Koffler KM, Bader D, Eager M, et al. The effect of posterior capsular tightness on glenohumeral translation in the late-cocking phase of pitching: a cadaveric study [Abstract SS-15] Washington, DC: Arthroscopy Association of North America Annual Meeting; 2001.
70. Muraki T, Yamamoto N, Zhao KD et al. Effect of posteroinferior capsule tightness on contact pressure and area beneath the coracoacromial arch during the pitching motion. *Am J Sports Med*. 2010;38(3):600-607. doi: 10.1177/0363546509350074. Epub 2009 Dec 4.
71. Warner JJP, Micheli LJ, Arslanian LE, Kennedy J, Kennedy R. Patterns of flexibility, laxity, and strength in normal shoulders and shoulders with instability and impingement. *Am J Sports Med*. 1990;18(4):366-375.
72. Tyler TF, Nicholas SJ, Lee SJ, Mullaney M, McHugh MP. Correction of posterior shoulder tightness is associated with symptom resolution in patients with internal impingement. *Am J Sports Med*. 2010;38(1):114-119. doi: 10.1177/0363546509346050. Epub 2009 Dec 4.
73. Hoppenfeld S. *Physical Examination of the Spine and Extremities*. Norwalk, CT: Prentice-Hall; 1976.
74. Daniels L, Worthingham C. *Muscle Testing: Techniques of Manual Examination*. 4th ed. Philadelphia, PA: WB Saunders; 1980.
75. Kelly BT, Kadrmas WH, Speer KP. The manual muscle examination for rotator cuff strength. An electromyographic investigation. *Am J Sports Med*. 1996;24(5):581-588.
76. Kendall FP, McCreary EK. *Muscle Testing and Function*. 3rd ed. Baltimore, MD: Lippincott Williams & Wilkins; 1983.
77. Jobe FW, Bradley JP. The diagnosis and nonoperative treatment of shoulder injuries in athletes. *Clin Sports Med*. 1989;8(3):419-437.
78. Malanga GA, Jenp YN, Growney ES, An KN. EMG analysis of shoulder positioning in testing and strengthening the supraspinatus. *Med Sci Sports Exerc*. 1996;28(6):661-664.
79. Chalmers PN, Cvetanovich GL, Kupfer N, et al. The Champagne toast position isolates the supraspinatus better than the Jobe test: an electromyographic study of shoulder physical examination tests. *J Shoulder Elbow Surg.* 2016;25(2):322-329.
80. Itoi E, Kido T, Sano A, Urayama M, Sato K. Which is more useful, the "full can test" or the "empty can test," in detecting the torn supraspinatus tendon? *Am J Sports Med.* 1999;27(1):65-68.
81. Jenp YN, Malanga BA, Growney ES, An KN. Activation of the rotator cuff in generating isometric shoulder rotation torque. *Am J Sports Med*. 1996;24(4):477-485.
82. Walch G, Boulahia A, Calderone S, Robinson AH. The 'dropping' and 'hornblower's' signs in evaluation of rotator cuff tears. *J Bone Joint Surgery Br.* 1998;80(4):624-628.
83. Leroux JL, Codine P, Thomas E, Pocholle M, Mailhe D, Blotman F. Isokinetic evaluation of rotational strength in normal shoulders and shoulders with impingement syndrome. *Clin Orthop Relat Res*. 1994;(304):108-115.
84. Patte D, Goutallier D, Monpierre H, Debeyre J. [Over-extension lesions]. *Rev Chir Orthop Reparatrice Appar Mot*. 1988;74(4):314-318.
85. Gerber C, Krushell RJ. Isolated rupture of the tendon of the subscapularis muscle. Clinical features in 16 cases. *J Bone Joint Surgery Br*. 1991;73(3):389-394.
86. Stefko JM, Jobe FW, VanderWilde RS, Carden E, Pink M. Electromyographic and nerve block analysis of the subscapularis liftoff test. *J Shoulder Elbow Surg*. 1997;6(4):347-355.
87. Riemann BL, Davies GJ, Ludwig L, Gardenhour H. Handheld dynamometer testing of the internal and external rotator musculature based on selected positions to establish normative data and unilateral ratios. *J Shoulder Elbow Surg.* 2010;19(8):1175-1183. doi: 10.1016/j.jse.2010.05.021. Epub 2010 Sep 20.
88. Tong HC, Haig AJ, Yamakawa K. The Spurling test and cervical radiculopathy. *Spine*. 2002;27(2):156-159.
89. Gould JA. The spine. In: Gould JA, Davies GJ, eds. *Orthopaedic and Sports Physical Therapy*. St Louis, MO: Mosby; 1985.
90. Nirschl RP, Ashman ES. Tennis elbow tendinosis (epicondylitis). *Instr Course Lect*. 2004;53:587-598.

91. Ellenbecker TS, Mattalino AJ. *The Elbow in Sport. Injury, Treatment and Rehabilitation.* Champaign, IL: Human Kinetics Publishers; 1997.
92. Morrey BF, An KN. Articular and ligamentous contributions to the stability of the elbow joint. *Am J Sports Med*. 1983;11(5):315-319.
93. Ellenbecker TS, Mattalino AJ, Elam EA, Caplinger RA. Medial elbow joint laxity in professional baseball pitchers. A bilateral comparison using stress radiography. *Am J Sports Med*. 1998;26(3):420-424.
94. Neer CS 2nd, Welsh RP. The shoulder in sports. *Orthop Clin North Am*. 1977;8(3):583-591.
95. Hawkins RJ, Kennedy JC. Impingement syndrome in athletes. *Am J Sports Med*. 1980;8(3):151-158.
96. Davies GJ, DeCarlo MS. Examination of the shoulder complex. *Current Concepts in Rehabilitation of the Shoulder*. La Crosse, WI: Sports Physical Therapy Association; 1995.
97. Magee DJ. *Orthopaedic Physical Assessment*. 5th ed. St Louis, MO: Saunders; 2009.
98. Yocum LA. Assessing the shoulder. History, physical examination, differential diagnosis, and special tests used. *Clin Sports Med*. 1983;2(2):281-289.
99. Valadie AL 3rd, Jobe CM, Pink MM, Ekman EF, Jobe FW. Anatomy of provocative tests for impingement syndrome of the shoulder. *J Shoulder Elbow Surg*. 2000;9(1):36-46.
100. Hegedus EJ, Goode A, Campbell S, et al. Physical examination tests of the shoulder: a systematic review with meta-analysis of individual tests. *Br J Sports Med*. 2008;42(2):80-92; discussion 92. Epub 2007 Aug 24.
101. Moen MH, de Vos RJ, Ellenbecker TS, Weir A. Clinical tests in shoulder examination: how to perform them. *Br J Sports Med*. 2010;44(5):370-375. doi: 10.1136/bjsm.2010.071928.
102. McFarland EG, Torpey BM, Curl LA. Evaluation of shoulder laxity. *Sports Med*. 1996;22(4):264-272.
103. Gerber C, Ganz R. Clinical assessment of instability of the shoulder. With special reference to anterior and posterior drawer tests. *J Bone Joint Surg Br*. 1984;66(4):551-556.
104. Harryman DT 2nd, Sidles JA, Harris SL Matsen FA 3rd. Laxity of the normal glenohumeral joint: a quantitative in-vivo assessment. *J Shoulder Elbow Surg*. 1992;1(2):66-76. doi: 10.1016/S1058-2746(09)80123-7. Epub 2009 Feb 19.
105. Pagnani MJ, Warren RF. Stabilizers of the glenohumeral joint. *J Shoulder Elbow Surg*. 1994;3(3):173-190. doi: 10.1016/S1058-2746(09)80098-0. Epub 2009 Feb 19.
106. Hawkins RJ, Mohtadi NGH. Clinical evaluation of shoulder instability. *Clin J Sports Med*. 1991;1:59-64.
107. Altchek DW, Dines DW. The surgical treatment of anterior instability: selective capsular repair. *Oper Tech Sports Med*. 1993;1:285-292.
108. Hawkins RJ, Schulte JP, Janda DH, Huckell GH. Translation of the glenohumeral joint with the patient under anesthesia. *J Shoulder Elbow Surg*. 1996;5(4):286-292.
109. Ellenbecker TS, Bailie DS, Mattalino AJ, et al. Intrarater and interrater reliability of a manual technique to assess anterior humeral head translation of the glenohumeral joint. *J Shoulder Elbow Surg*. 2002;11(5):470-475.
110. Hamner DL, Pink MM, Jobe FW. A modification of the relocation test: arthroscopic findings associated with a positive test. *J Shoulder Elbow Surg*. 2000;9(4):263-267.
111. Morgan CD, Burkhart SS, Palmeri M, Gillespie M. Type II SLAP lesions: three subtypes and their relationships to superior instability and rotator cuff tears. *Arthroscopy*. 1998;14(6):553-565.
112. Carter C, Wilkinson J. Persistent joint laxity and congenital dislocation of the hip. *J Bone Joint Surg Br*. 1964;46:40-45.
113. Beighton P, Horan F. Orthopaedic aspects of the Ehlers-Danlos syndrome. *J Bone Joint Surg Br.* 1969;51(3):444-453.
114. Juul-Kristensen B, Rogind H, Jensen DV, Remvig L. Inter-examiner reproducibility of tests and critera for generalized joint hypermobility and benign joint hypermobility syndrome. *Rheumatology (Oxford)*. 2007;46(12):1835-1841. Epub 2007 Nov 15.
115. Cameron KL, Duffey ML, DeBerardino TM, Stoneman PD, Jones CJ, Owens BD . Association of generalized joint hypermobility with a history of glenohumeral joint instability. *J Athl Train*. 2010;45(3):253-258. doi: 10.4085/1062-6050-45.3.253.
116. FA Matsen 3rd, DT Harryman 2nd, JA Sidles. Mechanics of glenohumeral instability. *Clin Sports Med*. 1991;10(4):783-788.
117. Kvitne KS, Jobe FW, Jobe CM. Shoulder instability in the overhand or throwing athlete. *Clin Sports Med*. 1995;14(4):917-935.
118. Altchek DW, Warren RF, Wickiewicz TL, Ortiz G. Arthroscopic labral debridement. A three year follow-up study. *Am J Sports Med*. 1992;20(6):702-706.
119. Terry GC, Friedman SJ, Uhl TL. Arthroscopically treated tears of the glenoid labrum. Factors influencing outcome. *Am J Sports Med*. 1994;22(4):504-512.
120. Knesek M, Skendzel JG, Dines JS, Altchek DW, Allen AA, Bedi A. Diagnosis and management of superior labral anterior posterior tears in throwing athletes. *Am J Sports Med*. 2013;41(2):444-460. doi: 10.1177/0363546512466067. Epub 2012 Nov 20.
121. Perthes G. Ueber operationen der habituellen schulterluxation. *Deutsche Ztschr Chir*. 1906;85:199.
122. Bankart AS. Recurrent or habitual dislocation of the shoulder joint. *Br Med J*. 1923;2(3285):1132-1133.
123. Bankart AS. The pathology and treatment of recurrent dislocation of the shoulder joint. *Br Med J*. 1938;26:23-29.
124. Gill TJ, Micheli LJ, Gebhard F, Binder C. Bankart repair for anterior instability of the shoulder. Long-term outcome. *J Bone Joint Surg Am*. 1997;79(6):850-857.
125. Speer KP, Hannafin JA, Altchek DW, Warren RF. An evaluation of the shoulder relocation test. *Am J Sports Med*. 1994;22(2):177-183.
126. Snyder SJ, Karzel RP, Del Pizzo W, Ferkel RD, Friedman MJ. SLAP lesions of the shoulder. *Arthroscopy*. 1990;6(4):274-279.
127. Cheng JC, Karzel RP. Superior labrum anterior posterior lesions of the shoulder: operative techniques of management. *Oper Tech Sports Med*. 1997;5(4):249-256.
128. Andrews JR, Gillogly S. Physical examination of the shoulder in throwing athletes. In: Zarins B, Andrews JR, Carson WG, eds. *Injuries to the Throwing Arm*. Philadelphia, PA: WB Saunders; 1985.
129. Burkhart SS, Morgan CD. The peel-back mechanism: its role in producing and extending posterior type II SLAP lesions and its effect on SLAP repair rehabilitation. *Arthroscopy*. 1998;14(6):637-640.
130. Kuhn JE, Bey MJ, Huston LJ, Blasier RB, Soslowsky LJ. Ligamentous restraints to external rotation in the humerus in the late-cocking phase of throwing. A cadaveric biomechanical investigation. *Am J Sports Med*. 2000;28(2):200-205.
131. Ellenbecker TS. Etiology and evaluation of rotator cuff pathologic conditions and rehabilitation. In: Donatelli RA, ed. *Physical Therapy of the Shoulder.* 4th ed. Philadelphia, PA: Churchill Livingstone; 2004:337-358.
132. LiuSH, Henry MH, Nuccion S. A prospective evaluation of a new physical examination in predicting glenoid labrum tears. *Am J Sports Med*. 1996;24(6):721-725.
133. Stetson WB, Templin K. The crank test, the O'Brien test, and routine magnetic resonance imaging scans in the diagnosis of labral tears. *Am J Sports Med*. 2002;30(6):806-809.
134. O'Brien SJ, Pagnani MJ, Fealy S, McGlynn SR, Wilson JB. The active compression test: a new and effective test for diagnosing labral tears and acromioclavicular joint abnormality. *Am J Sports Med*. 1998;26(5):610-613.
135. Myers TH, Zemanovic JR, Andrews JR. The resisted supination external rotation test: a new test for the diagnosis of superior labral anterior posterior lesions. *Am J Sports Med*. 2005;33(9):1315-1320. Epub 2005 Jul 7.
136. Pandya NK, Colton A, Webner D, Sennett B, Huffman GR. Physical examination and magnetic resonance imaging in the diagnosis of superior labrum anterior-posterior lesions of the shoulder: a sensitivity analysis. *Arthroscopy*. 2008;24(3):311-317. doi: 10.1016/j.arthro.2007.09.004. Epub 2007 Nov 9.

137. Reuss BL, Schwartzberg R, Ziatkin MB, Cooperman A, Dixon JR. Magnetic resonance imaging accuracy for the diagnosis of superior labrum anterior-posterior lesions in the community setting: eighty-three arthroscopically confirmed cases. *J Shoulder Elbow Surg*. 2006;15(5):580-585. Epub 2006 Aug 7.
138. Jee WH, McCauley TR, Katz LD, Matheny JM, Ruwe PA, Daigneault JP. Superior labral anterior posterior (SLAP) lesions of the glenoid labrum: reliability and accuracy of MR arthrography for diagnosis. *Radiology.* 2001;218(1):127-132.
139. Deyle GD. Musculoskeletal imaging in physical therapy practice. *J Orthop Sports Phys Ther*. 2005;35(11):708-721.
140. Burbank KM, Stevenson JH, Czarnecki GR, Dorfman J. Chronic shoulder pain: part I. Evaluation and diagnosis. *Am Fam Phys*. 2008;77(4):453-460.
141. Schwarts ML, Thornton DD. Diagnostic imaging of the shoulder complex. In: Wilk KE, Reinold MM, Andrews JR, eds. *The Athletes Shoulder*. 2nd ed New York, NY:Churchill Livingstone; 2009.
142. Sartoris D. *Musculoskeletal Imaging: The Requisites*. St. Louis, MO: Mosby; 1996.
143. Tirman PF, Smith ED, Stoller DW, Fritz RC. Shoulder imaging in athletes. *Semin Musculoskelet Radiol*. 2004;8(1):29-40.
144. Parker BJ, Zlatkin MB, Newman JS, Rathur SK. Imaging of shoulder injuries in sports medicine: current protocols and concepts. *Clin Sports Med*. 2008;27(4):579-606. doi: 10.1016/j.csm.2008.07.006.
145. Reiman MP, Manske RC. *Functional Testing in Human Performance*. Champaign, IL: Human Kinetics; 2009.
146. Goldbeck TG, Davies GJ. Test-retest reliability of the closed kinetic chain upper extremity stability test: a clinical field test. *J Sport Rehabil*. 2000;9(1):35-45.
147. Davies GJ, Dickhoff-Hoffman S. Neuromuscular testing and rehabilitation of the shoulder complex. *J Orthop Sports Phys Ther*. 1993;18(2):449-458.
148. Rankin SA, et al. *Test-retest reliability analysis of Davies clinically oriented functional throwing performance index (FTPI) over extended time intervals* [master's thesis]. Lexington, KY: University of Kentucky; 1996.
149. Collins DR, Hedges PB. *A Comprehensive Guide to Sports Skills Tests and Measurement*. Springfield, IL: Charles C. Thomas; 1978:330-333.
150. Ellenbecker TS. Muscular strength relationship between normal grade manual muscle testing and isokinetic measurement of the shoulder internal and external rotators. *Isokinet Exerc Sci*. 1996;6(1):51-56.
151. Davies GJ. *A Compendium of Isokinetics in Clinical Usage and Rehabilitation Techniques*. 4th ed. Onalaska, WI: S & S Publishing; 1992.
152. Knops JE, Meiners TK, Davies GJ, et al. Isokinetic test retest reliability of the modified neutral shoulder test position. Unpublished master's thesis. La Crosse, WI: University of Wisconsin-LaCrosse.
153. Elliott B, Marsh T, Blanksby B. A three dimensional cinematographic analysis of the tennis serve. *Int J Sports Biomech*. 1986;2:260-271.
154. Bassett RW, Browne AO, Morrey BF, An KN. Glenohumeral muscle force and moment mechanics in a position of shoulder instability. *J Biomech*. 1990;23(5):405-415.
155. Wilk KE, Andrews JR, Arrigo CA, Keirns MA, Erber DJ. The strength characteristics of internal and external rotator muscles in professional baseball pitchers. *Am J Sports Med*. 1993;21(1):61-66.
156. Ellenbecker TS, Mattalino AJ. Concentric isokinetic shoulder internal and external rotation strength in professional baseball pitchers. *J Orthop Sports Phys Ther*. 1997;25(5):323-328.
157. Ellenbecker TS, Roetert EP. Age specific isokinetic glenohumeral internal and external rotation strength in elite junior tennis players. *J Sci Med Sport*. 2003;6(1):63-70.
158. Ellenbecker TS, Davies GJ. The application of isokinetics in testing and rehabilitation of the shoulder complex. *J Athl Train*. 2000; 35(3):338-350.
159. Neer CS 2nd. Impingement lesions. *Clin Orthop Relat Res.* 1983;(173):70-77.
160. Neer CS 2nd. Anterior acromioplasty for the chronic impingement syndrome in the shoulder. *J Bone Joint Surg Am*. 1972;54(1):41-50.
161. Golding FC. The shoulder-- the forgotten joint. *Br J Radiol*. 1962;35:149-158.
162. Cotton RE, Rideout DF. Tears of the humeral rotator cuff: a radiological and pathological necropsy survey. *J Bone Joint Surg Br.* 1964;46:314-328.
163. Poppen NK, Walker PS. Forces at the glenohumeral joint in abduction. *Clin Orthop Relat Res*. 1978;(135):165-170.
164. Wuelker N, Plitz W, Roetman B. Biomechanical data concerning the shoulder impingement syndrome. *Clin Orthop Relat Res*. 1994;(303):242-249.
165. Fleisig GS, Andrews JR, Dillman CJ, Escamilla RF. Kinetics of baseball pitching with implications about injury mechanisms. *Am J Sports Med*. 1995;23(2):233-239.
166. Bigliani LU, Ticker JB, Flatow EL, Soslowsky LJ, Mow VC, The relationship of acromial architecture to rotator cuff disease. *Clin Sports Med*. 1991;10(4):823-828.
167. Zuckerman JD, Kummer FJ, Cuomo F, Simon J, Rosenblum S, Katz N. The influence of coracoacromial arch anatomy on rotator cuff tears. *J Shoulder Elbow Surg*. 1992;1(1):4-14. doi: 10.1016/S1058-2746(09)80010-4. Epub 2009 Feb 2.
168. Jobe FW, Kvitne RS, Giangarra CE. Shoulder pain in the overhand or throwing athlete. The relationship of anterior instability and rotator cuff impingement. *Orthop Rev*. 1989;18(9):963-975.
169. Andrews JR, Alexander EJ. Rotator cuff injury in throwing and racquet sports. *Sports Med Arthrosc*. 1995;3(1):30-38.
170. Nirschl RP. Shoulder tendonitis. In: Pettrone FP, ed. *Upper Extremity Injuries in Athletes*. Washington, DC: American Academy of Orthopaedic Surgeons Symposium, Mosby; 1988.
171. Kraushaar BS, Nirschl RP. Tendinosis of the elbow (tennis elbow). Clinical features and findings of histological, immunohistochemical, and electron microscopy studies. *J Bone Joint Surg Am*. 1999;81(2):259-278.
172. Cofield R. Rotator cuff disease of the shoulder. *J Bone Joint Surg Am*. 1985;67(6):974-979.
173. Jobe FW, Pink M. The athlete's shoulder. *J Hand Ther*. 1994;7(2):107-110.
174. Walch G, Boileau P, Noel E, Donell ST. Impingement of the deep surface of the supraspinatus tendon on the posterosuperior glenoid rim: an arthroscopic study. *J Shoulder Elbow Surg*. 1992;1(5):238-245. doi: 10.1016/S1058-2746(09)80065-7. Epub 2009 Feb 19.
175. Halbrecht JL, Tirman P, Atkin D. Internal impingement of the shoulder: comparison of findings between the throwing and nonthrowing shoulders of college baseball players. *Arthroscopy*. 1999;15(3):253-258.
176. Paley KJ, Jobe FW, Pink MM, Kvitne RS, ElAttrache NS. Arthroscopic findings in the overhand throwing athlete: evidence for posterior internal impingement of the rotator cuff. *Arthroscopy*. 2000;16(1):35-40.
177. Warner JJ, Micheli LJ, Arslanian LE, Kennedy J, Kennedy R. Scapulothoracic motion in normal shoulders and shoulders with glenohumeral instability and impingement syndrome. A study using Moire topographic analysis. *Clin Orthop Relat Res*. 1992;(285):191-199.
178. Jensen BR, Sjøgaard G, Bornmyr S, Arborelius M, Jørgensen K. Intramuscular laser-Doppler flowmetry in the supraspinatus muscle during isometric contractions. *Eur J Appl Physiol Occup Physiol*. 1995;71(4):373-378.
179. Solem-Bertoft E, Thuomas K, Westerberg C. The influence of scapula retraction and protraction on the width of the subacromial space. An MRI study. *Clin Orthop Relat Res*. 1993;(296):99-103.
180. Mosely JB, Jobe FW, Pink M, Perry J, Tibone J. EMG analysis of the scapular muscles during a shoulder rehabilitation program. *Am J Sports Med*. 1992;20(2):128-134.
181. Decker MJ, Hintermeister RA, Faber KJ, Hawkins RJ. Serratus anterior muscle activity during selected rehabilitation exercises. *Am J Sports Med*. 1999;27(6):784-791.

182. Burkhart SS, Morgan CD, Kibler WB. The disabled throwing shoulder: spectrum of pathology Part I: pathoanatomy and biomechanics. *Arthroscopy.* 2003;19(4):404-420.
183. Awan R, Smith J, Boon AJ. Measuring shoulder internal rotation range of motion: a comparison of 3 techniques. *Arch Phys Med Rehabil*. 2002;83(9):1229-1234.
184. Boon AJ, Smith J. Manual scapular stabilization: its effect on shoulder rotational range of motion. *Arch Phys Med Rehabil*. 2000;81(7):978-983.
185. Ellenbecker TS, Roetert EP, Piorkowski PA, Schulz DA. Glenohumeral joint internal and external rotation range of motion in elite junior tennis players. *J Orthop Sports Phys Ther*. 1996;24(6):336-341.
186. Ellenbecker TS. Shoulder internal and external rotation strength and range of motion in highly skilled tennis players. *Isokinet Exerc Sci*. 1992;2(2):65-72..
187. Brown LP, Neihues SL, Harrah A, Yavorsky P, Hirshman HP. Upper extremity range of motion and isokinetic strength of the internal and external shoulder rotators in major league baseball players. *Am J Sports Med*. 1988;16(6):577-585.
188. Crockett HC, Gross LB, Wilk KE, et al. Osseous adaptation and range of motion at the glenohumeral joint in professional baseball pitchers. *Am J Sports Med*. 2002;30(1):20-26.
189. Meister K, Day T, Horodyski MB, Kaminski TW, Wasik MP, Tillman S. Rotational motion changes in the glenohumeral joint of the adolescent /Little League baseball player. *Am J Sports Med*. 2005;33(5):693-698. Epub 2005 Feb 16.
190. Reagan KM, Meister K, Horodyski MB, Werner DW, Carruthers C, Wilk K, Humeral retroversion and its relationship to glenohumeral rotation in the shoulder of college baseball players. *Am J Sports Med*. 2002;30(3):354-360.
191. Osbahr DC, Cannon DL, Speer KP. Retroversion of the humerus in the throwing shoulder of college baseball pitchers. *Am J Sports Med*. 2002;30(3):347-353.
192. Chant CB, Litchfield R, Griffin S, Thain LM. Humeral head retroversion in competitive baseball players and its relationship to glenohumeral rotation range of motion. *J Orthop Sports Phys Ther*. 2007;37(9):514-520.
193. Reinold MM, Macrina LC, Wilk KE, et al. Electromyographic analysis of the supraspinatus and deltoid muscles during 3 common rehabilitation exercises. *J Athl Train*. 2007;42(4):464-469.
194. Izumi T, Aoki M, Muraki T, Hidaka E, Miyamoto S. Stretching positions for the posterior capsule of the glenohumeral joint: strain measurement using cadaver specimens. *Am J Sports Med*. 2008;36(10):2014-2022. doi: 10.1177/0363546508318196. Epub 2008 Jun 20.
195. Sullivan PE, Markos PD, Minor MD. *An Integrated Approach to Therapeutic Exercise: Theory and Clinical Application*. Reston, VA: Reston Publishing Co; 1982.
196. Zachezewski JE, Reischl S. Flexibility for the runner. Specific program considerations. *Top Acute Care Trauma Rehabil*. 1986:9-27.
197. McClure P, Balaicuis J, Heiland D, Broersma ME, Thorndike CK, Wood A. A randomized controlled comparison of stretching procedures in recreational athletes with posterior shoulder tightness [abstract]. *J Orthop Sports Phys Ther.* 2005;35(1):A5.
198. Ballantyne BT, O'Hare SJ, Paschall JL, et al. Electromyographic activity of selected shoulder muscles in commonly used therapeutic exercises. *Phys Ther*. 1993;73(10):668-677; discussion 677-682.
199. Blackburn TA, McLeod WD, White B, Wofford L. EMG analysis of posterior rotator cuff exercises. *Athl Train*. 1990;25:40-45.
200. Reinhold MM, Wilk KE, Fleisig GS, et al. Electromyographic analysis of the rotator cuff and deltoid musculature during common shoulder external rotation exercises. *J Orthop Sports Phys Ther*. 2004;34(7):385-394.
201. Townsend H, Jobe FW, Pink M, Perry J. Electromyographic analysis of the glenohumeral muscles during a baseball rehabilitation program. *Am J Sports Med*. 1991;19(3):264-272.
202. Rathburn JB, Macnab I. The microvascular pattern of the rotator cuff. *J Bone Joint Surgery Br*. 1970;52(3):540-553.
203. Fleck SJ, Kraemer WJ. *Designing Resistance Training Programs*. Champaign IL: Human Kinetics Publishers; 1987.
204. Ellenbecker TS, Davies GJ, Rowinski MJ. Concentric versus eccentric isokinetic strengthening of the rotator cuff: objective data versus functional test. *Am J Sports Med.* 1988;16(1):64-69.
205. Carter AB, Kaminski TW, Douex AT Jr, Knight CA, Richards JG. Effects of high volume upper extremity plyometric training on throwing velocity and functional strength ratios of the shoulder rotators in collegiate baseball players. *J Strength Cond Res*. 2007;21(1):208-215.
206. Niederbracht Y, Shim AL, Sloniger MA, Paternostro-Bayles M, Short TH. Effects of a shoulder injury prevention strength training program on eccentric external rotator muscle strength and glenohumeral joint imbalance in female overhead activity athletes. *J Strength Cond Res*. 2008;22(1):140-145. doi: 10.1519/JSC.0b013e31815f5634.
207. Moncrief SA, Lau JD, Gale JR, Scott SA. Effect of rotator cuff exercise on humeral rotation torque in healthy individuals. *J Strength Cond Res.* 2002;16(2):262-270.
208. Graichen H, Hinterwimmer S, von Eisenhart-Roth R, Vogl T, Englmeier KH, Eckstein F. Effect of abducting and adducting muscle activity on glenohumeral translation, scapular kinematics and subacromial space width in vivo. *J Biomech*. 2005;38(4):755-760.
209. Bitter NL, Clisby EF, Jones MA, Magarey ME, Jaberzadeh S, Sandow MJ. Relative contributions of infraspinatus and deltoid during external rotation in healthy shoulders. *J Shoulder Elbow Surg*. 2007;16(5):563-568. Epub 2007 Jun 8.
210. McCabe RA, Tyler TF, Nicholas SS, McHugh M. Selective activation of the lower trapezius muscle in patients with shoulder impingement [abstract]. *J Orthop Sports Phys Ther*. 2001;31(1):A45.
211. Englestad ED, Johnson RL, Jeno SHN, Mabey RL. An electromyographical study of lower trapezius muscle activity during exercise in traditional and modified positions [abstract]. *J Orthop Sports Phys Ther*. 2001;31(1):A29-A30.
212. Moesley JB, Jobe FW, Pink M, Perry J, Tibone J. EMG analysis of the scapular muscles during a shoulder rehabilitation program. *Am J Sports Med*. 1992;20(2):128-134.
213. Ellenbecker TS, Davies GJ. *Closed Kinetic Chain Exercise: A Comprehensive Guide to Multiple Joint Exercises*. Champaign, IL: Human Kinetics; 2001.
214. Uhl TL, Carver TJ, Mattacola CG, Mair SD, Nitz AJ. Shoulder musculature activation during upper extremity weight-bearing exercise. *J Orthop Sports Phys Ther.* 2003;33(3):109-117.
215. Happee R, VanDer Helm FC. The control of shoulder muscles during goal directed movements, an inverse dynamic analysis. *J Biomech*. 1995;28(10):1179-1191.
216. Tsai NT, McClure PW, Karduna AR. Effects of muscle fatigue on 3-dimensional scapular kinematics. *Arch Phys Med Rehabil*. 2003;84(7):1000-1005.
217. Ebaugh DD, McClure PW, Karduna AR. Scapulothoracic and glenohumeral kinematics following an external rotation fatigue protocol. *J Orthop Sports Phys Ther*. 2006;36(8):557-571.
218. Quincy RI, Davies GJ, Kolbeck KJ, Szymanski JL. Isokinetic exercise: the effects of training specificity on shoulder strength development. *J Athl Train*. 2000;35:S64.
219. Ivey FM, Calhoun JH, Rusche K, Bierschenk J. Isokinetic testing of shoulder strength: normal values. *Arch Phys Med Rehabil*. 1985;66(6):384-386.
220. Mont MA, Cohen DB, Campbell KR, Gravare K, Mathur SK. Isokinetic concentric versus eccentric training of the shoulder rotators with functional evaluation of performance enhancement in elite tennis players. *Am J Sports Med*. 1994;22(4):513-517.
221. Ellenbecker TS, Sueyoshi T, Bailie DS. Muscular activation during plyometric exercises in 90 degrees of glenohumeral joint abduction. *Sports Health*. 2015; 7(1):75-79. doi: 10.1177/1941738114553165
222. Vossen JE, Kramer JE, Bruke DG, Vossen DP. Comparison of dynamic push-up training and plyometric push-up training on upper-body power and strength. *J Strength Cond Res*. 2000;14(3):248-253.

223. Schulte-Edelmann JA, Davies GJ, Kernozek TW, Gerberding ED. The effects of plyometric training of the posterior shoulder and elbow. *J Strength Cond Res*. 2005;19(1):129-134.
224. Marshall RN, Elliott BC. Long-axis rotation: the missing link in proximal to distal sequencing. *J Sports Sci*. 2000;18(4):247-254.
225. Ellenbecker TS, Nazal F, Roetert P, Bailie DS, Stark R. Shoulder rating scale data from healthy unilaterally dominant overhead sports [abstract]. *J Orthop Sports Phys Ther*. 2005;35(1):A79.
226. Romeo AA, Bach BR, O'Halloran KL. Scoring systems for shoulder conditions. *Am J Sports Med.* 1996;24(4):472-476.
227. Fukada H, Hamada K, Nakajima T, Tomonaga A. Pathology and pathogenesis of the intratendinous tearing of the rotator cuff viewed from en bloc histologic sections. *Clin Orthop* Relat Res. 1994;(304):60-67.
228. Nakajima T, Rokumma N, Kazutoshi H, Tomatsu F, Fukuda H. Histologic and biomechanical characteristics of the supraspinatus tendon: reference to rotator cuff tearing. *J Shoulder Elbow Surg*. 1994;3(2):79-87. doi: 10.1016/S1058-2746(09)80114-6. Epub 2009 Feb 19.
229. Ellenbecker ES, Bailie DS, Kibler WB. Rehabilitation after mini-open and arthroscopic repair of the rotator cuff. In: Manske RC, ed. *Postsurgical Orthopedic Sports Rehabilitation: Knee and Shoulder.* St Louis, MO: Mosby; 2007,665-682.
230. Burkhart SS, Danaceau SM, Pearce CE Jr. Arthroscopic rotator cuff repair: analysis of results by tear size and by repair technique-margin convergence versus direct tendon-to-bone repair. *Arthroscopy*. 2001;17(9):905-912.
231. Burkhart SS. A stepwise approach to arthroscopic rotator cuff repair based on biomechanical principles. *Arthroscopy*. 2000;16(1):82-90.
232. Fealy S, Kingham P, Altchek DW. Mini-open rotator cuff repair using a two-row fixation technique: outcomes analysis in patients with small, moderate, and large rotator cuff tears. *Arthroscopy*. 2002;18(6):665-670.
233. Trappey GJ, Gartsman GM. A systematic review of the clinical outcomes of single row versus double row rotator cuff repairs. *J Shoulder Elbow Surgery* 2011; 20(2 Suppl): S14-19. doi: 10.1016/j.jse.2010.12.001.
234. Ahmad CS, Kleweno C, Jacir AM, et al. Biomechanical performance of rotator cuff repairs with humeral rotation: a new rotator cuff repair failure model. *Am J Sports Med.* 2008;36(5):888-92. doi: 10.1177/0363546508316285. Epub 2008 Apr 9.
235. Ellenbecker TS, Davies GJ. Current concepts in rehabilitation of rotator cuff pathology: Nonsurgical and postoperative considerations. In Miller: MD, ed. *Orthopaedic Knowledge Update. American Academy of Orthopaedic Surgeons: Sports Medicine 5,* Rosemont, IL: AAOS; 2016.
236. Park MC, ElAttrache NS, Ahmad CS, Tibone JE. "Transosseous-equivalent" rotator cuff repair technique. *Arthroscopy*. 2006;22(12):1360.e1-5,
237. Thigpen CA, Shaffer MA, Gaunt BW, Leggin BG, Williams GR, Wilcox RB 3rd. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following arthroscopic rotator cuff repair. *J Shoulder Elbow Surg.* 2016;25(4):521-535. doi: 10.1016/j.jse.2015.12.018.
238. Hatakeyama Y, Itoi E, Urayama M, Pradhan RL, Sato K. Effect of superior capsule and coracohumeral ligament release on strain in the repaired rotator cuff tendon. A cadaveric study. *Am J Sports Med*. 2001;29(5):633-640.
239. Muraki T, Aoki M, Uchiyama E, Murakami G, Miyamoto S. The effect of arm position on stretching of the supraspinatus, infraspinatus, and posterior portion of deltoid muscles: a cadaveric study. *Clin Biomech*. 2006;21(5):474-480. Epub 2006 Feb 14.
240. McCann PD, Wootten ME, Kadaba MP, Bigliani LU. A kinematic and electromyographic study of shoulder rehabilitation exercises. *Clin Orthop Relat Res*. 1993;(288):179-188.
241. Ellsworth AA, Mullaney M, Tyler TF, McHugh M, Nicholas S. Electromyography of selected shoulder musculature during un-weighted and weighted pendulum exercises. *N Am J Sports Phys Ther*. 2006;1(2):73-79.
242. Murphy CA, McDermott WJ, Petersen RK, Johnson SE, Baxter SA. Electromyographic analysis of the rotator cuff in postoperative shoulder patients during passive rehabilitation exercises. *J Shoulder Elbow Surg*. 2013;22(1):102-107. doi: 10.1016/j.jse.2012.01.021. Epub 2012 May 3.
243. Kibler WB, Sciascia AD, Uhl TL, Tambay N, Cunningham T. Electromyographic analysis of specific exercises for scapular control in early phases of shoulder rehabilitation. *Am J Sports Med*. 2008;36(9):1789-1798. doi: 10.1177/0363546508316281. Epub 2008 May 9.
244. Alenabi T, Jackson M, Tetreault P, Begon M. Electromyographic activity in the immobilized shoulder musculature during ipsilateral elbow, wrist and finger movements while wearing a shoulder orthosis. *J Shoulder Elbow Surg*. 2013;22(10):1400-1407. doi: 10.1016/j.jse.2013.04.007. Epub 2013 Jun 14.
245. Arndt J, Clavert P, Mielcarek P, et al. Immediate passive motion versus immobilization after endoscopic supraspinatus tendon repair:. a prospective randomized study. *Orthop Truamatol Surg Res.* 2012;98(6 suppl):S131-138. doi: 10.1016/j.otsr.2012.05.003. Epub 2012 Sep 1.
246. Cuff DJ, Pupello DR. Prospective randomized study of arthroscopic rotator cuff repair using an early versus delayed postoperative physical therapy protocol. *J Shoulder Elbow Surg.* 2012;21(11):1450-1455. doi: 10.1016/j.jse.2012.01.025. Epub 2012 May 2.
247. Kim YS, Chung SW, Kim JY, Ok JH, Park I, Oh JH. Is early passive motion exercise necessary after arthroscopic rotator cuff repair? *Am J Sports Med.* 2012;40(4):815-821. doi: 10.1177/0363546511434287. Epub 2012 Jan 27.
248. Lee BG, Cho NS, Rhee YG. Effect of two rehabilitation protocols on range of motion and healing rates after arthroscopic rotator cuff repair: aggressive versus limited early passive exercisers. *Arthroscopy.* 2012;28(1):34-42. doi: 10.1016/j.arthro.2011.07.012. Epub 2011 Oct 20.
249. Keener JD, Galatz LM, Stobbs-Cucchi G, Patton R, Yamaguchi K. Rehabilitation following arthroscopic rotator cuff repair: a prospective randomized trial of immobilization compared with early motion. *J Bone Joint Surg Am*. 2014;96(1):11-19. doi: 10.2106/JBJS.M.00034.
250. Riboh JC, Garrigues GE. Early passive motion versus immobilization after arthroscopic rotator cuff repair. *Arthroscopy*. 2014;30(8):997-1005. doi: 10.1016/j.arthro.2014.03.012. Epub 2014 May 10.
251. Brislin KJ, Field LD, Savoie FH 3rd. Complications after arthroscopic rotator cuff repair. *Arthroscopy.* 2007;23(2):124-128.
252. Namdari S, Green A. Range of motion limitation after rotator cuff repair. *J Shoulder Elbow Surg.* 2010;19(2):290-296. doi: 10.1016/j.jse.2009.07.009. Epub 2009 Sep 27.
253. Galatz LM, Ball CM, Teefey SA, Middleton WD, Yamaguchi K. The outcome and repair integrity of completely arthroscopically repaired large and massive rotator cuff tears. *J Bone Joint Surg Am.* 2004;86-A(2):219-224.
254. Tashjien RZ, Hollins AM, Kim HM, et al. Factors affecting healing rates after arthroscopic double-row rotator cuff repair. *Am J Sports Med.* 2010;38(12):2435-2442. doi: 10.1177/0363546510382835. Epub 2010 Oct 28.
255. Koo SS, Parsley BK, Burkhart SS, Schoolfield JD. Reduction of postoperative stiffness after arthrscopic rotator cuff repair: results of a customized physical therapy regimen based on risk factors for stiffness. *Arthroscopy.* 2011;27(2):155-160. doi: 10.1016/j.arthro.2010.07.007. Epub 2010 Oct 20.
256. Timmerman LA, Andrews JR, Wilk KE. Mini open repair of the rotator cuff. In: Andrews JR, Wilk KE, eds *The Athletes' Shoulder*. New York, NY: Churchill Livingstone; 1994:153-164.
257. Wang CH, McClure P, Pratt NE, Nobilini R. Stretching and strengthening exercises: their effect on three-dimensional scapular kinematics. *Arch Phys Med Rehabil*. 1999;80(8):923-929.
258. Malliou PC, Giannakopoulos K, Beneka AG, Gioftsidou A, Godolias G. Effective ways of restoring muscular imbalances of the rotator cuff muscle group: a comparative study of various training methods. *Br J Sports Med*. 2004;38(6):766-772.

259. Lee SB, An KN. Dynamic glenohumeral stability provided by three heads of the deltoid muscle. *Clin Orthop Relat Res*. 2002;(400):40-47.
260. Thigpen CA, Padua DA, Morgan N, Kreps C, Karas SG. Scapular kinematics during supraspinatus rehabilitation exercise: a comparison of full-can versus empty-can techniques, *Am J Sports Med*. 2006;34(4):644-652. Epub 2005 Nov 10.
261. Ekstrom RA, Donatelli RA, Soderberg GL. Surface electromyographic analysis of exercises for the trapezius and serratus anterior muscles. *J Orthop Sports Phys Ther*. 2003;33(5):247-258.
262. Castelein B, Cagnie B, Parlevliet T, Cools A. Superficial and deep scapulothoracic muscle electromyographic activity during elevation exercises in the scapular plane. *J Orthop Sports Phys Ther.* 2016;46(3):184-193. doi: 10.2519/jospt.2016.5927. Epub 2016 Feb 11.
263. Veeger HE, van der Helm FC. Shoulder function: the perfect compromise between mobility and stability. *J Biomech* 2007;40(10):2119-2129. Epub 2007 Jan 12.
264. Warner JJP, Caborn DN. Overview of shoulder instability. *Crit Rev Phys Rehabil Med*. 1992;4:145-198.
265. Davies GJ, Wilk K, Ellenbecker T, et al. The shoulder: Physical therapy patient management utilizing current evidence. In: Wilmarth MA, ed. *ISC 16.2, Current Concepts of Orthopaedic Physical Therapy.* 2nd ed. La Crosse WI: Orthopaedic Section, APTA, Inc; 2006.
266. Peltz CD, Zauel R, Ramo N, Mehran N, Moutzouros V, Bey MJ. Differences in glenohumeral joint morphology between patients with anterior shoulder instability and healthy, uninjured volunteers. *J Shoulder Elbow Surg*. 2015;24(7):1014-1020. doi: 10.1016/j.jse.2015.03.024. Epub 2015 May 7.
267. Kroner K, Lind T, Jensen J. The epidemiology of shoulder dislocations. *Arch Orthop Trauma Surg*. 1989;108(5):288-290.
268. Provencher MT, LeClere LE, King S, et al. Posterior instability of the shoulder: diagnosis and management. *Am J Sports Med*. 2011;39(4):874-886. doi: 10.1177/0363546510384232. Epub 2010 Dec 4.
269. Song DJ, Cook JB, Kurl KP, et al. High frequency of posterior and combined shoulder instability in young active patients. *J Shoulder Elbow Surg*. 2015;24(2):186-190. doi: 10.1016/j.jse.2014.06.053. Epub 2014 Sep 11.
270. Neer CS 2nd, Foster CR. Inferior capsular shift for involuntary inferior and multidirectional instability of the shoulder: a preliminary report. *J Bone Joint Surg Am*. 1980;62(6);897-908.
271. Davies GJ, Manske R, Schulte R, et al. Rehabilitation of macro-instability. In: Ellenbecker TS, ed. *Shoulder Rehabilitation. Nonoperative Treatment*. New York, NY: Thieme; 2006:39-63.
272. Parsons IM, Apreleva M, Fu FH, Woo SL. The effect of rotator cuff tears on reaction forces at the glenohumeral joint. *J Orthop Res*. 2002;20(3):439-446.
273. Clark JM, Harryman DT2nd. Tendons, ligaments, and capsule of the rotator cuff. Gross and microscopic anatomy. *J Bone Joint Surg Am*. 1992;74(5):713-725.
274. Wilk KE. Rehabilitation after stabilization surgery. In: Warren RF, Craig EV, Altchek DW, eds. *The Unstable Shoulder*. Philadelphia, PA: Lippincott Williams & Wilkins, 1999.
275. Black KP, Lim TH, McGrady LM, Raasch W. In vitro evaluation of shoulder external rotation after a Bankart reconstruction. *Am J Sports Med*. 1997;25(4):449-453.
276. Provencher MT, Verma N, Obopilwe E, et al. A biomechanical analysis of capsular placation versus anchor repair of the shoulder: can the labrum be used as a suture anchor? *Arthroscopy*. 2008;24(2):210-216. doi: 10.1016/j.arthro.2007.08.013. Epub 2007 Nov 8.
277. Gaunt BW, Shaffer MA, Sauers EL, et al. The American Society of Shoulder and Elbow Therapists' consensus rehabilitation guideline for arthroscopic anterior capsulolabral repair of the shoulder. *J Orthop Sports Phys Ther*. 2010;40(3):155-168. doi: 10.2519/jospt.2010.3186.
278. Schulze-Borges J, Agneskirchner JD, Bobrowitsch E, et al.. Biomechanical comparison of open and arthroscopic Latarjet procedures. *Arthroscopy.* 2013;29(4):630-637. doi: 10.1016/j.arthro.2012.12.003. Epub 2013 Feb 6.
279. Radwan A, Francis J, Green A, et al. Is there a relation between shoulder dysfunction and core stability. *Int J Sports Phys Ther*. 2014;9(1):8-13.
280. Andrews JR, Carson WG, McLeaod WD. The arthroscopic treatment of glenoid labrum tears–the throwing athlete. *Orthop Trans*. 1984;8:44-54.
281. Andrews JR, Carson WG Jr, McCleod WD. Glenoid labrum tears related to the long head of the biceps. *Am J Sports Med*. 1985;13(5):337-341.
282. Maffet MW, Gartsman GM, Moseley B. Superior labrum-biceps tendon complex lesions of the shoulder. *Am J Sports Med*. 1995;23(1):93-98.
283. Manske RC, Meschke M, Porter A, Smith B, Reiman M. A randomized controlled single-blinded comparison of stretching versus stretching and joint mobilization for posterior shoulder tightness measured by internal rotation motion loss. *Sports Health*. 2010;2(2):94-100.
284. Edwards SL, Lee JA, Bell JE, et al. Nonoperative treatment of superior labrum anterior posterior tears: improvements in pain, function, and quality of life. *Am J Sports Med*. 2010;38(7):1456-1461. doi: 10.1177/0363546510370937. Epub 2010 Jun 3.
285. Burkhart SS, Morgan CD. SLAP lesions in the overhead athlete. *Orthop Clin North Am*. 2001;32(3):431-441, viii.
286. Gartsman R, Hammerman SM. Superior labrum, anterior and posterior lesions. When and how to treat them. *Clin Sports Med*. 2000;19(1):115-124.
287. Manske RC, Prohaska D. Superior labrum anterior to posterior (SLAP) rehabilitation in the overhead athlete. *Phys Ther Sports*. 2010;11(4):110-121. doi: 10.1016/j.ptsp.2010.06.004. Epub 2010 Jul 27.
288. Manske RC. Electromyographically assessed exercises for the scapular muscles. *Athl Ther Today*. 2006;11:19-23.
289. Reinold MM, Wilk KE, Reed J, Crenshaw K, Andrews JR. Interval sport programs: guidelines for baseball, tennis, and golf. *J Orthop Sports Phys Ther*. 2002;32(6):293-298.
290. Ellenbecker TS, Reinold MM, Nelson CO. Clinical concepts for treatment of the elbow in the adolescent overhead athlete. *Clin Sports Med*. 2010;29(4):705-724. doi: 10.1016/j.csm.2010.06.006.
291. Mazzocca AD, Arciero RA, Bicos J, Evaluation and treatment of acromioclavicular joint injuries. *Am J Sports Med*. 2007;35(2):316-329.
292. Fukuda K, Craig EV, An KN, Cofield RH, Chao EY. Biomechanical study of the ligamentous system of the acromioclavicular joint. *J Bone Joint Surg Am*. 1986;68(3):434-440.
293. Rockwood C, Williams G, Young C. Injuries to the acromioclavicular joint. In: Rockwood C, Green D, Bucholz R, et al, eds. *Fractures in Adults*. 4th ed. Vol 2. Philadelphia, PA: Lippincott-Raven; 1996:1341-1414.
294. Nuber GW, Bowen MK. Arthroscopic treatment of acromioclavicular joint injuries and results. *Clin Sports Med.* 2003;22(2):301-317.
295. Gladstone J, Wilk K, Andrews JR. Non-operative treatment of acromioclavicular joint injuries. *Oper Tech Sports Med.* 1997;5(2):78-87.
296. Cote MP, Wojcik KE, Gomlinski G, Mazzocca AD. Rehabilitation of acromioclavicular joint separations: operative and nonoperative considerations. *Clin Sports Med*. 2010;29(2):213-228, vii. doi: 10.1016/j.csm.2009.12.002.
297. Dumonski M, Mazzocca AD, Rios C, Romeo AA, Arciero RA. Evaluation and management of acromioclavicular joint injuries. *Am J Orthop*. 2004;33(10):526-532.
298. Larsen E, Bjerg-Nielsen A, Christensen P. Conservative or surgical treatment of acromioclavicular dislocation. A prospective, controlled, randomized study. *J Bone Joint Surg Am*. 1986;68(4):552-555.
299. Phillips AM, Smart C, Groom AF. Acromioclavicular dislocation. Conservative or surgical therapy. *Clin Orthop Relat Res*. 1998;(353):10-17.
300. The Canadian Orthopaedic Trauma Society. Multicenter randomized clinical trial of nonoperative versus operative

treatment of acute acromio-clavicular joint dislocation. *J Orthop Trauma*. 2015;29(11):479-487. doi: 10.1097/BOT.0000000000000437.
301. Ma R, Smith PA, Smith MJ, et al. Managing and recognizing complications after treatment of acromioclavicular joint repair or reconstruction. *Curr Rev Musculoskel Med*. 2015;8(1):75-82. doi: 10.1007/s12178-014-9255-6.
302. Beitzal K, Cote MP, Apostolakos J, et al. Current concepts in the treatment of acromioclavicular joint dislocations. *Arthroscopy*. 2013;29(2):387-397. doi: 10.1016/j.arthro.2012.11.023.
303. Galpin RD, Hawkins RJ, Grainger RW. A comparative analysis of operative versus nonoperative treatment of grade III acromioclavicular separations. *Clin Orthop Relat Res*. 1985;(193):150-155.
304. Glick JM, Milburn LJ, Haggerty JF, Nishimoto D. Dislocated acromioclavicular joint: follow-up study of 35 unreduced acromioclavicular dislocations. *Am J Sports Med*. 1977;5(6):264-270.
305. Ceccarelli E, Bondi R, Alviti F, Garofalo R, Miulli F, Padua R. Treatment of acute grade III acromioclavicular dislocation: a lack of evidence. *J Orthop Traumatol*. 2008;9(2):105-108. doi: 10.1007/s10195-008-0013-7. Epub 2008 May 22.
306. Spencer EE Jr. Treatment of grade III acromioclavicular joint injuries: a systematic review. *Clin Orthop Relat Res*. 2007;455:38-44.
307. Joukainen A, Kroger H, Niemitukia L, et al. Results of operative and nonoperative treatment of rockwood type III and V acromioclavicular joint dislocation: a prospective, randomized trial with an 18 to 20 year followup. *Orthop J Sports Med*. 2014;2(12): 2325967114560130 doi: 10.1177/2325967114560130. eCollection 2014.
308. Wojtys EM, Nelson G. Conservative treatment of grade III acromioclavicular dislocations. *Clin Orthop Relat Res*. 1991;(268):112-119.
309. Gumina S, Carbone S, Arceri V, Rita A, Vestri AR, Postacchini F. The relationship between chronic type III acromioclavicular joint dislocation and cervical spine pain. *BMC Musculoskelet Disord*. 2009;10:157. doi: 10.1186/1471-2474-10-157.
310. Kosten K, Gunning AC, Leenan LP. Operative or conservative treatment in patients with rockwood type III acromioclavicular dislocation: a systematic review and update of current literature. *Int Orthop*. 2014;38(4):831-838. doi: 10.1007/s00264-013-2143-7. Epub 2013 Oct 31.
311. Dumontier C, Sautet A, Man M, Apoil A. Acromioclavicular dislocations: treatment by coracoacromial ligamentoplasty. *J Shoulder Elbow Surg*. 1995;4(2):130-134.
312. Weinstein DM, McCann PD, McIlveen SJ, Flatow EL, Bigliani LU. Surgical treatment of complete acromioclavicular dislocations. *Am J Sports Med*. 1995;23(3):324-331.
313. Nuber GW, Bowen MK, Arthroscopic treatment of acromioclavicular joint injuries and results. *Clin Sports Med*. 2003;22(2):301-317.
314. Rios CG, Arciero RA, Mazzocca AD. Anatomy of the clavicle and coracoid process for reconstruction of the coracoclavicular ligaments. *Am J Sports Med*. 2007;35(5):811-817. Epub 2007 Feb 9.
315. Woodmass JM, Esposito JG, Ono Y, et al. Complications following arthroscopic fixation of acromioclavicular separations: a systematic review of the literature. *Open Access J Sports Med*. 2015;6:97-107. doi: 10.2147/OAJSM.S73211. eCollection 2015.
316. DeBerardino T, Pensak MJ, Ferreira J, Mazzocca AD. Arthroscopic stabilization of the acromioclavicular joint dislocation using the AC graftrope system. *J Shoulder Elbow Surg*. 2010;19 (2 Suppl):47-52. doi: 10.1016/j.jse.2009.12.014.
317. Weaver JK, Dunn HK. Treatment of acromioclavicular injuries, especially complete acromioclavicular separation. *J Bone Joint Surg Am*. 1972;54(6):1187-1194.
318. Lee SJ, Nicholas SJ, Akizuki KH, McHugh MP, Kremenic IJ, Ben-Avi S. Reconstruction of the coracoclavicular ligaments with tendon grafts: a comparative biomechanical study. *Am J Sports Med*. 2003;31(5):648-655.
319. Jiang C, Wang M, Rong G. Proximally based conjoined tendon transfer for coracoclavicular reconstruction in the treatment of acromioclavicular dislocation. *J Bone Joint Sur Am*. 2007;89(11):2408-2412.
320. Dimakopoulos P, Panagopoulos A. Functional coracoclavicular stabilization for acute acromioclavicular joint disruption. *Orthopedics*. 2007;30(2):103-108.
321. Rios CG, Mazzocca AD. Acromioclavicular joint problems in athletes and new methods of management. *Clin Sports Med*. 2008;27(4):763-788. doi: 10.1016/j.csm.2008.06.006
322. Mazzocca AD, Santangelo SA, Johnson ST, Rios CG, Dumonski ML, Arciero RA. A biomechanical evaluation of an anatomical coracoclavicular ligament reconstruction. *Am J Sports Med*. 2006;34(2):236-246. Epub 2005 Nov 10.
323. Nordin JS, Aagaard K, Lunsjo K. Chronic acromioclavicular joint dislocations treated by the GraftRope device: *Acta Orthop*. 2015;86(2):225-228. doi: 10.3109/17453674.2014.976806. Epub 2014 Oct 17.
324. Horst K, Dienstknecht T, Andruszkow H, Gradl G, Kobbe P, Pape HC. Radiographic chances in the operative treatment of acute acromioclavicular joint dislocation- tight rope technique vs. K-wire fixation. *Pol J Radiol*. 2013;78(4):15-20. doi: 10.12659/PJR.889615. Epub 2013 Nov 19.
325. Spoliti M, DeCupis M, Via AG, Oliva F. All arthroscopic stabilization of acute acromioclavicular joint dislocation with fiberwire and endobutton system. *Muscles Ligaments Tendons J*. 2014;4(4):398-403.
326. De Carli A, Lanzetti RM, Ciompi A, Lupariello D, Rota P, Ferretti A . Acromioclavicular third degree dislocation: surgical treatment in acute cases. *J Orthop Surg Res*. 2015;10:13-19. doi: 10.1186/s13018-014-0150-z.
327. Kelley MJ, Shaffer MA, Kuhn JE, et al. Shoulder pain and mobility deficits: adhesive capsulitis. *J Orthop Sports Phys Ther*. 2013;43(5):A1-A31. doi: 10.2519/jospt.2013.0302. Epub 2013 Apr 30.
328. Lundberg BJ. The frozen shoulder. Clinical and radiographic observation. The effect of manipulation under general anesthesia. Structure and glycosaminoglycan content of the joint capsule. Local bone metabolism. *Acta Orthop Scand*. 1969;Suppl 119:1-59.
329. Pal B, Anderson J, Dick WC, Griffiths ID. Limitation of joint mobility and shoulder capsulitis in insulin and non-insulin dependent diabetes mullitus. *Br J Rheumatol*. 1986;25(2):147-151.
330. Aydeniz A, Gursoy S, Guney E. Which musculoskeletal complications are most frequently seen in type 2 diabetes mellitus? *J Int Med Res*. 2008;36(3):505-511.
331. Bridgman JF. Periarthritis of the shoulder and diabetes mellitus. *Ann Rheum Dis*. 1972;31(1):69-71.
332. Balci N, Balci MK, Tüzüner S. Shoulder adhesive capsulitis and shoulder range of motion in type II diabetes mellitus: association with diabetic complications. *J Diabetes Complications*. 1999;13(3):135-140.
333. Milgrom C, Novack V, Weil Y, Jaber S, Radeva-Petrova DR, Finestone A. Risk factors for idiopathic frozen shoulder. *Isr Med Assoc J*. 2008;10(5):361-364.
334. Neviaser RJ. Painful conditions affecting the shoulder. *Clin Orthop Relat Res* 1983;(173):63-69.
335. Neviaser RJ, Neviaser TJ. The frozen shoulder. Diagnosis and management. *Clin Orthop Relat Res*. 1987;(223):59-64.
336. Neviaser JS. Adhesive capsulitis and the stiff and painful shoulder. *Orthop Clin North Am*. 1980;11(2):327-331.
337. Binder AI, Bulgen DY, Hazleman BL, Tudor J, Wraight P. Frozen shoulder: an arthrographic and radionuclear scan assessment. *Ann Rheum Dis*. 1984;43(3):365-369.
338. Sheridan MA, Hannafin JA. Upper extemity: emphasis on frozen shoulder. *Orthop Clin North Am*. 2006;37(4):531-539.
339. Hannafin JA, Chiaia T. Adhesive capsulitis. A treatment approach. *Clin Orthop Relat Res*. 2000;(372):95-109.
340. Bulgen DY, Binder A, Hazleman BL, Park JR. Immunological studies in frozen shoulder. *J Rheumatol*. 1982;9(6):893-898.
341. Griggs SM, Ahn A, Green A. Idiopathic adhesive capsulitis. A prospective functional outcome study of nonoperative treatment. *J Bone Joint Surg Am*. 2000;82-A(10):1398-1407.

342. Shaffer B, Tibone JE, Kerlan RK. Frozen shoulder. A long-term follow-up. *J Bone Joint Surg Am*. 1992;74(5):738-746.
343. Bunker TD, Reilly J, Baird KS, Hamblin DL. Expression of growth factors, cytokines and matrix metalloproteinases in frozen shoulder. *J Bone Joint Surg Br.* 2000;82(5):768-773.
344. Rodeo SA, Hannafin JA, Tom J, Warren RF, Wickiewicz TL. Immunolocalization of cytokines and their receptors in adhesive capsulitis of the shoulder. *J Orthop Res*. 1997;15(3):427-436.
345. Hutchinson JW, Tierney GM, Parsons SL, Davis TR. Dupuytren's disease and frozen shoulder induced by treatment with a matrix metalloproteinase inhibitor. *J Bone Joint Surg Br.* 1998;80(5):907-908.
346. Mullett H, Byrne D, Colville J. Adhesive capsulitis: human fibroblast response to shoulder joint aspirate from patients with stage II disease. *J Shoulder Elbow Surg*. 2007;16(3):290-294. Epub 2007 Jan 18.
347. Hand GC, Athanasou NA, Matthews T, Carr AJ. The pathology of frozen shoulder. *J Bone Joint Surg Br*. 2007;89(7):928-932.
348. Neer CS 2nd, Satterlee CC, Dalsey RM, Flatow EL. The anatomy and potential effects of contracture of the coracohumeral ligament. *Clin Orthop Relat Res*. 1992;(280):182-185.
349. Ozaki J, Nakagawa Y, Sakurai G, Tamai S. Recalcitrant chronic adhesive capsulitis of the shoulder. Role of contracture of the coracohumeral ligament and rotator interval in pathogenesis and treatment. *J Bone Joint Surg Am*. 1989;71(10):1511-1515.
350. Omari A, Bunker TD. Open surgical release for frozen shoulder: surgical findings and results of the release. *J Shoulder Elbow Surg*. 2001;10(4):353-357.
351. Ide J, Takagi K. Early and long-term results of arthroscopic treatment for shoulder stiffness. *J Shoulder Elbow Surg*. 2004;13(2):174-179.
352. Uhthoff H, Boileau P. Primary frozen shoulder: global capsular stiffness versus localized contracture. *Clin Orthop Relat Res*. 2007;456:79-84.
353. Uitvlugt G, Detrisac DA, Johnson LL, Austin MD, Johnson C. Arthroscopic observations before and after manipulation of frozen shoulder. *Arthroscopy*. 1993;9(2):181-185.
354. Wiley AM. Arthroscopic appearance of frozen shoulder. *Arthroscopy*. 1991;7(2):138-143.
355. Pouliart N, Somers K, Eid S, Gagey O. Variations in the superior capsuloligamentous complex and description of a new ligament. *J Shoulder Elbow Surg.* 2007;16(6):821-836. Epub 2007 Nov 1.
356. Harryman DT 2nd, Sidles JA, Harris SL, Matsen FA 3rd. The role of the rotator interval capsule in passive motion and stability of the shoulder. *J Bone Joint Surg Am*. 1992;74(1):53-66.
357. Neviaser JS. Adhesive capsulitis of the shoulder. A study of the pathological findings in periarthritis of the shoulder. *J Bone Joint Surg*. 1945;27(2):211-222.
358. Neviaser JS. Athrography of the shoulder joint: study of the findings in adhesive capsulitis of the shoulder. Study of the findings in adhesive capsulitis of the shoulder. *J Bone Joint Surg*. 1962;44-A:1321-1359.
359. Watson L, Dalziel R, Stay I. Frozen shoulder: a 12-month clinical outcome trial. *J Shoulder Elbow Surg.* 2000;9(1):16-22.
360. Ueda Y, Sugaya H, Takahashi N, et al. Rotator cuff lesions in patients with stiff shoulders: a prospective analysis of 379 shoulders. *J Bone Joint Surg Am*. 2015;97(15):1233-1237. doi: 10.2106/JBJS.N.00910.
361. Reeves B. The natural history of the frozen shoulder syndrome. *Scand J Rheumatol*. 1975;4(4):193-196.
362. Codman EA. *Rupture of the Supraspinatus Tendon and Other Lesions in or About the Subacromial Bursa*. Boston, MA: Thomas Todd Company; 1934.
363. Haggart G, Dignam RJ, Sullivan TS. Management of the frozen shoulder. *J Am Med Assoc*. 1956;161(13):1219-1222.
364. Clarke GR, Willis LA, Fish WW, Nichols PJ. Preliminary studies in measuring range of motion in normal and painful stiff shoulders. *Rheumatol Rehabil*. 1975;14(1):39-46.
365. Bulgen DY, Binder AI, Hazleman BL, Dutton J, Roberts S. Frozen shoulder: prospective clinical study with an evaluation of three treatment regimens. *Ann Rheum Dis*. 1984;43(3):353-360.
366. Zuckerman JD. Definition and classification of frozen shoulder: a consensus approach. *J Shoulder Elbow Surg*. 1994;3(1):S73.
367. Kelley MJ, McClure PW, Leggin BG. Frozen shoulder: evidence and a proposed model guiding rehabilitation. *J Orthop Sports Phys Ther*. 2009;39(2):135-148. doi: 10.2519/jospt.2009.2916.
368. Bunker TD, Anthony PP. The pathology of frozen shoulder. A Dupuytren-like disease. *J Bone Joint Surg Br*. 1995;77(5):677-683.
369. Rizk TE, Pinals RS. Frozen shoulder. *Semin Arthritis Rheum*. 1982;11(4):440-452.
370. Vermeulen HM, Stokdijk M, Eilers PH, Meskers CG, Rozing PM, Vliet Vlieland TP. Measurement of three dimensional shoulder movement patterns with an electromagnetic tracking device in patients with a frozen shoulder. *Ann Rheum Dis*. 2002;61(2):115-120.
371. Rundquist PJ, Anderson DD, Guanche CA, Ludewig PM. Shoulder kinematics in subjects with frozen shoulder. *Arch Phys Med Rehabil.* 2003;84(10):1473-1479.
372. Cyriax J. *Diagnosis of Soft Tissue Lesions*. Baltimore, MD: Williams and Wilkins; 1970.
373. Binder AI, Bulgen DY, Hazleman BL, Roberts S. Frozen shoulder: a long-term prospective study. *Ann Rheum Dis*. 1984;43(3):361-364.
374. Vermeulen HM, Rozing PM, Obermann WR, Saskia C, Vliet Vlieland TP. Comparison of high-grade and low-grade mobilization techniques in the management of adhesive capsulitis of the shoulder: randomized controlled trial. *Phys Ther*. 2006;86(3):355-368.
375. Wadsworth CT. Frozen shoulder. *Phys Ther*. 1986;66(12):1878-1883.
376. Leggin B, Kelley MJ, Pontillo M. Impairments and function in patients with frozen shoulder compared to patients with rotator cuff tendinopathy. Second International Congress of Shoulder Therapists; 2007; Bahia, Brazil.
377. Jürgel J, Rannama L, Gapeyeva H, Ereline J, Kolts I, Pääsuke M. Shoulder function in patients with frozen shoulder before and after 4-week rehabilitation. *Medicina (Kaunas)*. 2005;41(1):30-38.
378. Sokk J, Gapeyeva H, Ereline J, Kolts I, Pääsuke M. Shoulder muscle strength and fatigability in patients with frozen shoulder syndrome: the effect of 4-week individualized rehabilitation. *Electromyogr Clin Neurophysiol.* 2007;47(4-5):205-213.
379. Arslan S, Celiker R. Comparison of the efficacy of local corticosteroid injection and physical therapy for the treatment of adhesive capsulitis. *Rheumatol Int.* 2001;21(1):20-23.
380. van der Windt DA, Koes BW, Devillé W, Boeke AJ, de Jong BA, Bouter LM. Effectiveness of corticosteroid injections versus physiotherapy for the treatment of painful stiff shoulder in primary care: randomized trial. *BMJ*. 1998;317(7168):1292-1296.
381. Carette S, Moffet H, Tardif J, et al. Intraarticular corticosteroids, supervised physiotherapy, or a combination of the two in the treatment of adhesive capsulitis of the shoulder: a placebo-controlled trial. *Arthritis Rheum*. 2003;48(3):829-838.
382. Hazleman BL. The painful stiff shoulder. *Rheumatol Phys Med*. 1972;11(8):413-421.
383. Järvinen TA, Järvinen TL, Kääriäinen M, Kalimo H, Järvinen M. Muscle injuries: biology and treatment. *Am J Sports Med*. 2005;33(5):745-764.
384. Safran M, Garrett W Jr, Seaber A, Glisson R, Ribbeck B. The role of warmup in muscular injury prevention. *Am J Sports Med*. 1988;16(2):123-129.
385. Kurtais Gürsel YK, Ulus Y, Bilgic A, Dincer G, van der Heijden G. Adding ultrasound in the management of soft tissue disorders of the shoulder: a randomized placebo-controlled trial. *Phys Ther*. 2004;84(4):336-343.
386. Dogru H, Basaran S, Sarpel T. Effectiveness of therapeutic ultrasound in adhesive capsulitis. *Joint Bone Spine*. 2008;75(4):445-450. doi: 10.1016/j.jbspin.2007.07.016. Epub 2008 May 2.

387. Leung MS, Cheing GL. Effects of deep and superficial heating in the management of frozen shoulder. *J Rehabil Med*. 2008;40(2):145-150. doi: 10.2340/16501977-0146.
388. Rizk TE, Christopher RP, Pinals RS, Higgins AC, Frix R. Adhesive capsulitis (frozen shoulder): a new approach to its management. *Arch Phys Med Rehabil*. 1983;64(1):29-33.
389. Cheing GL, So EM, Chao CY. Effectiveness of electroacupuncture and interferential electrotherapy in the management of frozen shoulder. *J Rehabil Med*. 2008;40(3):166-170. doi: 10.2340/16501977-0142.
390. Jewell DV, Riddle DL, Thacker LR. Interventions associated with an increased or decreased likelihood of pain reduction and improved function in patients with adhesive capsulitis: a retrospective cohort study. *Phys Ther.* 2009;89(5):419-429. doi: 10.2522/ptj.20080250. Epub 2009 Mar 6.
391. Diercks RL, Stevens M. Gentle thawing of the frozen shoulder: a prospective study of supervised neglect versus intensive physical therapy in seventy-seven patients with frozen shoulder syndrome followed up for two years. *J Shoulder Elbow Surg*. 2004;13(5):499-502.
392. Levine WN, Kashyap CP, Bak SF, Ahmad CS, Blaine TA, Bigliani LU. Nonoperative management of idiopathic adhesive capsulitis. *J Shoulder Elbow Surg*. 2007;16(5):569-573. Epub 2007 May 24.
393. Ryans I, Montgomery A, Galway R, Kernohan WG, McKane R. A randomized controlled trial of intra-articular triamcinolone and/or physiotherapy in shoulder capsulitis. *Rheumatology (Oxford)*. 2005;44(4):529-535. Epub 2005 Jan 18.
394. Kivimäki J, Pohjolainen T, Malmivaara A, et al. Manipulation under anesthesia with home exercises versus home exercises alone in the treatment of frozen shoulder: a randomized controlled trial with 125 patients. *J Shoulder Elbow Surg*. 2007;16(6):722-726. Epub 2007 Oct 10.
395. Bal A, Eksioglu E, Gulec B, Aydog E, Gurcay E, Cakci A. Effectiveness of corticosteroid injection in adhesive capsulitis. *Clin Rehabil*. 2008;22(6):503-512. doi: 10.1177/0269215508086179.
396. Edwards BT, Kadakia NR, Boulahia A, et al. A comparison of hemiarthroplasty and total shoulder arthroplasty in the treatment of primary glenohumeral humeral osteoarthritis: results of a multicenter study. *J Shoulder Elbow Surg*. 2003;12(3):207-213.
397. Gleyze P, Flurin PH, Laprelle E, et al. Pain management in the rehabilitation of stiff shoulder: prospective multicenter comparative study of 193 cases. *Orthop Traumatol Surg Res*. 2011;97 (8 Suppl):S195-S203. doi: 10.1016/j.otsr.2011.09.006. Epub 2011 Oct 28.
398. McClure PW, Blackburn LG, Dusold C. The use of splints in the treatment of joint stiffness: biologic rationale and an algorithm for making clinical decisions. *Phys Ther*. 1994;74(12):1101-1107.
399. Flowers KR, LaStayo P. Effect of total end range time on improving passive range of motion. *J Hand Ther*. 1994;7(3):150-157.
400. Johnson AJ, Godges JJ, Zimmerman G, Ounanian LL. The effect of anterior versus posterior glide joint mobilization on external rotation range of motion in patients with the shoulder adhesive capsulitis. *J Orthop Sports Phys Ther*. 2007;37(3):88-99.
401. Nicholson GG. The effects of passive joint mobilization on pain and hypomobility associated with adhesive capsulitis of the shoulder. *J Orthop Sports Phy Ther*. 1985;6(4):238-246.
402. Vermeulen HM, Obermann WR, Burger BJ, Kok GJ, Rozing PM, van Den Ende CH. End-range mobilization techniques in adhesive capsulitis of the shoulder joint: a multiple-subject case report. *Phys Ther.* 2000;80(12):1204-1213.
403. Gleyze P, Clavert P, Flurin PH, et al. Management of the stiff shoulder. A prospective multicenter comparative study of the six main techniques in use: 235 cases. *Orthop Traumatol Surg Res*. 2011;97(8 Suppl):S167-S181. doi: 10.1016/j.otsr.2011.09.004. Epub 2011 Oct 28.
404. Shah N, Lewis M. Shoulder adhesive capsulitis: systematic review of randomised trials using multiple corticosteroid injections. *Br J Gen Pract*. 2007;57(541):662-667.
405. Murnaghan JP. Adhesive capsulitis of the shoulder: current concepts and treatment. *Orthopedics*. 1988;11(1):153-158.
406. Gleyze P, Georges T, Flurin PH, et al. Comparison and critical evaluation of rehabilitation and home-based exercises for treating shoulder stiffness: prospective, multicenter study with 148 cases. *OrthopTraumatol Surg Res*. 2011;97(8 Suppl):S182-S194. doi: 10.1016/j.otsr.2011.09.005. Epub 2011 Oct 28.
407. Yang J, Chang C, Chen S, Wang S, Lin J. Mobilization techniques in subjects with frozen shoulder syndrome: randomized multiple-treatment trial. *Phys Ther*. 2007;87(10):1307-1315. Epub 2007 Aug 7.
408. Weinstein DM, Bucchieri JS, Pollock RG, Flatow EL, Bigliani LU. Arthroscopic debridement of the shoulder for osteoarthritis. *Arthroscopy*. 2000;16(5):471-476.
409. Iannotti JP, Norris TR. Influence of preoperative factors on outcome of shoulder arthroplasty for glenohumeral osteoarthritis. *J Bone Joint Surg Am*. 2003;85-A(2):251-258.
410. Godeneche A, Boileau P, Favard L, et al. Prosthetic replacement in the treatment of osteoarthritis of the shoulder: early results of 268 cases. *J Shoulder Elbow Surg*. 2002;11(1):11-18.
411. Norris TR, Iannotti JP. Functional outcome after shoulder arthroplasty for primary osteoarthritis: a multicenter study. *J Shoulder Elbow Surg*. 2002;11(2):130-135.
412. Boileau P, Krishnan SG, Tinsi L, Walch G, Coste JS, Molé D. Tuberosity malposition and migration: reasons for poor outcomes after hemiarthroplasty for displaced fractures of the proximal humerus. *J Shoulder Elbow Surg*. 2002;11(5):401-412.
413. Sperling JW, Cofield RH, Schleck CD, Harmsen WS. Total shoulder arthroplasty versus hemiarthroplasty for rheumatoid arthritis of the shoulder: results of 303 consecutive cases. *J Shoulder Elbow Surg*. 2007;16(6):683-690. Epub 2007 Oct 29.
414. Orfaly RM, Rockwood CA Jr, Esenyel CM, Wirth MA. A prospective functional outcome study of shoulder arthroplasty for osteoarthritis with an intact rotator cuff. *J Shoulder Elbow Surg*. 2003;12(3):214-221.
415. Orfaly RM, Rockwood CA Jr, Esenyel CZ, Wirth MA. Shoulder arthroplasty in cases with avascular necrosis of the humeral head. *J Shoulder Elbow Surg*. 2007;16 (3 Suppl 1):S27-S32. Epub 2006 Nov 16.
416. Antuña S, Sperling JW, Sánchez-Sotelo J, Cofield RH. Shoulder arthroplasty for proximal humeral malunions: long-term results. *J Shoulder Elbow Surg*. 2002;11(2):122-129.
417. Antuña SA, Sperling JW, Sánchez-Sotelo J, Cofield RH. Shoulder arthroplasty for proximal humeral nonunions. *J Shoulder Elbow Surg*. 2002;11(2):114-121.
418. Antuña SA, Sperling JW, Cofield RH. Shoulder hemiarthroplasty for acute fractures of the proximal humerus: a minimum five-year follow-up. *J Shoulder Elbow Surg*. 2008;17(2):202-209. doi: 10.1016/j.jse.2007.06.025. Epub 2008 Jan 11.
419. Zuckerman JD, Scott AJ, Gallagher MA. Hemiarthroplasty for cuff tear arthropathy. *J Shoulder Elbow Surg*. 2000;9(3):169-172.
420. Williams GR Jr, Rockwood CA Jr. Hemiarthroplasty in rotator cuff-deficient shoulders. *J Shoulder Elbow Surg*. 1996;5(5):362-367.
421. Agorastides I, Sinopidis C, El Meligy M, Yin Q, Brownson P, Frostick SP. Early versus late mobilization after hemiarthroplasty for proximal humeral fractures. *J Shoulder Elbow Surg*. 2007;16 (3 Suppl):S33-S38. Epub 2006 Dec 13.
422. Zyto K, Wallace WA, Frostick SP, Preston BJ. Outcome after hemiarthroplasty for three- and four-part fractures of the proximal humerus. *J Shoulder Elbow Surg*. 1998;7(2):85-89.
423. Prakash U, McGurty DW, Dent JA. Hemiathroplasty for severe fractures of the proximal humerus. *J Shoulder Elbow Surg*. 2002;11(5):428-430.
424. Mighell MA, Kolm GP, Collinge CA, Frankle MA. Outcomes of hemiarthroplasty for fractures of the proximal humerus. *J Shoulder Elbow Surg*. 2003;12(6):569-577.
425. Torchia ME, Cofield RH, Settergren CR. Total shoulder arthroplasty with the Neer prosthesis: long-term results. *J Shoulder Elbow Surg*. 1997;6(6):495-505.

426. Cofield RH. Total shoulder arthroplasty with the Neer prosthesis. *J Bone Joint Surg Am*. 1984;66(6):899-906.
427. Boileau P, Gonzalez JF, Chuinard C, Bicknell R, Walch G. Reverse total shoulder arthroplasty after failed rotator cuff surgery. *J Shoulder Elbow Surg*. 2009;18(4):600-606. doi: 10.1016/j.jse.2009.03.011. Epub 2009 May 29.
428. Frankle M, Siegal S, Pupello D, Saleem A, Mighell M, Vasey M. The reverse shoulder prosthesis for glenohumeral arthritis associated with severe rotator cuff deficiency. A minimum two-year follow-up study of sixty patients. *J Bone Joint Surg Am*. 2005;87(8):1697-1705.
429. Rittmeister M, Kerschbaumer F. Grammont reverse total shoulder arthroplasty in patients with rheumatoid arthritis and nonreconstructible rotator cuff lesions. *J Shoulder Elbow Surg*. 2001;10(1):17-22.
430. Sirveaux F, Favard L, Oudet D, Huquet D, Walch G, Molé D. Grammont inverted total shoulder arthroplasty in the treatment of glenohumeral osteoarthritis with massive rupture of the cuff. Results of a multicentre study of 80 shoulders. *J Bone Joint Surg Br*. 2004;86(3):388-395.
431. Wall B, NovéJosserand L, O'Connor DP, Edwards BT, Walch G. Reverse total shoulder arthroplasty: a review of results according to etiology. *J Bone Joint Surg Am*. 2007;89(7):1476-1485.
432a. Cuff D, Pupello D, Virani N, Levy J, Frankle M. Reverse shoulder arthroplasty for the treatment of rotator cuff deficiency. *J Bone Joint Surg Am*. 2008;90(6):1244-1251.
432b. Scheibel M, Habermeyer P. Subscapularis dysfunction following anterior surgical approaches to the shoulder. *J Shoulder Elbow Surg*. 2008;17(4):671-683. doi: 10.2106/JBJS.G.00775.
433. Miller SL, Hazrati Y, Klepps S, Chiang A, Flatow EL. Loss of subscapularis function after total shoulder replacement: a seldom recognized problem. *J Shoulder Elbow Surg*. 2003;12(1):29-34.
434. Gerber C, Yian EH, Pfirrmann CA, Zumstein MA, Werner CM. Subscapularis muscle function and structure after total shoulder replacement with lesser tuberosity osteotomy and repair. *J Bone Joint Surg Am*. 2005;87(8):1739-1745.
435. Armstrong A, Lashgari C, Teefey S, Menendez J, Yamaguchi K, Galatz LM. Ultrasound evaluation and clinical correlation of subscapularis repair after total shoulder arthroplasty. *J Shoulder Elbow Surg*. 2006;15(5):541-548. Epub 2006 Jul 27.
436. Caplan JL, Whitfield B, Neviaser RJ. Subscapularis function after primary tendon to tendon repair in patients after replacement arthroplasty of the shoulder. *J Shoulder Elbow Surg*. 2009;18(2):193-196; discussion 197-198. doi: 10.1016/j.jse.2008.10.019. Epub 2008 Dec 31.
437. Buckley T, Miller R, Nicandri G, Lewis R, Voloshin I. Analysis of subscapularis integrity and function after lesser tuberosity osteotomy versus subscapularis tenotomy in total shoulder arthroplasty using ultrasound and validated clinical outcome measures. *J Shoulder Elbow Surg*. 2014;23(9):1309-1317. doi: 10.1016/j.jse.2013.12.009. Epub 2014 Mar 4.
438. Lo IK, Litchfield RB, Griffin S, Faber K, Patterson SD, Kirkley A. Quality-of-life outcome following hemiarthroplasty or total shoulder arthroplasty in patients with osteoarthritis. A prospective, randomized trial. *J Bone Joint Surg Am*. 2005;87(10):2178-2185.
439. Gartsman GM, Roddey TS, Hammerman SM. Shoulder arthroplasty with or without resurfacing of the glenoid in patients who have osteoarthritis. *J Bone Joint Surg Am*. 2000;82(1):26-34.
440. Cofield RH, Edgerton BC. Total shoulder arthroplasty: complications and revision surgery. *Instructor Course Lecture*. 1990;39:449-462.
441. Hawkins RJ, Bell RH, Jallay B. Total shoulder arthroplasty. *Clin Orthop Relat Res*. 1989;(242):188-194.
442. Neer CS 2nd. Replacement arthroplasty for glenohumeral osteoarthritis. *J Bone Joint Surg Am*. 1974;56(1):1-13.
443. Bryant D, Litchfield R, Sandow M, Gartsman GM, Guyatt G, Kirkley A. A comparison of pain, strength, range of motion, and functional outcomes after hemiarthroplasty and total shoulder arthroplasty in patients with osteoarthritis of the shoulder. A systematic review and meta-analysis. *J Bone Joint Surg Am*. 2005;87(9):1947-1956.
444. Radnay CS, Setter KJ, Chambers L, Levine WN, Bigliani LU, Ahmad CS. Total shoulder replacement compared with humeral head replacement for the treatment of primary glenohumeral osteoarthritis: a systematic review. *J Shoulder Elbow Surg*. 2007;16(4):396-402. Epub 2007 Jun 20.
445. Edwards TB, Boulahia A, Kempf JF, Boileau P, Nemoz C, Walch G. The influence of rotator cuff disease on the results of shoulder arthroplasty for primary osteoarthritis: results of a multicenter study. *J Bone Joint Surg Am*. 2002;84-A(12):2240-2248.
446. Maier MW, Niklasch M, Dreher T, et al. Motion patterns in activities of daily living: 3- year longitudinal follow-up after total shoulder arthroplasty using an optical 3D motion analysis system. *BMC Musculoskelet Disord*. 2014;15:244. doi: 10.1186/1471-2474-15-244
447. Friedman RJ, Thornhill TS, Thomas WH, Sledge CB. Non-constrained total shoulder replacement in patients who have rheumatoid arthritis and class-IV function. *J Bone Joint Surg Am*. 1989;71(4):494-498.
448. Neer CS 2nd, Watson KC, Stanton FJ. Recent experience in total shoulder replacement. *J Bone Joint Surg Am*. 1982;64(3):319-337.
449. Cofield RF, Chang W, Sperling JW. Complications of shoulder arthroplasty. In: Iannotti J, Williams GR, eds. *Disorders of the Shoulder: Diagnosis and Management*. Philadelphia, PA: Lippincott Williams and Wilkins; 1999:571-593.
450. Levy O, Funk L, Sforza G, Copeland S. Copeland surface replacement arthroplasty of the shoulder in rheumatoid arthritis. *J Bone Joint Surg Am*. 2004;86(3):512-518.
451. Hughes M, Neer CS 2nd. Glenohumeral joint replacement and postoperative rehabilitation. *Phys Ther*. 1975;55(8):850-858.
452. Bigliani LU, Flatow EL, McCluskey GI, Fischer R. Failed prosthetic replacement for displaced proximal humeral fractures. *Orthop Trans*. 1991;15:747-748.
453. Hasan SS, Leith JM, Campbell B, Smith KL, Matsen FA 3rd. Characteristics of unsatisfactory shoulder arthroplasties. *J Shoulder Elbow Surg*. 2002;11(5):431-441.
454. Robinson CM, Page RS, Hill RM, Sanders DL, Court-Brown CM, Wakefield AE. Primary hemiarthroplasty for treatment of proximal humeral fractures. *J Bone Joint Surg Am*. 2003;85-A(7):1215-1223.
455. Frankle MA, Ondrovic EL, Markee BA, Harris ML, Lee WE 3rd. Stability of tuberosity reattachment in proximal humeral hemiarthroplasty. *J Shoulder Elbow Surg*. 2002;11(5):413-420.
456. Green A, Barnard WL, Limbird RS. Humeral head replacement for acute, four-part proximal humerus fractures. *J Shoulder Elbow Surg*. 1993;2(5):249-254. doi: 10.1016/S1058-2746(09)80084-0. Epub 2009 Feb 19.
457. Visser CP, Coene LN, Brand R, Tavy DL. Nerve lesions in proximal humeral fractures. *J Shoulder Elbow Surg*. 2001;10(5):421-427.
458. Frich LH, Søjbjerg JO, Sneppen O. Shoulder arthroplasty in complex acute and chronic proximal humeral fractures. *Orthopedics*. 1991;14(9):949-954.
459. Boileau P, Trojani C, Walch G, Krishnan SG, Romeo A, Sinnerton R. Shoulder arthroplasty for the treatment of the sequelae of fractures of the proximal humerus. *J Shoulder Elbow Surg*. 2001;10(4):299-308.
460. Mansat P, Guity MR, Bellumore Y, Mansat M. Shoulder arthroplasty for late sequelae of proximal humeral fractures. *J Shoulder Elbow Surg*. 2004;13(3):305-312.
461. Neer CS II. Fractures and dislocations of the shoulder. Part I: fractures about the shoulder. In: Rockwood CA, ed. *Fractures*. 2nd ed. Philadelphia, PA: JB Lippincott; 1984;675-721.
462. Hattrup SJ, Cofield RH. Osteonecrosis of the humeral head: results of replacement. *J Shoulder Elbow Surg*. 2000;9(3):177-182.
463. Hovelius L, Augestine BG, Fredin H, Johannson O, Norlin R, Thorling J. Primary anterior dislocation of the shoulder in the young patients. A ten-year prospective study. *J Bone Joint Surg Am*. 1996;78(11):1677-1684.

464. Hindmarsh J, Lindberg A. Eden-Hybinette's operation for recurrent dislocation of the humero-scapular joint. *Acta Orthop Scand*. 1967;38(4):459-478.
465. Harryman DT II, Sidles JA, Matsen FA III. The humeral head translates on the glenoid with passive motion. In: Post M, Morrey BF, Hawkins RJ, eds. *Surgery of the Shoulder*. St Louis, MO: Mosby Year Book; 1990:186-190.
466. Janevic J, Craig EV, Hsu KC, Engebretsen L, Lew WD. Biomechanics of repair of anterior glenohumeral instability. *Trans Orthop Res Soc*. 1992;17:495.
467. Green A, Norris TR. Shoulder arthroplasty for advanced glenohumeral arthritis after anterior instability repair. *J Shoulder Elbow Surg*. 2001;10(6):539-549.
468. Franklin JL, Barrett WP, Jackins SE, Matsen FA 3rd. Glenoid loosening in total shoulder arthroplasty. Association with rotator cuff deficiency. *J Arthroplasty*. 1988;3(1):39-46.
469. Matsen F 3rd, Boileau P, Walch G, Gerber C, Bicknell RT. The reverse total shoulder arthroplasty. *J Bone Joint Surg Am*. 2007;89(3):660-667.
470. Arntz CT, Jackins S, Matsen FA 3rd. Prosthetic replacement of the shoulder for the treatment of defects in the rotator cuff and the surface of the glenohumeral joint. *J Bone Joint Surg Am*. 1993;75(4):485-491.
471. Boardman ND 3rd, Cofield RH, Bengtson KA, Little R, Jones MC, Rowland CM. Rehabilitation after total shoulder arthroplasty. *J Arthroplasty*. 2001;16(4):483-486.
472. Mulieri PJ, Holcomb JO, Dunning P, et al. Is a formal physical therapy program necessary after total shoulder arthroplasty for osteoarthritis? *J Shoulder Elbow Surg*. 2010;19(4):570-579. doi: 10.1016/j.jse.2009.07.012. Epub 2009 Oct 2.
473. Wilcox RB, Arslanian LE, Millet P. Rehabilitation following total shoulder arthroplasty. *J Orthop Sports Phys Ther*. 2005;35(12):821-832.
474. Kelley M, Leggin B. Rehabilitation following arthroplasty. In: Williams G, Ramsey M, eds. *Shoulder and Elbow Arthroplasty*. Philadelphia, PA: Williams and Wilkins/Lippincott; 2005.
475. Kelley MJ, Leggin BG. Rehabilitation following arthroplasty. In: Dines D, Laurencin CT, Williams GR, eds. *Arthritis and Arthroplasty: The Shoulder*. Philadelphia, PA: Saunders Elsevier; 2009:123-138.
476. Brems JJ. Rehabilitation following total shoulder arthroplasty. *Clin Orthop Relat Res*. 1994;(307):70-85.
477. Moeckel BH, Altchek DW, Warren RF, Wickiewicz TL, Dines DM. Instability of the shoulder after arthroplasty. *J Bone Joint Surg Am*. 1993;75(4):492-497.
478. McCann PD, Wootten ME, Kadaba MP, Bigliani LU. A kinematic and electromyographic study of shoulder rehabilitation exercises. *Clin Orthop Relat Res*. 1993;(288):179-188.
479. Gaunt B, Uhl TL. EMG activation of the shoulder during the elevation progression. New York, NY: ASSET Annual Meeting; 2004.
480. Wise MB, Uhl TL, Mattacola CG, Nitz AJ, Kibler WB. The effect of limb support on muscle activation during shoulder exercises. *J Shoulder Elbow Surg*. 2004;13(6):614-620.
481. Uhl TL, Muir TA, Lawson L. Electromyographical assessment of passive, active assisted and active shoulder rehabilitation exercises. *PM R*. 2010;2(2):132-141. doi: 10.1016/j.pmrj.2010.01.002.
482. Basti J. Rehabilitation of shoulder arthroplasty. In: Bigliani LU, Flatow EL, eds. *Shoulder Arthroplasty*. New York, NY: Springer; 2005.
483. Kelly BT, Roskin LA, Kirkendall DT, Speer KP. Shoulder muscle activation during aquatic and dry land exercises in nonimpaired subjects. *J Orthop Sports Phys Ther*. 2000;30(4):204-210.
484. Levy JC, Everding NG, Gil CC Jr, Stephens S, Giveans MR. Speed of recovery after shoulder arthroplasty: a comparison of reverse and anatomic total shoulder arthroplasty. *J Shoulder Elbow Surg*. 2014;23(12):1872-1881. doi: 10.1016/j.jse.2014.04.014. Epub 2014 Jun 26.
485. Boileau P, Watkinson D, Hatzidakis AM, Hovorka I: Neer Award 2005: The Grammont reverse shoulder prosthesis: Results in cuff tear arthritis, fracture sequelae, and revision arthroplasty. *J Shoulder Elbow Surg*. 2006;15(5):527-540.
486. Schairer WW, Nwachukwu BW, Lyman S, Craig EV, Gulotta LV. National utilization of reverse total shoulder arthroplasty in the United States. *J Shoulder Elbow Surg*. 2015;24:91-97. doi: 10.1016/j.jse.2014.08.026. Epub 2014 Oct 29.
487. Sebastiá-Forcada E; Cebrián-Gómez R; Lizaur-Utrilla A; Gil-Guillén V. Reverse shoulder arthroplasty versus hemiarthroplasty for acute proximal humeral fractures. A blinded, randomized, controlled, prospective study. *J Shoulder Elbow Surg*. 2014;23(10):14191426. doi: 10.1016/j.jse.2014.06.035. Epub 2014 Jul 30.
488. Molé D, Wein F, Dézaly C, Valenti P, Sirveaux F. Surgical technique: the anterosuperior approach for reverse shoulder arthroplasty. *Clin Orthop Relat Res*. 2011;469(9):2461-2468. doi: 10.1007/s11999-011-1861-7.
489. Zumstein MA, Pinedo M, Old J, Boileau P. Problems, complications, reoperations and revisions in reverse total shoulder arthroplasty: a systematic review. *J Shoulder Elbow Surg*. 2011;20(1):146-157. doi: 10.1016/j.jse.2010.08.001.
490. Grammont PM, Baulot E. Delta shoulder prosthesis for rotator cuff rupture. *Orthopedics*. 1993;16(1):65-68.
491. Collins D. Reverse shoulder arthroplasty: indications, techniques, and results. In: Dines D, Laurencin CT, Williams GR, eds. *Arthritis & Arthroplasty of the Shoulder*. Philadelphia, PA: Saunders Elsevier; 2009;196-217.
492. Boudreau S, Boudreau ED, Higgins LD, Wilcox RB 3rd. Rehabilitation following reverse total shoulder arthroplasty. *J Orthop Sports Phys Ther*. 2007;37(12):734-743. doi: 10.2519/jospt.2007.2562. Epub 2007 Aug 28.
493. Kuhn JE, Dunn WR, Sanders R, et al: Effectiveness of physical therapy in treating atraumatic full-thickness rotator cuff tears: a multi-center prospective cohort study. *J Shoudler Elbow Surg*. 2013;22(10):1371-1379. doi: 10.1016/j.jse.2013.01.026. Epub 2013 Mar 27.
494. Al-Hadithy, N, Domos, P, Sewell, MD, Pandit, R. Reverse shoulder arthroplasty in 41 patients with cuff tear arthropathy with a mean follow-up period of 5 years. *J Shoulder Elbow Surg*. 2014;23(11):1662-1668.
495. Puskas B; Harreld K; Clark R; Downes K; Virani NA; Frankle M. Isometric strength, range of motion, and impairment before and after total and reverse shoulder arthroplasty. *J Should Elbow Surg*. 2013;22(7):869-76. doi: 10.1016/j.jse.2012.09.004. Epub 2013 Jan 10.