KSC: Kinetic Shoulder Complex Bibliography

SHOULDER GIRDLE

1. **Dizziness, Unsteadiness, Visual Disturbances, and Sensorimotor Control in Traumatic Neck Pain.** There is considerable evidence to support the importance of cervical afferent dysfunction in the development of dizziness, unsteadiness, visual disturbances, altered balance, and altered eye and head movement control following neck trauma, especially in those with persistent symptoms. However, there are other possible causes for these symptoms, and secondary adaptive changes should also be considered in differential diagnosis. Understanding the nature of these symptoms and differential diagnosis of their potential origin is important for rehabilitation. In addition to symptoms, the evaluation of potential impairments (altered cervical joint position and movement sense, static and dynamic balance, and ocular mobility and coordination) should become an essential part of the routine assessment of those with traumatic neck pain, including those with concomitant injuries such as concussion and vestibular or visual pathology or deficits. Once adequately assessed, appropriate tailored management should be implemented. Research to further assist differential diagnosis and to understand the most important contributing factors associated with abnormal cervical afferent input and subsequent disturbances to the sensorimotor control system, as well as the most efficacious management of such symptoms and impairments, is important for the future. J Orthop Sports Phys Ther 2017;47(7):492–502. Epub 16 Jun 2017. doi:10.2519/jospt.2017.7052 Treleaven, Julia, PhD, BPhty
2. **Pain and motor control: From the laboratory to rehabilitation.** Movement is changed in pain and is the target of clinical interventions. Yet the understanding of the physiological basis for movement adaptation in pain remains limited. Contemporary theories are relatively simplistic and fall short of providing an explanation for the variety of permutations of changes in movement control identified in clinical and experimental contexts. The link between current theories and rehabilitation is weak at best. New theories are required that both account for the breadth of changes in motor control in pain and provide direction for development and refinement of clinical interventions. This paper describes an expanded theory of the motor adaptation to pain to address these two issues. The new theory, based on clinical and experimental data argues that: activity is redistributed within and between muscles rather than stereotypical inhibition or excitation of muscles; modifies the mechanical behaviour in a variable manner with the objective to "protect" the tissues from further pain or injury, or threatened pain or injury; involves changes at multiple levels of the motor system that may be complementary, additive or competitive; and has short-term benefit, but with potential long-term consequences due to factors such as increased load, decreased movement, and decreased variability. This expanded theory provides guidance for rehabilitation directed at alleviating a mechanical contribution to the recurrence and persistence of pain that must be balanced with other aspects of a multifaceted intervention that includes management of psychosocial aspects of the pain experience. J Electromyogr Kinesiol. 2011 Apr;21(2):220-8. doi: 10.1016/j.jelekin.2011.01.002. Hodges PW1.

4. Effects of scapular stabilization exercise on pain related parameters in patients with scapulocostal syndrome: A randomized controlled trial Vitsarut Buttagat, B.Sc., M.Sc., Ph.D. Naruecha Taepa, B.PT. Nitchakarn Suwannived, B.PT. Nattanan Rattanachan, B.PT. The aim of this study was to evaluate the effects of scapular stabilization exercise (SSE) on pain intensity, pressure pain threshold (PPT), muscle tension and anxiety in patients with scapulocostal syndrome (SCS). Thirty-six patients were randomly assigned to receive a 30- minute session of either SSE or control (relaxed by lying supine quietly) for 12 sessions over a period of 4 weeks. Pain intensity, PPT, muscle tension and anxiety were assessed before and after a 4-week intervention period and 2 weeks after the intervention period. The adverse effects were evaluated after completion of the intervention period. Results indicated that the SSE group showed a significant improvement in all parameters after the intervention period and at 2 weeks after the intervention period ($p < 0.05$). For all outcomes, similar changes were not found in the control group. The adjusted post-test means values of each assessment time point for pain intensity, muscle tension and anxiety were significantly lower in the SSE group than those of the control group ($p < 0.05$). Moreover, the values for PPT were significantly higher in the SSE group ($p > 0.05$). There were no reports of adverse effects in either group. We therefore conclude that SSE can improve pain related parameters and could be an effective intervention for SCS.

5. The role of the scapula in preventing and treating shoulder instability. Knee Surg Sports Traumatol Arthrosc. 2015 Aug 1. Kibler WB[1], Sciascia A. The shoulder is a closed-chain mechanism that balances the mobility required by the ranges of motion in normal activities with the stability required to act as a stable ball and socket base for those activities. The scapula plays key roles in the closed-chain mechanism by being mobile enough to place the glenoid in optimal relation to the humerus to facilitate concavity/compression and by being a stable base for coordinated muscle activation to compress the humerus into the glenoid. Scapular dyskinesis alters these roles and is frequently present in many types of glenohumeral instability. It may create or exacerbate the abnormal glenohumeral kinematics in instability. Clinical evaluation methods can demonstrate scapular dyskinesis, and if dyskinesis is present, rehabilitation for the dyskinesis should be included in the non-operative, preoperative, or post-operative treatment. Rehabilitation for scapular dyskinesis can be performed by specific protocols and is more successful in muscle-predominant instabilities such as multidirectional instability and repetitive microtrauma instability. Level of evidence V. PMID: 26231154

6. Acute effects of scapular kinesiotaping on shoulder rotator strength, range of motion and acromiohumeral distance in asymptomatic overhead athletes. J Sports Med Phys Fitness. 2016 Jul 8. Harput G[1], Guney H, Toprak U, Colakoglu F, Baltaci G. There is limited information in the literature that shows whether scapular taping has an effect on the acromiohumeral distance (AHD) and shoulder functions. The aim of this study was to investigate the acute effects of scapular kinesiotaping on shoulder internal rotation (IR) and external rotation (ER) strength, IR and ER range of motion (ROM) and AHD in asymptomatic overhead athletes. The results of this study suggest that scapular taping could be an effective method for enhancing the acromiohumeral distance, shoulder rotator strength and range of motion. Therefore, scapular

taping could be recommended for not only in the asymptomatic athletes' shoulder exercise training but also in the prevention of subacromial impingement syndrome.

7. Predominance of the critical shoulder angle in the pathogenesis of degenerative diseases of the shoulder J Shoulder Elbow Surg. 2016 Feb 15. pii: S1058-2746(15)00689-8. doi: 10.1016/j.jse.2015.11.059. Blonna D[1], Giani A[2], Bellato E[2], Mattei L[3], Caló M[3], Rossi R[2], Castoldi F[3]. HYPOTHESIS:

The critical shoulder angle (CSA) could be responsible for cuff tears and concentric osteoarthritis. We aimed to assess this association when potential confounding factors were excluded and to test the

hypothesis that more extreme CSAs are associated with larger tears and more severe osteoarthritis. \CONCLUSION: Larger CSAs are associated with increased risk of symptomatic cuff tears, larger cuff tears, and the severity of eccentric osteoarthritis. Smaller angles increased the risk and severity of concentric symptomatic osteoarthritis. These associations remained significant even after removal of some of the potentially confounding variables.

8. Superficial and Deep Scapulothoracic Muscle EMG Activity During Different Types of Elevation Exercises in the Scapular Plane Authors: Birgit Castelein, PT, MsC[1], Barbara Cagnie, PT, PhD[1], Thierry Parlevliet, MD[2], Ann Cools, PT, PhD[1] **Published:** *Journal of Orthopaedic & Sports Physical Therapy*, 2016 **Volume:**0 **Issue:**0 **Pages:**1–26 **DOI:**10.2519/jospt.2016.5927 S**tudy Design** Controlled laboratory study. **Background** In scapular rehabilitation training, exercises that include a humeral elevation component in the scapular plane are commonly implemented. While performing humeral elevation, the scapula plays an important role as it has to create a stable basis for the glenohumeral joint. However, a comparison of both deep and superficial muscle activity of the scapula between different types of elevation exercises is lacking and would be helpful for the clinician in the choice of exercises. **Conclusion** Scaption activated UT to its highest. The addition of an extra external rotation component could be used when the goal is to activate LT and MT. The towel wall slide exercise was found to increase Pm activity. Adding load resulted in higher muscle activity. Some muscles showed a different activation pattern between the elevation exercises pending on the loading. The findings of this study give information about which elevation exercises a clinician can choose when the aim is to facilitate specific muscle scapulothoracic activity.

SHOULDER

1. **Psychological Distress Is Associated with Greater Perceived Disability and Pain in Patients Presenting to a Shoulder Clinic** Mariano E. Menendez, MD; Dustin K. Baker, BS; Lasun O. Oladeji, MS; Charles T. Fryberger, BS; Gerald McGwin, PhD; Brent A.Ponce, MD *J Bone Joint Surg Am*, 2015 Dec 16; 97 (24): 1999 -2003 . http://dx.doi.org/10.2106/JBJS.O.00387 B**ackground:** Shoulder disorders are a common cause of disability and pain. The Shoulder Pain and Disability Index (SPADI) is a frequently employed and previously validated measure of shoulder pain and disability. Although the SPADI has high reliability and construct validity, greater differences between individual patients are often observed than would be expected on the basis of diagnosis and pathophysiology alone. This study aims to determine how psychological factors (namely depression, catastrophic thinking, and self-efficacy) affect pain and perceived disability in the shoulder. C**onclusions:** Catastrophic thinking and decreased self- efficacy are associated with greater shoulder pain and disability. Our data support the notion that patient-to-patient variation in symptom intensity and magnitude of disability is more strongly related to psychological distress than to the specific shoulder diagnosis.

2. **Cervicothoracic Manual Therapy Plus Exercise Therapy Versus Exercise Therapy Alone in the Management of Individuals With Shoulder Pain: A Multicenter Randomized Controlled Trial Authors:** Paul E. Mintken, DPT[1,2], Amy W. McDevitt, DPT[1,3], Joshua A. Cleland, PT, PhD[4], Robert E. Boyles, PT, DSc[5], Amber R. Beardslee, DPT[6], Scott A. Burns, DPT[7,8], Matthew D. Haberl, DPT[9], Lauren A. Hinrichs, DPT[10], Lori A. Michener, PT, PhD[11] **Published:** *Journal of Orthopaedic & Sports Physical Therapy*, 2016 **Volume:**46 **Issue:**8 **Pages:**617–628 **DOI:**10.2519/jospt.2016.6319 **Background** Cervicothoracic manual therapy has been shown to improve pain and disability in individuals with shoulder pain, but the incremental effects of manual therapy in addition to exercise therapy have not been investigated in a randomized controlled trial. **Conclusion** Adding 2 sessions of high-dose cervicothoracic manual therapy to an exercise program did not improve pain or disability in patients with shoulder pain but did improve patient-perceived success at 4 weeks and 6 months and acceptability of symptoms at 4 weeks. More research is needed on the use of cervicothoracic manual therapy for treating shoulder pain.

3. **Risk stratification of patients with shoulder pain seen in physical therapy practice.** J Eval Clin Pract. 2016 Jun 29. doi: 10.1111/jep.12591. Rodeghero JR[1], Cleland JA[2], Mintken PE[3], Cook CE[4]. RATIONALE, AIMS AND OBJECTIVES: Musculoskeletal shoulder pain is commonly treated in physical therapy. There is inconsistency in the literature regarding patient characteristics related to prognosis. Having prognostic information could be useful for improving clinical efficiency and decreasing the cost of associated care. The objective of this study was to identify predictive characteristics related to patients with shoulder pain who have a high-risk of a bad prognosis (lowest functional recovery compared with visit utilization) as well as those who are at low-risk of a bad prognosis (highest functional recovery compared with visit utilization). CONCLUSION: Selected variables were associated with both poor and good recovery. Further research on prognosis, efficacy of physical therapy care and cost appear warranted for patients with shoulder pain.

4. **Effectiveness of Manual Physical Therapy for Painful Shoulder Conditions: A Systematic Review** J Man Manip Ther. 2009; 17(4): 206–15. 10.1179/106698109791352076 PMCID: PMC2813507 James Camarinos, DPT[a] and Lee Marinko, PT, ScD, OCS, FAAOMPT[a,*] Multiple disease-specific systematic reviews on the effectiveness of physical therapy intervention for shoulder dysfunction have been inconclusive. To date, there have been two systematic reviews that examined manual therapy specifically, but both considered effects within diagnoses. The purpose of this systematic review was to identify the effectiveness of manual therapy to the glenohumeral joint across all painful shoulder conditions. A search of MEDLINE, CINAHL, Web of Science, and Cochrane Central Register of

Randomized Controlled Trials for articles dated 1996 to June 2009 was performed. Inclusion for review were manual therapy performed to the glenohumeral joint only; non-surgical painful shoulder disorders; subjects 18-80 years; and outcomes of range of motion, pain, function, and/or quality of life. Quality assessment was performed using the PEDro scale with subsequent data extraction. Seventeen related articles were found with seven fitting the inclusion criteria. The average PEDro score was 7.86, meeting the cutoff score for high quality. Significant heterogeneity in outcome measures prohibited meta-analysis. Five studies demonstrated benefits utilizing manual therapy for mobility, and four demonstrated a trend towards decreasing pain values. Functional outcomes and quality-of-life measures varied greatly among all studies. Manual therapy appears to increase either active or passive mobility of the shoulder. A trend was found favoring manual therapy for decreasing pain, but the effect on function and quality of life remains inconclusive. Future research utilizing consistent outcome measurements is necessary.

5. **An Evidence-Based Approach to Differentiating the Etiology of Shoulder and Cervical Spine Pain.** Am J Med. 2016 May 4. pii: S0002-9343(16)30462-4. doi: 10.1016/j.amjmed.2016.04.023. Bokshan SL[1], DePasse JM[1], Eltorai AE[2], Paxton ES[3], Green A[3], Daniels AH[4]. Differentiating the etiology of pain and dysfunction due to cervical spine and shoulder pathology presents a difficult clinical challenge in many patients. Furthermore, the anatomical region reported to be painful may mislead the practitioner. uccessfully treating these patients requires a careful and complete history and physical exam with appropriate provocative maneuvers. An evidence- based selection of clinical testing is also essential and should be tailored to the most likely underlying etiology. When advanced imaging does not reveal a conclusive source of pathology, electromyography (EMG) and selective injections have been shown to be useful adjuncts, although the sensitivity, specificity, and risk-reward ratio of each test must be considered. This review provides an evidence-based review of common etiologies of shoulder and neck pain and guidelines for assistance in determining the pain generator in ambiguous cases.

6. **The role of central sensitization in shoulder pain: A systematic literature review.** Semin Arthritis Rheum. 2015 Jun;44(6):710-6. doi: 10.1016/j.semarthrit.2014.11.002. Epub 2014 Nov 13. N Sanchis M1, Lluch E2, Nijs J3, Struyf F4, Kangasperko M1. **INTRODUCTION:** Hyperexcitability of the central nervous system has been suggested to play an important role in pain experienced by patients with unilateral shoulder pain. A systematic literature review following the PRISMA guidelines was performed to evaluate the existing evidence related to the presence of central sensitization in patients with unilateral shoulder pain of different etiologies including those with chronic subacromial impingement syndrome. Studies addressing neuropathic pain (e.g., post-stroke shoulder pain) were not considered. **CONCLUSIONS:** Although the majority of the literature reviewed provides emerging evidence for the presence of central sensitization in unilateral shoulder pain (including those diagnosed with subacromial impingement syndrome), our understanding of the role central sensitization plays in the shoulder pain population is still in its infancy. Future studies with high methodical quality are therefore required to investigate this further.

7. **Assessment of the glenohumeral joint's active and passive axial rotational range.** J Shoulder Elbow Surg. 2015 Sep 22. pii: S1058-2746(15)00381-X. doi: 10.1016/j.jse.2015.07.007. Humphries A[1], Cirovic S[2], Bull AM[3], Hearnden A[4], Shaheen AF[2]. BACKGROUND: Assessment of the range of axial rotation of the glenohumeral joint will improve understanding of shoulder function, with applications in shoulder rehabilitation and sports medicine. However, there is currently no complete description of motion of the joint. The study aimed to develop a reliable protocol to quantify the internal and external axial rotations of the glenohumeral joint during active and passive motion at multiple humeral positions. CONCLUSION: The results describe normal ranges of internal-external rotation of the glenohumeral joint at multiple humeral positions. The protocol's low variability means that it could be

used to test whether shoulder pathologic conditions lead to changes in axial rotational range at specific humeral positions.

8. **The champagne toast position isolates the supraspinatus better than the Jobe test: an electromyographic study of shoulder physical examination tests**. J Shoulder Elbow Surg. 2015 Oct 3. pii: S1058-2746(15)00412-7. doi: 10.1016/j.jse.2015.07.031. Chalmers PN[1], Cvetanovich GL[2], Kupfer N[2], Wimmer MA[2], Verma NN[2], Cole BJ[2], Romeo AA[2], Nicholson GP[2]. BACKGROUND: While Jobe's test is widely used, it does not isolate supraspinatus activity. Our purpose was to examine the electromyographic (EMG) activity within the supraspinatus and deltoid with resisted abduction to determine the shoulder position that best isolates the activity of the supraspinatus. CONCLUSIONS: Testing of abduction strength in the champagne toast position, i.e., 30° of abduction, mild external rotation, and 30° of flexion, better isolates the activity of the supraspinatus from the deltoid than Jobe's "empty can" position.

9. **Changes in sitting posture affect shoulder range of motion.** J Bodyw Mov Ther. 2014 Apr;18(2):239-43. doi: 10.1016/j.jbmt.2013.09.008. Epub 2013 Sep 25 Kanlayanaphotporn R. *OBJECTIVE:* To assess the effect of slouched sitting on shoulder range of motion (ROM). *CONCLUSION:* Changes in sitting posture affect shoulder ROMs in all directions tested. Greater changes in shoulder ROMs were associated with greater increase in thoracic kyphosis. These findings suggest that even subtle changes in thoracic kyphosis need to be considered during shoulder evaluation.

10. **Differences in glenohumeral joint morphology between patients with anterior shoulder instability and healthy, uninjured volunteers.** J Shoulder Elbow Surg. 2015 May 7. pii: S1058-2746(15)00165-2. doi: 10.1016/j.jse.2015.03.024. Peltz CD[1], Zauel R[2], Ramo N[2], Mehran N[3], Moutzouros V[3], Bey MJ[2]. BACKGROUND: Traumatic glenohumeral joint (GHJ) dislocations are common, resulting in significant shoulder disability and pain. Previous research indicates that bony morphology is associated with an increased risk of injury in other joints (eg, the knee), but the extent to which bony morphology is associated with traumatic GHJ dislocation is unknown. This study assessed GHJ morphology in patients with anterior GHJ instability and in a control population of healthy volunteers. CONCLUSIONS: There are significant differences in GHJ morphology between healthy control subjects and both shoulders (injured and uninjured, contralateral) of patients diagnosed with anterior instability after GHJ dislocation. These findings are important clinically because they suggest that glenoid morphology may influence the risk of GHJ dislocation.

ROTATOR CUFF

1. **Effectiveness of scapula-focused approaches in patients with rotator cuff related shoulder pain: A systematic review and meta-analysis** Man Ther. 2016 Sep; 25:35-42. doi: 10.1016/j.math.2016.05.337. Epub 2016 Jun 4. Bury J[1], West M[2], Chamorro-Moriana G[3], Littlewood C[4]. BACKGROUND: Rotator cuff related shoulder pain (RCSP) is common with a range of conservative treatments currently offered. Evidence supporting superiority of one approach over another is lacking. Scapula focused approaches (SFA) are frequently prescribed and warrant investigation. CONCLUSION: SFA for RCSP confers benefit over generalised approaches up to six weeks but this benefit is not apparent by 3 months. Early changes in pain are not clinically significant. With regards to scapula position/movement, the evidence is conflicting. These preliminary conclusions should be treated with significant caution due to limitations of the evidence base.

2. **Microvascular blood flow in normal and pathologic rotator cuffs.** J Shoulder Elbow Surg. 2015 Sep 25. pii: S1058-2746(15)00388-2. doi: 10.1016/j.jse.2015.07.014. Karthikeyan S[1], Griffin DR[2], Parsons N[3], Lawrence TM[4], Modi CS[4], Drew SJ[4], Smith CD[5].BACKGROUND: Microvascular blood flow in the tendon plays an important role in the pathogenesis of rotator cuff abnormalities. There are conflicting views about the presence of a hypovascular zone in the supraspinatus tendon. Besides, no studies have

looked at the pattern of blood flow around a partial-thickness tear. Our aim was to measure microvascular blood flow in normal and a range of pathologic rotator cuff tendons using laser doppler flowmetry. V CONCLUSION: Real-time
in vivo laser doppler analysis has shown that microvascular blood flow is not uniform throughout the supraspinatus tendon. Blood flow in the pathologic supraspinatus tendon was significantly lower compared with the normal tendon.

3. **A Systematic Review of Preoperative Fatty Infiltration and Rotator Cuff Outcomes Review Article** HSS Journal ® pp 1-7 M. Michael Khair Jason Lehman
Nicholas Tsouris Lawrence V. Gulotta Background Fatty infiltration (FI) of the muscle as graded by the Goutallier classification (GC) is a well-known sequela following rotator cuff injury. The degree to which this predicts the success of rotator cuff repair is unknown. Conclusions While lower preoperative GC scores are associated with lower rates of rotator cuff retear following repair, there is insufficient data to make conclusions on the effects of FI on functional outcomes following repair.

4. **Treatment of non-traumatic rotator cuff tears: A randomised controlled trial with one-year clinical results.** Bone Joint J. 2014 Jan;96(1):75-81. doi: 10.1302/0301-620X.96B1.32168. Kukkonen J, Joukainen A, Lehtinen J, Mattila KT, Tuominen EK, Kauko T, Äärimaa V. We have compared three different methods of treating symptomatic non-traumatic tears of the supraspinatus tendon in patients above 55 years of age. These results suggest that at one-year follow-up, operative treatment is no better than conservative treatment with regard to non- traumatic supraspinatus tears, and that conservative treatment should be considered as the primary method of treatment for this condition. Cite this article: Bone Joint J 2014;96-B:75-81.

5. **Human evolution and tears of the rotator cuff.** Int Orthop. 2013 Dec 10. Craik JD, Mallina R, Ramasamy V, Little NJ. Department of Orthopaedics, Epsom General Hospital, Dorking Road, Epsom, Surrey, KT18 7EG, UK, jcraik82@gmail.com. **PURPOSE:** Humans differ from other great ape species in their propensity to develop tears of the rotator cuff. The aim of this study was to compare the anatomical risk factors for subacromial impingement and rotator cuff tears amongst the great apes and to determine which features may be accentuated in humans and therefore play a more significant role in disease aetiology. **CONCLUSIONS:** These results indicate that an alternative primary aetiological factor for rotator cuff tears must exist. A reduction in the size of the supraspinatus fossa in human scapulae suggests that structural insufficiency of the supraspinatus or a change in rotator cuff force vectors could play a role.

6. J Orthop Surg Res. 2014 Aug 7;9:70. doi: 10.1186/s13018-014-0070-y.

7. **The diagnostic value of the combination of patient characteristics, history, and clinical shoulder tests for the diagnosis of rotator cuff tear.** van Kampen DA[1], van den Berg T, van der Woude HJ, Castelein RM, Scholtes VA, Terwee CB, Willems WJ. **BACKGROUND:** It is unknown which combination of patient information and clinical tests might be optimal for the diagnosis of rotator cuff tears. This study aimed to determine the diagnostic value of nine individual clinical tests for evaluating rotator cuff tear and to develop a prediction model for diagnosing rotator cuff tear. **CONCLUSION:** Our results showed that individual clinical shoulder tests had moderate diagnostic value for diagnosing rotator cuff tear. Our prediction model showed improved diagnostic value. However, the prediction value is still relatively low, supporting a low threshold for additional diagnostic tests for the diagnosis of rotator cuff tears.

8. **Treatment of Nontraumatic Rotator Cuff Tears: A Randomized Controlled Trial with Two Years of Clinical and Imaging Follow-up.** J Bone Joint Surg Am. 2015 Nov 4;97(21):1729-37. doi: 10.2106/JBJS.N.01051. Kukkonen J[1], Joukainen A[2], Lehtinen J[3], Mattila KT[4], Tuominen EK[4], Kauko T[5], Äärimaa V[4]. ***BACKGROUND:*** The optimal treatment for symptomatic, nontraumatic rotator cuff tear is unknown. The purpose of this trial was to compare the effectiveness of physiotherapy, acromioplasty, and rotator cuff repair for this condition. We hypothesized that rotator cuff repair yields superior results compared with other treatment modalities. ***CONCLUSIONS:*** There was no significant difference in clinical outcome between the three interventions at the two-year follow-up. The potential progression of the rotator cuff tear, especially in the non-repaired treatment groups, warrants further follow-up. On the basis of our findings, conservative treatment is a reasonable option for the primary initial treatment for isolated, symptomatic, nontraumatic, supraspinatus tears in older patients.

9. **Comparing surgical repair with conservative treatment for degenerative rotator cuff tears: a randomized controlled trial.** J Shoulder Elbow Surg. 2015 Aug;24(8):1274-81. doi: 10.1016/j.jse.2015.05.040. Lambers Heerspink FO[1], van Raay JJ[2], Koorevaar RC[3], van Eerden PJ[4], Westerbeek RE[5], van 't Riet E[3], van den Akker-Scheek I[6], Diercks RL[6]. BACKGROUND: Good clinical results have been reported for both surgical and conservative treatment of rotator cuff tears. The primary aim of this randomized controlled trial was to compare functional and radiologic improvement after surgical and conservative treatment of degenerative rotator cuff tears. CONCLUSION: In our population of patients with degenerative rotator cuff tears who were randomly treated by surgery or conservative protocol, we did not observe differences in functional outcome as measured with the CMS 1 year after treatment. **However**, significant differences in pain and disabilities were observed in favor of surgical treatment. The best outcomes in function and pain were seen in patients with an intact rotator cuff postoperatively.

LABRUM/ADHESIVE CAPSULITIS/IMPINGEMENT

1. **The "3-Pack" Examination Is Critical for Comprehensive Evaluation of the Biceps-Labrum Complex and the Bicipital Tunnel: A Prospective Study.** Arthroscopy. 2016 Jul 20. pii: S0749-8063(16)30249-3. doi: 10.1016/j.arthro.2016.05.015. Taylor SA[1], Newman AM[2], Dawson C[3], Gallagher KA[4], Bowers A[5], Nguyen J[4], Fabricant PD[4], O'Brien SJ[4]. PURPOSE: To determine the diagnostic value of the 3-Pack examination for biceps-labrum complex (BLC) disease, assess interobserver reliability, and generate an evidence-based diagnostic and therapeutic algorithm. CONCLUSIONS: The 3-Pack has excellent inter-rater reliability, sensitivity, and NPV and is a critical screening tool for BLC disease in all zones. Hidden extra- articular bicipital tunnel disease can reliably be excluded based on negative tenderness to palpation or a negative O'Brien sign (NPV 93% to 96%).

2. **Does adding mobilization to stretching improve outcomes for people with frozen shoulder? A randomized controlled clinical trial.** Clin Rehabil. 2015 Jul 30. pii: 0269215515597294. Çelik D[1], Kaya Mutlu E[2]. OBJECTIVE: To assess the effectiveness of joint mobilization combined with stretching exercises in patients with frozen shoulder. CONCLUSION: In the treatment of patients with frozen shoulder, joint mobilization combined with stretching exercises is better than stretching exercise alone in terms of external rotation, abduction range of motion and function score.

3. **The pathophysiology associated with primary (idiopathic) frozen shoulder: A systematic review** Victoria Ryan, Hazel Brown, Catherine J. Minns Lowe and Jeremy S. Lewis *BMC Musculoskeletal Disorders*BMC series – open, inclusive and trusted2016**17**:340 **DOI:** 10.1186/s12891-016-1190-9 Background Frozen shoulder is a common yet poorly

understood musculoskeletal condition, which for many, is associated with substantial and protracted morbidity. Understanding the pathology associated with this condition may help to improve management. To date this has not been presented in a systematic fashion. As such, the aim of this review was to summarise the pathological changes associated with this primary frozen shoulder. Conclusions This systematic review presents a summary of what is currently known about the tissue pathophysiology of primary frozen shoulder. Further studies that use standardised inclusion and exclusion criteria and investigate changes in naïve tissue at different stages of the condition are required.

4. **Primary frozen shoulder: brief review of pathology and imaging abnormalities.** J Orthop Sci. 2013 Dec 4. Tamai K, Akutsu M, Yano Y. **BACKGROUND:** Primary frozen shoulder (FS) is a painful contracture of the glenohumeral joint that arises spontaneously without an obvious preceding event. Investigation of the intra-articular and periarticular pathology would contribute to the treatment of primary FS. **CONCLUSION:** Primary FS shows fibrosis of the joint capsule, associated with preceding synovitis. The initiator of synovitis, however, still remains unclear. Future studies should be directed to give light to the pathogenesis of inflammation to better treat or prevent primary FS.

5. **The effectiveness of physiotherapeutic interventions in treatment of frozen shoulder/adhesive capsulitis: A systematic review.** J Back Musculoskelet Rehabil. 2013 Nov 27. Jain TK, Sharma NK. BACKGROUND AND OBJECTIVE: Frozen shoulder is a common condition, yet its treatment remains challenging. In this review, the current best evidence for the use of physical therapy interventions (PTI) is evaluated. CONCLUSIONS: Therapeutic exercises and mobilization are strongly recommended for reducing pain, improving range of motion (ROM) and function in patients with stages 2 and 3 of frozen shoulder. Low-level laser therapy is strongly suggested for pain relief and moderately suggested for improving function but not recommended for improving ROM. Corticosteroid injections can be used for stage 1 frozen shoulder. Acupuncture with therapeutic exercises is moderately recommended for pain relief, improving ROM and function. Electro- therapy can help in providing short-term pain relief. Continuous passive motion is recommended for short-term pain relief but not for improving ROM or function. Deep heat can be used for pain relief and improving ROM. Ultrasound for pain relief, improving ROM or function is not recommended.

6. **The efficacy of different types of mobilization techniques in patients with primary adhesive capsulitis of the shoulder: a systematic review** Suzie Noten, MSc Mira Meeus, PhD Gaetane Stassijns, MD, PhD Francis Van Glabbeek, MD, PhD Olivier Verborgt, MD, PhD Filip Struyf, PhD DOI: http://dx.doi.org/10.1016/j.apmr.2015.07.025 Objective To systematically review the literature for efficacy of isolated articular mobilization techniques in patients with primary adhesive capsulitis (AC) of the shoulder. Conclusion Overall, mobilization techniques have beneficial effects in patients with primary AC of the shoulder. Due to preliminary evidence for many mobilization techniques, the Maitland's technique and the combined mobilizations seem recommended at the moment.

7. **Relationship between extrinsic factors and the acromio-humeral distance** June 2016Volume 23, Pages 1–8 Tanya Anne Mackenzie Lee Herrington Lenard Funk Ian Horsley Ann Cools Highlights •Pectorals minor length had a moderate relationship with AHD. •Shoulder rotation ranges had a weak relationship with AHD. •Shoulder activity levels had a moderate relationship with AHD. •Existence and strength of relationship was population specific. •Relationships only accounted for small variances in AHD.

8. **Relative scapular muscle activity ratios are altered in subacromial pain syndrome**. J Shoulder Elbow Surg. 2016 Jun 30. pii: S1058-2746(16)30065-9. doi: 10.1016/j.jse.2016.04.010. Michener LA[1], Sharma S[2], Cools AM[3], Timmons MK[4].

BACKGROUND: Coordinated muscle activity is needed for synchronized joint motion and stability. Characterizing relative scapular muscle activity deficits in participants with shoulder pain will provide foundational knowledge to develop rehabilitation programs. DISCUSSION: There is a disruption in coordination between the LT and SA and the UT and LT during an arm elevation task in patients with subacromial pain syndrome. The LT was part of both altered ratios, indicating the relative importance of the LT. Future research should determine if exercises aimed at restoring the dysfunctional LT/SA and UT/LT force couples are beneficial to reduce shoulder pain and disability in patients with unilateral shoulder pain.

MANUAL THERAPY

1. **EMG activity of selected rotator cuff musculature during grade III distraction and posterior glide glenohumeral mobilization: results of a pilot trial comparing painful and non-painful shoulders** Journal of Manual & Manipulative Therapy Volume 24, Issue 1, 2016 Brian T. Swanson[ab*], Brian Holst[a], John Infante[a], James Poenitzsch[a] & Alexis Ortiz[a] Objectives: The objectives of this pilot study were to investigate rotator cuff activity that may be present during grade III distraction and posterior glide mobilization of the glenohumeral (GH) joint, as well as to examine any differences in response between painful and non-painful shoulders utilizing these techniques. Discussion: GH distraction and posterior glide mobilizations have traditionally been thought of as passive treatment procedures. The results of this pilot study indicate that the supraspinatus and infraspinatus are significantly active during these techniques. Findings suggest that during these techniques, the total infra/supraspinatus EMG activity approaches the level produced while raising the arm against gravity.

2. **The Efficacy of Manual Therapy for Rotator Cuff Tendinopathy: A Systematic Review and Meta-analysis**. Desjardins-Charbonneau A[1], Roy JS, Dionne CE, Frémont P, MacDermid JC, Desmeules F. Author information-. J Orthop Sports Phys Ther 2015;45(5):330-350. Epub 26 Mar 2015. Doi:10.2519/jospt.2015.5455. Study Design Systematic review and meta-analysis. Objectives To evaluate the efficacy of manual therapy (MT) for patients with rotator cuff (RC) tendinopathy. Conclusion For patients with RC tendinopathy, based on low- to moderate-quality evidence, MT may decrease pain; however, it is unclear whether it can improve function. More methodologically sound studies are needed to make definitive conclusions. Level of Evidence Therapy, level 1a

3. **Effects of Mobilization with Movement on Pain and Range of Motion in Patients with Unilateral Shoulder Impingement Syndrome: A Randomized Controlled Trial**. J Manipulative Physiol Ther. 2015 Apr 30. pii: S0161-4754(15)00045-7. doi: 10.1016/j.jmpt.2014.12.008. Delgado-Gil JA[1], Prado-Robles E[2], Rodrigues-de-Souza DP[3], Cleland JA[4], Fernández-de-Las-Peñas C[5], Alburquerque-Sendín F[6]. OBJECTIVE: The purpose of this study was to compare the immediate effects of mobilization with movement (MWM) to a sham technique in patients with shoulder impingement syndrome. CONCLUSIONS: Patients with shoulder impingement syndrome who received 4 sessions of MWM exhibited significantly better outcomes for pain during shoulder flexion, pain-free range of shoulder flexion, maximal shoulder flexion, and maximal external rotation than those patients who were in the sham group.

4. **The Efficacy of Manual Therapy for Rotator Cuff Tendinopathy: A Systematic Review and Meta-analsis** Authors: Ariel Desjardins-Charbonneau, PT, MSc1, Jean-Sébastien Roy, PT, PhD2,3, Clermont E. Dionne, OT, PhD2,4, Pierre Frémont, MD, PhD2,5, Joy C. MacDermid, PT, PhD6, François Desmeules, PT, PhD1,7 Published: Journal of Orthopaedic & Sports Physical

Therapy, 2015, Volume: 45 Issue: 5 Pages: 330-350 doi:10.2519/jospt.2015.5455 Systematic review and meta-analysis. Objectives To evaluate the efficacy of manual therapy (MT) for patients with rotator cuff (RC) tendinopathy. Conclusion For patients with RC tendinopathy, based on low- to moderate-quality evidence, MT may decrease pain; however, it is unclear whether it can improve function. More methodologically sound studies are needed to make definitive conclusions.

5. **The efficacy of different types of mobilization techniques in patients with primary adhesive capsulitis of the shoulder: a systematic review.** Arch Phys Med Rehabil. 2015 Aug 15. pii: S0003-9993(15)01066-7. doi: 10.1016/j.apmr.2015.07.025. Noten S[1], Meeus M[2], Stassijns G[3], Van Glabbeek F[4], Verborgt O[5], Struyf F[6]. OBJECTIVE: To systematically review the literature for efficacy of isolated articular mobilization techniques in patients with primary adhesive capsulitis (AC) of the shoulder. Overall, mobilization techniques have beneficial effects in patients with primary AC of the shoulder. Due to preliminary evidence for many mobilization techniques, the Maitland's technique and the combined mobilizations seem recommended at the moment.

6. Thoracic spinal manipulation for musculoskeletal shoulder pain: can an instructional set change patient expectation and outcome? Manual Therapy, 12/23/2014 Clinical Article Riley SP, et al. Study Design: Planned secondary analysis of a randomized clinical trial. Objectives: To examine: 1) patients' baseline expectations for treatment outcome of thoracic high velocity low amplitude thrust manipulations (HVLATM) to the thoracic spine for shoulder pain; 2) if the message conveyed by the clinician changed the patients' expectation; 3) any differences in outcome based on expectation independent of messaging.; and 4) any differences in outcome for those patients whose expectations significantly changed as a result of the messaging. Conclusion: Although patients' expectations of positive outcome significantly changed when providing a positive instructional set, these changes did not translate into clinically significant

7. **Short-term effects of thoracic spinal manipulations and message conveyed by clinicians to patients with musculoskeletal shoulder symptoms:** Sean P. Riley1; Mark P. Cote1; Robin R. Leger2; Brian T. Swanson3; Vincent Tafuto1; Phillip S. Sizer4; Jean-Michel Brismée4
DOI: http://dx.doi.org/10.1179/2042618613Y.0000000066 JMMT Volume 23, Issue 1 (February 2015), pp. 3-11 **Objectives:** To evaluate the effects of high-velocity, low-amplitude thrust manipulations (HVLATMs) and various messages on patients with musculoskeletal shoulder symptoms. **Conclusion:** Patients improved following the interventions. Neither the type of HVLATM nor the message conveyed to the patients had a significant effect on the patients' improvements.

EXERCISE

1. **Effectiveness of Exercises in Reducing Pain, Improving Quality of Life and Reducing Need For Surgery:** Ellenbecker, Todd. Shoulder Rehabilitation Clin Orthop Relat Res. 2001 Jan;(382):99-107. Outcome of nonoperative management of full-thickness rotator cuff tears. Conclusion: Treatment consisted only of patient education and a home program of gentle stretching and strengthening. Patients completed the Simple Shoulder Test at the initial visit and sequentially at 6-month intervals thereafter. At an average follow-up of 2.5+/-1.6 years, 27 (59%) patients experienced improvement with nonoperative treatment, 14 (30%) patients experienced worsening, and five (11%) patients remained unchanged.

2. "**SUBACROMIAL IMPINGEMENT: Shoulder Exercise 'Prevents Surgery'**." Pulse (2012): 13. ProQuest. Web. 18 Feb. 2015. shows that versus control group, only 20% of group given home exercises for rotator cuff and scapular stabilizer muscles chose to have surgery, 63% of control chose to have surgery.

3. Pro**gressive Strengthening Exercises for Subacromial Impingement Syndrome** Clinical Journal of Sport Medicine Issue: Volume 23(1), January 2013, p 86–87 Litchfield, Robert MD Conclusion: When the surgeon discussed the option of surgery with the patients at the end of the trial,
a lower proportion of patients in the specific exercise group chose surgery. The authors note that the treatment effect that they found is similar in magnitude to that found in surgical trials of subacromial decompression.

4. **A randomized, controlled clinical trial of a treatment for shoulder pain** Ginn, Karen AView Profile; Herbert, Robert D; Khouw, Wendy; Lee, Rebecca. Physical Therapy77.8(Aug 1997): 802- 9; discussion 810-1. Conclusion: This randomized controlled trial demonstrated that a program of physical therapy aimed at restoring muscle force, length, and control at the painful shoulder produces better outcomes than does no treatment. These results highlight the importance of muscle stretching, strengthening, and reeducation in the treatment of shoulder pain of local mechanical origin and suggest that spontaneous recovery of shoulder pain cannot be expected.

5. **A specific exercise program for patients with subacromial impingement syndrome can *improve function and reduce the need for surgery.*** J Physiother. 2012;58(2):127. doi: 10.1016/S1836-9553(12)70093-0. – a specific, progressive exercise program focusing on training the rotator cuff and scapular stabilisers were effective in improving function, reducing pain, and reducing the need of surgery for patients with chronic subacromial impingement syndrome

6. **Progressive strengthening exercises for subacromial impingement syndrome.** Clin J Sport Med. 2013 Jan;23(1):86-7. doi: 10.1097/JSM.0b013e31827e9fb5. Conclusions: A 3-month specifically tailored progressive strengthening exercise program was more beneficial in improving shoulder function in subacromial impingement syndrome than were nonspecific exercises. More patients felt their treatment was successful, and fewer subsequently chose surgery.

7. **Evaluation of an exercise concept focusing on eccentric strength training of the rotator cuff for patients with subacromial impingement syndrome** Clin Rehabil. 2011 Jan;25(1):69-78. doi: 10.1177/0269215510376005. Epub 2010 Aug 16. Bernhardsson S1, Klintberg IH, Wendt GK. Conclusions: A 12-week eccentric strengthening programme targeting the rotator cuff and incorporating scapular control and correct movement pattern can be effective in decreasing pain and increasing function in patients with subacromial impingement syndrome. A randomized controlled trial is necessary to provide stronger evidence of the method. Exercises versus arthroscopic decompression in patients with subacromial impingement: a randomised, controlled study in 90 cases with a one year follow up

8. **The subacromial impingement syndrome of the shoulder treated by conventional physiotherapy, self-training, and a shoulder brace: Results of a prospective, randomized study** Markus Walther, MD, PhDa, Andreas Werner, MD, PhDb, Theresa Stahlschmidt, MDc, Rainer Woelfel, MD, PhDd, Frank Gohlke, MD, Prof.a notes: 3 groups were given 3 different treatments
– self-guided physical therapy exercises, traditional physiotherapy, and a brace. All 3 groups showed about the same level of improvement. Conclusions: All three methods led to a significant improvement in the Constant-Murley score and a significant decrease in pain levels over a period of 12 weeks. The differences among the three groups were small and not statistically significant. This confirms the effect of muscular strengthening of the rotator cuff, either by physiotherapy or by guided self-training.