Annotated Bibliography

Shoulder Impingement Syndrome

1. Von Der Heyde, R. (2011). Occupational therapy interventions for shoulder conditions: A systematic review. *American Journal of Occupational Therapy, 65*(1), 16-23. https://doi.org/10.5014/ajot.2011.09184

This source included a systematic review of twenty-two studies including 16 level one, two level two, and 4 level 3 evidence sources. The goal of this study was to find effective occupational therapy interventions for individuals with work related and clinical shoulder conditions. The conditions focused on included general shoulder pain, rotator cuff tears, frozen shoulder, shoulder instability, proximal humorous fractures, shoulder impingement syndromes, and thoracic outlet syndrome. For shoulder impingement syndrome, results found that laser therapy shows benefits when used alone. Not a lot of evidence supported the use of ultrasound, exercise, or joint mobilization. A randomized control trial showed that at home exercise programs may improve shoulder function and reduce symptoms for those who participate in continuous overhead movements

2. Marik, T., & Roll, S. (2016). Effectiveness of occupational therapy interventions for musculoskeletal shoulder conditions: A systematic review. *American Journal of Occupational Therapy, 71*. https://doi.org/10.5014/ajot.2017.023127

A systematic review was completed to evaluate the evidence for interventions to address different shoulder conditions. For shoulder impingement syndrome, evidence showed improvements in pain and functional outcomes for interventions including exercise combines with physical agent modalities such as laser and electrotherapy, neuromuscular reeducation,

steroid injections, and joint mobilizations. Multiple studies showed short term pain reduction with the use of laser treatment as well as elastic taping.

3. Kaya, E., Zinnuroglu, M., & Tugcu, I. (2010). Kinesio taping compared to physical therapy modalities for the treatment of shoulder impingement syndrome. *Clinical Rheumatology, 30,* 201-207. https://doi.org/10.1007/s10067-010-1475-6

This study compared the use of kineseo taping and physical therapy modalities to treat shoulder impingement syndrome. 30 patients were treated using kinesio taping with 25 receiving a daily program of local modalities. The disability of arm, shoulder, and hand scale was used to test the effectiveness with patients questions for pain during the night, during the day, and with motion. The scale was used before treatment and after weeks one and two. At the end of week one, the individuals receiving kinesio taping had significantly lower pain ratings when compared to the physical modality group. However, there was no significant difference in the differences when tested again at the end of the second week, but they kinesio taping showed similar effectives as it did the first week.

4. Ludwig, P., & Bramam, J. (2011). Shoulder impingement: Biomechanical considerations in rehabilitation. *Manual Therapy, 16*(1), 33-39. https://doi.org/10.1016/j.math.2010.08.004

This article discusses the motions and biomechanics of the shoulder and how these may be affected with shoulder impingement syndrome. It discusses the different musculature that affects the movement of the shoulder. The article then discusses interventions for shoulder impingement syndrome and talks about how every case is different and every individual responds differently to treatment. It gives two case examples that discuss best treatment protocols per each case. For one case, the belief of the impingement is from subacromial

overcrowding and suggests normalizing their movement patterns to reduce symptoms and exercises that target the serratus anterior and lower trapezius. The second case study deals with soft tissue tightness and talks about best evidence for intervention including strengthening exercises for the serratus anterior and all parts of the trapezius.

5. Kachingwe, A., Phillips, B., Sletten, E., & Plunkett, S. (2013). Comparison of manual therapy techniques with therapeutic exercise in the treatment of shoulder impingement: A randomized controlled pilot clinical trial. *Journal of Manual & Manipulative Therapy, 16*(4), 238-247. https://doi.org/10.1179/106698108790818314

This article included a double blind randomized controlled pilot study that was comparing three different interventions for shoulder impingent syndrome: supervised exercises, supervised exercise with glenohumeral mobilizations, and supervised exercise with a mobilization-with-movement technique. The tests used to check for effectiveness of treatment included 24-hour pain, pain with the Neers or Hawkins tests, shoulder active range of motion, and shoulder function. Results showed that the glenohumeral mobilizations and mobilization-with movement groups had the greatest percent of change pre- to post- intervention in pain. All should increase in function and the mobilization-with-movement group had the greatest increase in active range of motion.

Rotator cuff lesions/tears

1. Von Der Heyde, R. (2011). Occupational therapy interventions for shoulder conditions: A systematic review. *American Journal of Occupational Therapy, 65*(1), 16-23. https://doi.org/10.5014/ajot.2011.09184

This source included a systematic review of twenty-two studies including 16 level one, two level two, and 4 level 3 evidence sources. The goal of this study was to find effective occupational therapy interventions for individuals with work related and clinical shoulder conditions. The

conditions focused on included general shoulder pain, rotator cuff tears, frozen shoulder, shoulder instability, proximal humorous fractures, subacromial impingement syndromes, and thoracic outlet syndrome. For rotator cuff lesions/tears, this article found that not a lot of evidence supports the use of electrotherapy, steroid injections, exercise therapy, mobilization techniques acupuncture, or laser therapy as conservative treatment methods.

2. Krischak, G., Gebhard, F., Reichel, H., Friemert, B., Schneider, F., Fisser, C… & Kraus, M. (2013). A prospective randomized controlled trial comparing occupational therapy with home-based exercise in conservative treatment of rotator cuff tears. Journal of *Shoulder and Elbow Surgery, 22*(9), 1173-1179. https://doi.org/10.1016/j.jse.2013.01.008

This article discusses a pilot study of 38 adult subjects with rotator cuff tears in comparing effectiveness of treatment for occupational therapy vs an independent home-based exercise program as conservative treatment for rotator cuff tears. Occupational therapy treatment included formal therapy with supervised exercises for 8 weeks, 3x a week. The home exercise program included a booklet with detailed instructions on how to do each exercise with demonstrations and focused on strength, ROM, and restoring the control of the shoulder. Exercises were to be done for 30 minutes a day and included 4-7 exercises per day. Pre- and Post- intervention was done using a pain scale, Constant-Murley score, isokinetic strength testing in abduction and external rotation, functional limitation, clinical shoulder tests, and health related quality of life. Results showed that both treatment groups had 2/3 of patients improve in pain, ROM, Constant Murley score, and health based quality of life.

3. Abdul-Wahab, T., Betancourt, J., Hassan, F., Thani, S., Choueiri, H, Jain, N…& Verborgt, O. (2016). *Initial treatment of complete rotator cuff tear and transition to*

surgical treatment: Systematic review of the evidence. Muscle, Ligaments, and Tendons Journal, 6(1), 35-47. doi: 10.11138/mltj/2016.6.1.035

A systematic review was completed looking at the effectiveness of conservative treatment methods for rotator cuff tears. Across 11 studies, 452 patients with non-traumatic rotator cuff tears were investigated and 75% of them found that using evidence based, standardized home or therapist lead programs were effective at the 24 month follow up. For traumatic rotator cuff tears, it was found that 67% of the non-surgical group rated their results as good or excellent based upon decreased pain and increased functional outcomes while using conservative treatment programs.

4. Kuhn, J., Dunn, W., Sanders, R., Baumgarten, K., Bishop, J., Brophy, R… & Wright, R. (2013). Effectiveness of physical therapy in treating atraumatic full-thickness rotator cuff tears: A multicenter prospective cohort study. *Journal of Shoulder and Elbow Surgery, 22*(10), 1271-1379. https://doi.org/10.1016/j.jse.2013.01.026

A cohort study was completed looking at effectiveness of a therapy program developed from systematic evidence for helping to treat atraumatic full thickness rotator cuff tears. The program included 2 rehab exercise books with instructions. One was for supervised, in clinic, therapy and the other was for a home-based exercise program. The program included a variety of exercises such as ROM, stretching, and strengthening and was to be completed 3 times a week. Therapists also provided manual mobilization exercises if needed and suggested heat and cold as home modalities. The patients were to return at 6 and 12 weeks to show their results choosing from one of three options: cured, improved, or not better. Those that showed not better had the option to get surgery if they wanted it. Results showed that of the 452 patients, less than 25% of them chose to have surgery showing that conservative therapy was effective for 75% of patients.

5. Itoi, E. (2013). Rotator cuff tear: Physical examination and conservative treatment. *Journal of Orthopedic Science, 18* (2), 197-204. https://doi.org/10.1007/s00776-012-0345-2

This article discusses rotator cuff tears and treatment methods used for therapy. When discussing conservative treatment, including heat, stretching, ROM, and strengthening exercises, it goes on to discuss the effectiveness of treatment. A study was completed that looked at 54 patients who received conservative therapy for rotator cuff tears. 82% of patients were satisfied with their treatment. In the next study, 107 shoulders were treated for 6 months. If shoulder symptoms disappeared, treatment was stopped and if patients were unhappy at the end of 6 months they had the option for surgery. Only 3 patients were unhappy with conservative treatment and underwent the surgical operation. The last study discussed the study from the source above. Overall, between the three studies, results showed 73-89% of cases showed effective results using conservative treatment.

S/P rotator cuff surgery

1. Marik, T., & Roll, S. (2016). Effectiveness of occupational therapy interventions for musculoskeletal shoulder conditions: A systematic review. *American Journal of Occupational Therapy, 71*. https://doi.org/10.5014/ajot.2017.023127

A systematic review was completed to evaluate the evidence for interventions to address different shoulder conditions. For rotator cuff tears post-surgery, two level one systematic reviews showed strong evidence to support progressive tendon forces and standard rehab programs post-surgery. Two level one randomized control trials showed mixed evidence in regards to the effectiveness of accelerated vs slow progression for therapy post-surgery for rotator cuff tears. Another study showed inconclusive evidence for therapy interventions post-

surgery including continuous passive motion, aquatic therapy, and guided programs via therapist and video instruction.

2. Simank, H., Dauer, G., Schneider, S., & Loew, M. (2006). Incidence of rotator cuff tears in shoulder dislocations and results of therapy in older adults. *Archives of Orthopedic and Trauma Surgery, 126*, 135-240. https://doi.org/10.1007/s00402-005-0034-0

A study was completed that looked at the incidence of rotator cuff tears in older adults and compared treatment methods of conservative vs. surgical treatment in 87 patients with rotator cuff tears. Results showed increased function and satisfaction for individuals whom received surgical treatment over conservative therapy. In the individuals who received conservative treatment, 3 out of 87 patients had recurrences of pain and problems of their shoulder, where none of the patients whom received surgery had recurrences.

3. Conti, M., Garofalo, R., Delle Rose, G., Massazza, G., Vinci, E., Randelli, M., & Castagna, A. (2009). Post-operative rehabilitation after surgical repair of the rotator cuff. *Musculoskeletal Surgery, 93*, 55-63. https://doi.org/10.1007/s12306-009-0003-9

This article does not discuss a study, however it discusses important evidence that helps improve outcomes of therapy post rotator cuff surgery. Some of the factors that play into the type of therapy that should be provided that are discussed in the article discussed include the technique used by the surgeon, biological factors, the patients typical work and daily activities completed on a regular day, and timing of healing based on the type of repair (passive vs, assistive exercises). A four phase protocol is discussed that is general for therapy use post surgery and includes: phase 1-sling rest with passive small arm motion, phase 2-passive mobilization along with scapular mobilization and stabilizer reinforcement, phase 3-progressive active arm

mobilization along with proprioceptive exercises and core stabilization, and phase 4-full strength recovery will use of normal ADLs and work/sports integrated.

4. Brady, B., Redfern, J., Macdougal, G., & Williams, J. (2008). The addition of aquatic therapy to rehabilitation following surgical rotator cuff repair: A feasibility study. *Physiotherapy Research International, 13*(3), 153-161. https://doi.org/10.1002/pri.403

This article discusses a cohort study of 18 patients post rotator cuff surgery to test the effectiveness of aquatic physiotherapy for rehabilitation purposes. Two groups were used, one group receiving land-based therapy only and the other receiving both land based and aquatic therapy. Results showed significant improvement in ROM and Western Ontario Rotator Cuff scores in all participants, however, those undergoing aquatic therapy showed significant increases at weeks 4 and 6 compared to the land-based only program.

5. Sgroi, T., & Cilenti, M. (2018). Rotator cuff repair: Post-operative rehabilitation concepts. *Current Reviews in Musculoskeletal Medicine, 11,* 86-91. https://doi.org/10.1007/s12178-018-9462-7

This article discusses evidence based rehabilitation protocols following surgery of the rotator cuff. To begin, it discusses the importance of communication between the rehab team and the surgical team to ensure they are aware of any complications and healing potential. It then discusses proper rehab for different stages of the healing process. During the early stages, reducing pain and swelling should be prioritized with progressive restoration of ROM. To allow for proper healing and to reduce stress, ROM should be graded gradually from passive, to active assisted, to active movements. For up to 12 weeks post-surgery, excessive stress should not be placed on the shoulder. For rehab exercises, it discusses the importance of scapular muscle activation followed by isometric and then isotonic rotator cuff exercises.

S/P reverse total shoulder arthroplasty surgery

1. Boudreau, S., Boudreau, E., Higgins, L., &Wilcox, R. (2007). Rehabilitation following reverse total shoulder arthroplasty. *Journal of Orthopedic & Sports Physical Therapy, 37*(12), 734-743. https://www.jospt.org/doi/10.2519/jospt.2007.2562

This article discusses a rehab protocol for individuals who have had reverse total shoulder arthroplasty surgery. Several factors are listed that the therapist should be aware of including the preoperative shoulder status, the type of implant used, the quality of the glenoid and humeral bone, the integrity of the remaining rotator cuff, and the overall stability of the structure. The article also discusses correct postoperative care and activity levels of the affected shoulder. In regards to rehabilitation, the article discusses three key components; joint protection, deltoid function, and establishing functional and ROM expectations that are appropriate for each client. Rehab protocols for each of these components are further discusses including positioning, initial activity, and strengthening exercises. The article then goes on to discuss a specific rehabilitation program that includes four phases; immediate joint protection, active ROM/early strengthening, moderate strengthening, and independent/progressive home program.

2. Palm, K., Blazar, P., Manna, J., Serig, A., Phillips, E., Bay, C., Casey, E., & Earp, B. (2021). Feasibility, effectiveness and patient satisfaction of telerehabilitation after thumb carpometacarpal arthroplasty and reverse total shoulder arthroplasty: A pilot study. *Journal of Telemedicine and Telecare*. https://doi.org/10.1177/1357633X21999578

This study focused on comparing satisfaction of individuals status post total reverse shoulder arthroplasty and telehealth rehabilitation vs. in person rehabilitation. Both forma of rehab measured range of motion, pain, and patient reported functional outcomes. 21 individuals participated 5 receiving telehealth and 14 receiving in person therapy. Results showed no

statistically significant difference, however, individuals who participated in telehealth reported high satisfaction showing possibilities for telehealth and rehab post total reverse shoulder arthroplasty.

3. Hagen, M., Allahabadi, S., Zhang, A., Feeley, B., Grace, T., & Ma, B. (2020). A randomized single-blinded trial of early rehabilitation versus immobilization after reverse total shoulder arthroplasty. Journal of Shoulder and Elbow Surgery, 29(3), 442-450. https://doi.org/10.1016/j.jse.2019.10.005

This article looked at a study that compared early rehab with delayed rehab and the potential of increasing ROM. The delayed group was immobilized for 6 weeks whereas the early rehab group received immediate therapy with both passive and active ROM. 44 individuals were included in the delayed group and 42 in the immediate. Results showed no significant difference in ROM with both groups improving ROM generally equally.

4. Lee, J., Consigliere, P., Fawzy, E., Mariani, L., Witney-Lagen, C., Natera, L…& Levy, O. (2021). Accelerated rehabilitation following reverse total shoulder arthroplasty. Journal of Shoulder and Elbow Surgery. https://doi.org/10.1016/j.jse.2020.11.017

This article talks about accelerated rehab programs following reverse total shoulder arthroplasty versus the conservative approach of immobilization in a sling for 6 weeks before beginning rehab. 320 patients were divided into 3 groups, immobilization for 6 weeks, immobilization for 3 weeks, and no immobilization. Rehab exercises included pendulum exercises, passive assisted shoulder exercises in elevation and external rotation, stretching, passive internal rotation in abduction. Eventually the individual would progress to active assisted and eventually active exercises. Subjective shoulder value, pain, and patient satisfaction were used to compare the

groups. Results showed the accelerated rehab had greater implications for a quick return to function with fewer complications and showed both psychological and emotional advantages in patients when compared to the other two groups.

5. Wilcox, R., Arslanian, L., & Millett, P. (2005). Rehabilitation following total shoulder arthroplasty. Journal of Orthopedic and Sports Physical Therapy, 35(12), 821-836. https://www.jospt.org/doi/10.2519/jospt.2005.35.12.821

This article discusses the rehab protocol post total shoulder arthroplasty. It discuses that most programs follow Neer's basic protocol and include specific exercises that progress in difficulty as the individual gets further along in the program including passive to active Rom and eventual strengthening. This article also discusses the lack of evidence and literature that back up these programs and the limited evidence on early mobilization.

Primary/idiopathic shoulder adhesive capsulitis

1. Siegel, L., Cohen, N., & Gall, E. (1999). Adhesive capsulitis: A sticky issue. *American Family Physician, 59*(7), 1843-1850. Retrieved from https://www.aafp.org/afp/1999/0401/p1843.html

This article discusses shoulder adhesive capsulitis and treatment methods provided to prevent secondary capsulitis from occurring. The goal of therapy is discussed as being pain reduction and preserving shoulder mobility. ROM as well as modalities such as heat and cold to help relax the muscles and improve or preserve ROM. This article specifically states that intense exercises are contraindicated because of the pain that is caused. Home exercises such as codman exercises, "climbing the wall", or placing items up high to promote overhead reaching are effective but require a long therapy process. Again, this article touches on the fact that no specific treatment shows long term advantages and there are multiple contraindications and overlap in the literature.

2. Neviaser, A., & Hannafin, J. (2010). Adhesive capsulitis: A review of current treatment. *The American Journal of Sports Medicine, 38*(11), 2346-2356. https://doi.org/10.1177/0363546509348048

This article discusses the many treatments that exist for treating shoulder adhesive capsulitis. In terms of therapy, four studies were looked at. The first two studies were level 1 studies and results showed that those being treated with therapy vs. no treatment had similar outcomes, however, there was a low number of patients enrolled and patients were randomized into four groups, increasing the likelihood for errors. A level 3 study compared benign neglect therapy vs. intensive therapy. The benign neglect group engaged in pendulum exercises and active exercises that remained within their pain threshold where the intensive group experienced more strenuous treatment including both active and passive exercises that stretched beyond their pain limits. Results showed that the neglect group had 90% of participants near normal shoulder function after 2 years where the intensive group only had 63% near normal functioning. A level 4 study looked at 75 patients and treated them with a specific 4-direction stretching program that kept them within their pain limits and found that 90% of them were satisfied. Overall, results showed that gentle stretching and active range within the patients pain threshold shows the most satisfaction and improvement.

3. Le, H., Lee, S., Nazarian, A., & Rodriguez, E. (2016). Adhesive capsulitis of the shoulder: Review of the pathophysiology and current clinical treatments. *Shoulder & Elbow, 9*(2), 75-84. https://doi.org/10.1177/1758573216676786

This article discusses current treatments that exist for idiopathic shoulder adhesive capsulitis. For therapy, it discusses the controversial literature that exists on current treatment modalities. Most literature discuses early mobilization and therapy as being crucial for treatment, frequency and

technique remain controversial. For example, one article shows that 90% of patients improved with low grade pendulum and gentle exercises showed improvement where only 63% undergoing intense therapy improved, but another article showed no difference in improvement with low grade vs. high grade therapy. Therapy is generally recommended after phase 1, which is considered to be the painful phase, because patients are able to tolerate it better. The article also discusses home self-exercise programs as being an effective therapy method. Lastly, it discuses modalities that can be combined with therapy that have shown improvements including ultrasound, electrical nerve stimulation, low-level laser therapy, and hydrotherapy.

4. D'Orsi, G., Via, A., Frizziero, A., & Olivia, F. (2012). Treatment of adhesive capsulitis: A review. *Muscle, Ligaments, and Tendons Journal, 2*(2), 70-78. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3666515/

This article looks at conservative treatment for primary shoulder adhesive capsulitis. One randomized control trial included 42 patients divided into four groups looking at mobilization, mobilization and ice pack, intra-articular corticosteroid injection, and no treatment. Only few difference existed in those receiving therapy vs. no treatment. Another study concluded that phase 2 primary shoulder adhesive capsulitis has shown to have positive improvements with a shoulder stretching exercise program that lasts 3 months, with more aggressive therapy once concluded. Another level 3 article shows that exercises within the pain limits showed greater improvement than stretches and exercises past the pain limits in terms of functional outcomes and speed of recovery. In a study that looked at anterior vs. posterior glide mobilization, it was found that posterior directed joint mobilization techniques showed greater improvement for improving external rotation. A cohort study showed that a home based exercise program including self exercises twice daily showed greater improvement than shoulder mobilization by a

therapist twice weekly. In terms of physical agent modalities, deep heating in addition to stretching has shown improved performance in daily activities, pain relief, and ROM in comparison to superficial heating. Lastly, ultrasound, massage, iontophoresis, and phonophoresis has shown to reduce likelihood of favorable outcomes and therefore are discouraged as treatment methods.

5. Johnson, A., Godges, J., Zimmerman, G., & Ounanian, L. (2007). The effect of anterior versus posterior glide joint mobilization on external rotation range of motion in patients with shoulder adhesive capsulitis. *Journal of Orthopedic & Sports Physical Therapy, 37*(3), 88-99. https://www.jospt.org/doi/10.2519/jospt.2007.2307

This study looked at the difference between anterior vs. posterior glide joint mobilization techniques on individuals with primary shoulder adhesive capsulitis and compared the effectiveness of improving external rotation. Twenty patients were included that had specific ROM deficits for external shoulder rotation. Subjects received 6 sessions of therapy including therapeutic ultrasound, joint mobilization, and upper-body exercises. Half of the group received posterior joint mobilization whereas the other half received anterior joint glides. ROM of shoulder external rotation was measured before and after each treatment session. Initially there was no difference between the two groups, however by the third session individuals in the anterior mobilization group had a mean improvement of external rotation ROM of 3 degrees whereas the posterior mobilization group had a mean improvement of 31.3 degrees. Both groups should a significant decrease in pain, however the posterior group showed greater improvement in ROM for external rotation of the shoulder.

6. Guler-Uysal, F., & Kozanoglu, E. (2004). Comparison of the early response to two method of rehabilitation in adhesive capsulitis. *Swiss Medicine Weekly, 134*, 353-358.

Retrieved from

http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.566.3638&rep=rep1&type=pdf

This article compares two treatment methods for individuals with shoulder adhesive capsulitis. 40 patients were randomized into two treatment groups: one receiving the Cyriax approach including deep friction massage and mobilization exercises three times a week and the other receiving therapy daily including hot pack and short wave diathermy. Both groups also ended treatments with stretching and were given an home exercise program. 95% of individuals in the Cyriax group and 65% in the therapy group reached sufficient ROM in the shoulder by the end including improvements in shoulder flexion, inner and outward rotation and decreased pain.

Secondary shoulder adhesive capsulitis

1. Von Der Heyde, R. (2011). Occupational therapy interventions for shoulder conditions: A systematic review. *American Journal of Occupational Therapy, 65*(1), 16-23. https://doi.org/10.5014/ajot.2011.09184

This source included a systematic review of twenty-two studies including 16 level one, two level two, and 4 level 3 evidence sources. The goal of this study was to find effective occupational therapy interventions for individuals with work related and clinical shoulder conditions. The conditions focused on included general shoulder pain, rotator cuff tears, frozen shoulder, shoulder instability, proximal humorous fractures, shoulder impingement syndromes, and thoracic outlet syndrome. For secondary shoulder adhesive capsulitis, evidence showed that deep friction massage and joint mobilization, also known as the Cyriax method, shoulder improvements in glenohumeral flexion and rotation with decreased pain. Evidence also showed that high grade mobilization showed greater improvement in patients when compared to low grade mobilization. Lastly, another study showed that for idiopathic shoulder adhesive capsulitis,

less aggressive exercises including the pendulum, active exercises in range that doesn't cause pain, and tolerable functional activities showed the greatest improvement.

2. Kelley, M., Mcclure, P., & Leggin, B. (2009). Frozen shoulder: Evidence and a proposed model guiding rehabilitation. *Journal of Orthopedic and Sports Physical Therapy, 39*(2), 135-148. https://www.jospt.org/doi/10.2519/jospt.2009.2916

This article discusses both primary and secondary shoulder adhesive capsulitis and different treatment methods that can be used. It does not however divide the treatment up based on primary or secondary diagnosis, but instead provides an overall approach to shoulder adhesive capsulitis as a whole. In terms of therapy, the article discusses the importance of patient education on the disorder and home exercise programs that can be useful. Modalities, stretching, and joint mobilization are the main treatment methods hit on for therapy purposes.

3. Chan, H., Pua, P., & How, C. (2017). Physical therapy in the management of frozen shoulder. *Singapore Medical Journal, 58*(12), 685-689. doi: 10.11622/smedj.2017107

This article discusses both primary and secondary frozen shoulder and different therapy exercises that can be applied with this condition. It breaks up exercises into the three phases: freezing, frozen, and thawing. For the freezing stage, gentle stretching for short durations can be done without going past the patients pain threshold. For the frozen stage, strengthening exercises should be completed including scapular retraction, posterior capsule stretch, and isometric shoulder external rotation. During the thawing stage, as the individual begins to return to their previous ROM gradually, stretching and strengthening exercises can increase in intensity and duration.

4. Horst, R., Maicki, T., Trabka, R., Albrecht, S., Schmidt, K., Metel, S., & Piekartz, H. (2017). Activity vs. structural-oriented treatment approach for frozen shoulder: A

randomized controlled trial. *Clinical Rehabilitation, 31*(5), 686-695. https://doi.org/10.1177/0269215516687613

This article discusses a randomized control study including 66 patinets that compared intervention for frozen shoulder with one group receiving therapy including performance of activities such as ADLs (functional therapy), and another receiving manual therapy and neuromuscular facilitation. Therapy lasted 10 days for 30 minutes each day. ROM, muscle function tests, pains scale, and modified upper extremity motor activity log were used before and after treatment to compare improvements. Results showed that the activity oriented group showed greater performance in daily life activities and functional outcomes.

5. Harada, Y., Iwahori, Y., Kajita, Y., Saito, Y., Takahashi, R., & Deie, M. (2020). Secondary frozen shoulder after traumatic anterior shoulder instability. Journal of Shoulder and Elbow Surgery International, 4(1), 72-76. https://doi.org/10.1016/j.jses.2019.10.100

This study included 12 patient who were diagnosed with secondary frozen shoulder. 10 patients underwent conservative therapy including ROM exercises, strengthening, and mobilization and after 26-82 months none of them had recurrent instability and ROM scores showed significant improvement.

Long head bicipital tendinitis

1. Krupp, R., Kevern, M., Gaines, M., Kotara, S., & Singleton, S. (2009). Long head of the biceps tendon pain: Differential diagnosis and treatment. J*ournal of Orthopedic & Sports Physical Therapy,* 39(2), 55-70. https://www.jospt.org/doi/10.2519/jospt.2009.2802

This article looks at nonoperative treatment for long head bicipital tendinitis. The rehabilitation process is described in phases and the therapist should follow these phases for conservative treatment. Phase one includes pain management and restoring full PROM. Phase two includes AROM exercises and beginning stages of strengthening. Phase three consists of rotator cuff and periscapular strengthening specifically trying to improve dynamic stability. When the patient has completed these phases, they may then focus on more powerful and high speed exercises. Each treatment plan is unique and specific to the individual.

2. Genc, E., & Duymaz, T. Effectiveness of kinesio taping in bicipital tendinitis treatment: A randomized controlled trial. *Annals of Clinical and Analytical Medicine*. Retrieved from https://www.researchgate.net/profile/Erdinc-Genc/publication/340502608_Effectiveness_of_kinesio_taping_in_bicipital_tendinitis_treatment_A_randomized_controlled_trial/links/5e8d8a59299bf1307985ebc2/Effectiveness-of-kinesio-taping-in-bicipital-tendinitis-treatment-A-randomized-controlled-trial.pdf

This study looked at the effectiveness of kineseo taping for treatment of long head bicipital tendinitis. 80 individuals with 40 randomly split into a control group and the other 40 receiving KT taping. In the KT group, taping and exercises were used as treatment. In the control group, only exercises were given. Exercises included 5 days a week for 6 weeks and included elbow flexion and extension with the arm adducted with weight. KT tape was applied twice a week for 6 weeks with a tonus reduction muscle application and fascia correction. Pain, function, and quality of life were measured. Results showed a statistically significant decrease in pain intensity of those in the KT group. DASH scored showed a statistically significant difference in function of the KT group with a less significant score in the control group.

3. Chrugay, C. (2009). Diagnosis and treatment of biceps tendinitis and tendinosis. *American Family Physician*, 80(5), 470-476. Retrieved from https://www.aafp.org/afp/2009/0901/p470.html

This article discusses both surgical and conservative treatment for bicipital tendinitis. For conservative treatment, it discusses the goal as controlling inflammation and selling. Rest from overhead motions shows positive implication for improving pain and inflammation. Stretches and TENS has also shown improvements. Specific stretching and ROM exercises through therapy help regain ROM and strengthen the muscles. Rehab occurs in four phases and includes rest, exercises for stretching of the scapula, rotator cuff, and posterior capsule, strengthening, and a progressively difficult throwing program for athletes. Exercises should begin once the shoulder is pain free.

4. Wilk, K., and Hooks, T. (2016). The painful long head of the biceps brachii: Nonoperative treatment approaches. *Clinical in Sports Medicine*, 35(1), 75-92. Retrieved from https://epublications.marquette.edu/cgi/viewcontent.cgi?article=1089&context=phys_therapy_fac

This article discusses phases of the rehab program for bicipital tendinitis and associated pain. The first phase, the acute phase, is to decrease pain and inflammation, normalize motion and muscle tone and restore stability. Physical agent modalities may be used including ice, laser therapy, and iontophoresis. AAROM, light stretching, and joint mobilization may be used. The second phase known as the intermediate phase includes continuing to progress with strengthening exercises, increase flexibility, mobility, and ROM of the elbow and shoulder. More aggressive isotonic exercises are used. The third phase includes the advance strengthening phase

and aggressive strengthening is used to build endurance and power. Phase four includes returning to activity.

5. Ahrens, P., & Boileau, P. (207). The long head of biceps and associated tendinopathy. The Journal of Bone and Joint Surgery, 89(8). https://doi.org/10.1302/0301-620X.89B8.19278

This article discusses a review that looked at 26 trials of physiotherapy for shoulder conditions. Although it mentions that there were no articles that looked specifically at LHB, there was a trend in mobilization and exercises for strengthening. It also discusses that no evidence proves therapeutic ultrasound or laser to be useful for LHB tendinitis.

A-C joint sprain

1. Mazzocca, A., Arciero, R., & Bicos, J. (2007). Evaluation and treatment of acromioclavicular joint injuries. The American Journal of Sports Medicine, 35(2), 316-329. https://doi.org/10.1177/0363546506298022

This article discusses both operative and non-operative treatments for A-C joint sprains with different studies to support each method. Each grade of sprain is described with the best treatment options. For conservative treatment, a 4-phase rehabilitation program is discussed. The first phase includes pain control and immediate protective ROM and isometric exercises. Phase 2 includes strengthening exercises through isotonic movements. Phase 3 includes functional participation to increase strength, power, endurance, and neuromuscular control. Phase 4 includes returning to normal activity.

2. Simovitch, R., Sanders, B., Ozbayder, M., Lavery, K., & Warner, J. (2009). Acromioclavicular joint injuries: Diagnosis and management. *Journal of the American Academy of Orthopedic Surgeons*, 17(4), 207-219. Retrieved from

https://journals.lww.com/jaaos/fulltext/2009/04000/acromioclavicular_joint_injuries__diagnosis_and.2.aspx

This article discusses nonsurgical treatment with a period of immobilization for both type 1 and type 2 sprains. Once pain has subsided, a rehab program is implemented including focus of passive and active assist ROM, followed by an isometric strengthening program. Eventually the individual will receive isotonic strengthening exercises. Contact sports and heavy lifting should be eliminated for 2-3 months.

3. Gladstone, J., Wilk, K., & Andrews, J. (1997). Nonoperative treatment of acromioclavicular joint injuries. *Operative Techniques in Sports Medicine, 5*(2), 78-87. https://doi.org/10.1016/S1060-1872(97)80018-4

This article discusses the use of conservative treatment for type 1 and 2 AC joint sprains and operative treatment for type 3 and higher. For conservative treatment, it has been shown beneficial to follow therapy and rehab programs that address range of motion, strength, and neuromuscular control. A specific rehab program consists of 4 phases. Phase one includes pain control, isometric exercise, and protective ROM. Phase 2 includes exercises for strengthening purposes including isotonic motions and PNF exercises. Phase 3 includes functional participation without restriction to increase strength, power, and endurance, and phase 4 includes returing back to previous sports and activities.

4. Harris, J., Griesser, M., & Jones, G. (n.d.). Acromioclavicular joint and clavicle injuries. *The Systematic Approach to Shoulder Rehabilitation,* 142-157. Retrieved from https://www.researchgate.net/profile/Joshua-Harris-9/publication/264993394_Acromioclavicular_Joint_and_Clavicle_Injuries/links/53fb3f4f0cf27c365cf08ac2/Acromioclavicular-Joint-and-Clavicle-Injuries.pdf

This article discusses a rehab program for AC joint sprains but states that all of the evidence that exists is low level. Rehab programs are described with a common goal of returning to participation of previous activities and sports in a pain free zone with full ROM and strength. To begin, the program must work to reduce pain. Once pain is managed, the rehab process should address ROM in a protected range to prevent stiffness along with isometric strengthening for prevention of atrophy. Gradually the program should include strengthening with isotonic exercises, and eventually sports drills and activities.

5. Shamus, J., & Shamus, E. (1997). A taping technique for the treatment of acromioclavicular joint sprains: A case study. *Journal of Orthopedic & Sports Physical Therapy, 25*(6), 390-394. https://www.jospt.org/doi/10.2519/jospt.1997.25.6.390

This article describes a taping technique for AC joint sprains to help reduce pain and therefore allow for rehabilitation programs to begin earlier. Two case studies were completed in which the specific taping protocol was tested. Treatment included the taping protocol along with pain free active assist ROM exercises and isometrics. Progressive resistive exercises were eventually implemented ending with isokinetic exercises as the patient progressed. Results showed decreased pain and increased ROM and strength in both patients.

SLAP lesion/tear (labral)

1. Blanchette, M., Pham, A., Grenier, J. (2015). Conservative treatment of a rock climber with a SLAP lesion: A case report. *The Journal of the Canadian Chiropractic Association, 59*(3), 238-244. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4593038/

This article is a case study that discusses conservative treatment for a SLAP lesion that occurred in a 26 year old male. After four weeks of conservative therapy including soft tissue mobilization

of the muscles, tendons, ligaments, and joints affected, active release techniques, and strengthening exercises of the external shoulder rotators with and the serratus anterior using TheraBand. After just four treatments the patient reported that he was pain free and was able to return to his normal activities.

2. Dodson, C., & Altchek, D. (2009). SLAP lesions: An update on recognition and treatment. *Journal of Orthopedic & Sports Physical Therapy, 39*(2), 71-80. https://www.jospt.org/doi/10.2519/jospt.2009.2850

This article discusses treatment options for individuals with SLAP lesions. Conservative therapy is mentioned and treatment is focused on restoring normal motion of the shoulder. This is done by strengthening the muscles of the shoulder girdle, with emphasis placed on stretching the posterior capsule to restore internal rotation. Eventually the client is able to advance to strengthening exercises focusing on the trunk, core, rotator cuff, and scapular muscles. The goal of conservative treatment is states as reducing pain, improving motion, and restoring strength.

3. Wilk, K., Reinold, M., Dugas, J., Arrigo, C., Moser, M., & Andrews, J. (2005). Current concepts in the recognition and treatment of superior labral (SLAP) lesions. *Journal of Orthopedic & Sports Physical Therapy, 35*(5), 273-291. https://www.jospt.org/doi/10.2519/jospt.2005.35.5.273

This article discusses SLAP lesions and the different treatment options. For rehabilitation programs, emphasis is placed on restoring and improving dynamic stability of the GH joint while preventing adding aversive stresses. The rehab process is dependent on each client and the mechanism of injury. For those who had a compressive injury, weightbearing should be avoided to prevent compression of the superior labrum. For those who have sustained SLAP lesions from traction injuries, heavy resistive or eccentric bicep contractions should be avoided. Those with

overuse injuries should avoid external rotation of the shoulder during the healing process. The rehabilitation protocol outlined in this article consists of 4 phases: motion phase, intermediate phase, dynamic/advanced strengthening phase, and return to activity phase.

4. Edwards, S., Lee, J., Bell, J., Packer, J., Ahmad, C., Levine, W., Bigliani, L., & Blaine, T. (2010). Nonoperative treatment of superior labrum anterior posterior tears: Improvements in pain, function, and quality of life. *The American Journal of Sports Medicine, 38*(7), 1456-1461. doi: 10.1177/0363546510370937

This article looked at nonoperative treatment for individuals with SLAP lesions. 19 individuals who received nonoperative treatment for SLAP lesions were questioned using the following assessments: Short Form 36, European Quality of Life measure, visual analog pain scale, American Shoulder and Elbow Surgeons score, and simple shoulder test. These individuals received therapy focusing on scapular stabilization exercises and stretching of the posterior capsule. After a 3.1 year average follow up, function, quality of life, pain relief, and return to sport all increased significantly.

5. Katz, L., Hsu, S., Miller, S., Richmond, J., Khetia, E., Kohli, N., & Curtis, A. (2009). Poor outcomes after SLAP repair: Descriptive analysis and prognosis. *Arthroscopy: The Journal of Arthroscopic & Related Surgery, 25*(8), 849-855. https://doi.org/10.1016/j.arthro.2009.02.022

This article explored patient satisfaction with different forms of treatment for SLAP lesions. Conservative treatment including therapy and revision surgery. Conservative treatment included therapy. Results showed 29% satisfied after conservative treatment and 62% satisfied after surgery.

Bankart lesion/tear (labral)

1. Spiegl, U., Ryf, C., Hepp, P., & Rillmann, P. (2013). Evaluation of a treatment algorithm for acute traumatic osseous bankart lesions resulting from first time dislocation of the shoulder with a two year follow-up. *BMC Musculoskeletal Disorders, 14*. https://doi.org/10.1186/1471-2474-14-305

This study looked at 12 patients who received conservative treatment for Bankart lesions. Treatment included immobilization in a sling for 6 weeks with assisted PROM avoiding external rotation after 2 weeks and active assisted and passive external rotation started after 6 weeks. After 8 weeks, strengthening exercises were incorporated with non-contact sports being allowed after 12 weeks. The Rowe score was used to measure outcomes with the results being excellent in 58%, good in 25% and moderate in 17% with 25% reporting instability.

2. McDonough, A., & Funk, L. (2013). Critical reflection of the advanced rehabilitation of an elite rugby league player sustaining a posterior bankart lesion. *Physical Therapy in Sport, 14*(1), 60-67. https://doi.org/10.1016/j.ptsp.2012.01.002

This article discusses a case study of a rugby player who sustained a Bankart lesion of his right shoulder and the rehab protocol that was followed. Therapy was implemented with many different steps starting with early mobilization as tolerated. Next, the goal was to restore normal kinematics of the shoulder with a focus on posture, ROM, and treating tightness. Strengthening was then completed starting with isometrics and progressing to isotonic exercises with the use of resistance bands. Weightbearing was incorporated for shoulder stability and eventually cable weight resistance was used. The individual was able to return to play 15 weeks after the injury and there was an increase in strength and ROM.

3. Kim, Y., & So, W. (2019). Effects of rehabilitation in bankart lesion in non-athletes: A report of three cases. Open Medicine, 14, 369-375. doi: 10.1515/med-2019-0037

This article looked at 3 cases of bankart lesions and a rehab program that was followed. The program consisted of passive and active Rom exercises initially 3 times a day. The second phase consisted of strength exercises of light intensity with resistance bands including shoulder flexion, extension, internal and external rotation 10 times each 2-3 times a day. Weightbearing exercises were also performed for shoulder stability. The third phase included strengthening through weights with pullups and lat pulldowns cautioned against. These started slow with low weight and eventually increased in weight and speed. In the fourth phase dynamic shoulder exercises and functional tasks were introduced. Results showed increased ROM, strength, and decreased pain.

4. Jakobsen, B., Johannsen, H., Suder, P., & Sojbjerg, J. (2007). Primary repair versus conservative treatment of first-time traumatic anterior dislocation of the shoulder: A randomized study with 10-year follow-up. Arthroscopy: *The Journal of Arthroscopic & Related Surgery, 23*(2), 118-123. https://doi.org/10.1016/j.arthro.2006.11.004

This study compared conservative vs surgical repair of Bankart lesions. 76 patients were randomly placed into surgical or conservative groups with the conservative group being placed in a sling for a week followed by a rehab protocol. At a 2 year follow up, 21 of the patients treated conservatively had recurrence whereas only one patient had recurrence in the surgical repair group.

5. Arciero, R., Wheller, J., Ryan, J., & McBride, J. (1994). Arthroscopic bankart repair versus nonoperative treatment for acute, initial anterior shoulder dislocations. *The American Journal of Sports Medicine, 22*(5), 589-594. https://doi.org/10.1177/036354659402200504

This study compared nonoperative treatment vs surgical repair for Bankart lesions. 36 individuals were included and the nonoperative group received a month of immobilization followed by a rehab program. Group 2 underwent arthroscopic repair followed by the immobilization and rehab program. Group 1 consisting of 15 individuals had 12 with recurrent instability and group 2, 21 patients, had 3 patients with recurrent instability.

Thoracic outlet syndrome

1. Von Der Heyde, R. (2011). Occupational therapy interventions for shoulder conditions: A systematic review. *American Journal of Occupational Therapy, 65*(1), 16-23. https://doi.org/10.5014/ajot.2011.09184

This source included a systematic review of twenty-two studies including 16 level one, two level two, and 4 level 3 evidence sources. The goal of this study was to find effective occupational therapy interventions for individuals with work related and clinical shoulder conditions. The conditions focused on included general shoulder pain, rotator cuff tears, frozen shoulder, shoulder instability, proximal humorous fractures, shoulder impingement syndromes, and thoracic outlet syndrome. For thoracic outlet syndrome, evidence showed that home exercise programs helped to reduce pain. This was shown through the use of a level 3 cross sectional study

2. Lindgren, K. (1997). Conservative treatment of thoracic outlet syndrome: A 2-year follow-up. *Archives of Physical Medicine and Rehabilitation, 78*(4), 373-378. https://doi.org/10.1016/S0003-9993(97)90228-8

This study looked at conservative treatment via IPR and home exercise program for TOS. 119 patients participated and intervention included. Exercises, stretching, and strengthening were all used as a means for therapy. Outcomes were measured via normalized motions of the cervical spine and upper thoracic cavity, frequency of return to work, and objective satisfaction of

patients. 88% of patients claimed to be satisfied and 73% returned to work. 80% had normalized range of motion after treatment.

3. Kuhn, J., Lebus, G., & Bible, J. (2015). Thoracic Outlet Syndrome. *Journal of the American Academy of Orthopedic Surgeons, 23*(4), 222-232. doi: 10.5435/JAAOS-D-13-00215

This article discusses treatment methods for individuals with TOS. It is described that nonsurgical, conservative treatment is the initial strategy with therapy being a crucial part. A study was mentioned in which 25/42 patients with TOS reported symptomatic relief after 6 months of therapy. Therapy intervention should include patient education on positioning, posture, relaxation techniques, modifying activities and the environment to help the individual to be successful such as limiting repetitive overhead motions, and stretching, ROM exercises, and tendon gliding.

4. Watson, L., Pizzari, T., & Balster, S. (2010). Thoracic outlet syndrome part 2: Conservative management of thoracic outlet. *Manual Therapy, 15*(4), 305-314. https://doi.org/10.1016/j.math.2010.03.002

This article discusses the rehabilitative protocol for TOS. It states that the rehab process should begin with establishing normal scapula control while resting. Next, focus should be on maintaining that control while in motion and then in motion with load. Exercises should begin with abduction in low range, then eventually move into higher range and flexion in order to properly retrain the functional movement pattern. “scapula setting” can be used as a way to retrain the muscles by having the individual actively place the scapula in a normal position and hold it. Some exercises may require facilitation including upper, middle, and lower traps and serratus anterior.

5. Novak, C., Collins, D., & Mackinnon, S (1995). Outcome following conservative management of thoracic outlet syndrome. *The Journal of Hand Surgery, 20*(40), 542-548. https://doi.org/10.1016/S0363-5023(05)80264-3

This article discusses a study that was completed measuring outcomes of conservative therapy treatment for TOS. 42 patients were included and telephone questionnaires were asked 6 months post therapy. 25 out of the 42 patients reported symptomatic relief, 10 were the same, and 7 reported that their symptoms were worse. 16 patients reports that they were able to fully return to work and recreation with 8 reporting restrictions. Neck and shoulder symptoms were improved in 38 patients, and demographic information showed that those who didn't improve had comorbidities including obesity or carpal tunnel, or were receiving workers compensation.