

The Benefits of Osteopathic Treatment for Overhead Athletes

Connor Myers: C170916

National Academy of Osteopathy

Diploma in Osteopathic Manual Practice

Dr. Shawn Pourgol

August 3<sup>rd</sup>, 2018

## **Introduction**

People have been playing sport since the beginning of time and while some things have changed, many of the same barriers continue to hinder athletes in current sport. Injuries continue to be an issue and although rehabilitation and prevention both continue to advance, injuries will always happen. Specifically, overhead athletes are known to have a lot of shoulder and elbow injuries on top of the other normal, more common injuries amongst other types of athletes. What exactly classifies an overhead athlete? Anyone who plays a sport that involves their arm moving above their head. Some examples of overhead sports include baseball, softball, volleyball, tennis, swimming, basketball, etc. Many of the overhead sports involve similar movements; throwing, swinging, and circumduction – there are only so many movements you can physically do with your arm overhead and this leads to many of the same muscles, ligaments, and tendons being worked and overused. Some structures commonly overused include the flexors and extensors of the forearm, rotator cuff muscles, trapezius, biceps, and deltoid muscles, ulnar collateral ligament (UCL), the glenohumeral joint of the shoulder, and the ulnar and median nerves (Moore et. al., 2011). Another common theme in overhead athletes is rotational force. To create power in sports such as baseball, tennis, and volleyball a great deal of work must be done by the hips and core to rotate the trunk and transfer power into the arm. Muscles that assist in hip and trunk rotation include the gluteus minimus and medius, tensor fascia lata, rectus abdominus, transverse abdominus, and the external and internal obliques (Oliver et. al., 2015). The overuse of these muscles can lead to some serious problems that arise from muscle tightness, leading to a decrease in flexibility and a potential limited range of motion in the associated joints. Osteopathic techniques such as joint mobilizations, soft tissue therapy and muscle energy technique (MET) can be used to effectively prevent injuries, rehabilitate injuries and improve functionality of overhead athletes.

## **Joint Mobilizations**

The joint capsule is responsible for movements of each joint in each direction including internal rotation, external rotation, abduction, adduction, flexion, and extension (Moore et. al., 2011). All the joints in the body can become obstructed in the capsule due to a few different reasons. Stiffness can be caused by inactivity, overuse, arthritis, and different medical conditions. Essentially, what causes the joint to be hypomobile is the joint capsule tightening around the bones that are trying to move. The common solution for this is to stretch the joint capsule by having joint mobilizations performed and working the joint through its regular range of motion to increase and restore the normal movement for the patient.

In overhead athletes, the most common joints that become restricted and cause issues, are the shoulder joint (glenohumeral joint) and hip joint (acetabulofemoral joint). The glenohumeral joint is the most mobile joint in the body and can move in any direction so restriction for it and restriction for another joint are two completely different things. To say the shoulder joint becomes restricted simply means that it can still move in each direction, it just cannot move as far as it

should be able to for proper functioning. On the other hand, the acetabulofemoral joint is normally much more stable. It is commonly used for rotation in many overhead sports so it can easily become restricted simply from doing the same motion repeatedly (Oliver et. al., 2015). In most joints traction is a very useful technique that can begin to get the joint moving and can also prepare the joint for more aggressive mobilizations. Traction is essentially pulling the joint away from the joint capsule to stretch that area and desensitize the nociceptors (pain receptors) in the area which takes away the pain associated with the stiffness and allows to work on improving ROM of the joint. A posterior glide, which stretches the back of the joint works great to increase range in the joint. Other mobilizations include anterior, inferior, superior, medial, and lateral glides which all work to free up the joint space.

It is common for overhead athletes, specifically throwers to see a reduction in internal rotation of their dominant shoulder when compared to their non-dominant shoulder (Wilk et. al., 2016). Internal rotation limitations can be attributed to posterior glenohumeral joint capsular tightness which can be improved with posterior glides of the glenohumeral joint. The surrounding muscles can be lengthened and strengthened as well, but if the joint capsule is causing the restriction, it has to be stretched before functional improvements can be made. The hip, similarly can become quite restricted in the joint and posterior and inferior glides along with traction can make great improvements with hip mobility. Once the hip mobility is attained, the strengthening of the hip flexors, rotators, abductors and adductors begins (Short et. al., 2017).

### **Soft Tissue Therapy**

Muscular restrictions can hamper body movement just as much or possibly more than joint restrictions. Soft tissue therapy focuses mainly on tight muscles and restoring proper functioning to the muscles. There are several techniques that are used as part of soft tissue therapy. The goal is to increase blood flow to the area initially to warm it up and then to start breaking down the tight tissue to restore it to its normal state so that it can properly function.

Once again, some common muscles that become tight for overhead athletes include the rotator cuff muscles; subscapularis, infraspinatus, supraspinatus and teres minor, shoulder and neck muscles; deltoids, trapezius, biceps, triceps, and the hip rotators; gluteus medius, piriformis, and tensor fascia lata. An osteopathic approach accounts for the fact that all of these muscles, along with the other muscles of the body, are interdependent on one another and affect each other directly. It is important that each muscle is not seen as a particular issue, rather as one piece of the puzzle (Cole et. al., 2015). Often times, if one of these muscle groups is tight, there is a great possibility that there is a lack of strength from an opposing muscle group which is not doing its job properly.

Joint mobilizations and soft tissue therapy work well with one another to prepare the body to begin to move in its functional range. As the joint begins to loosen, the muscles must also begin

to release. Less aggressive treatment techniques like effleurage and petrissage which are both superficial treatments aimed at increasing blood flow to the affected area, are great ways to repair tissues that are damaged, however, another technique that can really help to work through muscles and fascial tissue is myofascial release. The fascial tissue in the body connect basically all of the other structures together so it is important to keep in mind when we are working on improving mobility. One of the most effective methods for myofascial release is simply holding pressure on a trigger point and waiting for the tissue to let go and lengthen itself (Moraska et. al., 2015). The unfortunate part is that this type of treatment is not permanent, but it can become permanent if coupled with the appropriate supplementation and frequency of treatments. Another form of soft tissue therapy that is becoming quite popular is known as self-induced myofascial release (SMR). SMR is when the patient is able to apply pressure to areas of tightness using things such as a foam roller or a lacrosse ball (MacDonald et. al., 2013). Even just a short period of time per day using a foam roller has shown great benefit in improving muscle and joint mobility. Instrument assisted soft tissue mobilization (IASTM) is a different technique that uses metal instruments to break down scar tissue, decrease inflammation and begin to move the tissues. MacDonald et. al. (2013) also show that IASTM has significantly increased range of motion of the shoulder in horizontal adduction of the glenohumeral joint (+11.1 degrees) and internal rotation of the posterior shoulder (+4.8 degrees) in baseball players (Laudner et. al., 2014).

### **Muscle Energy Technique (MET)**

MET is the most important technique of the three and there has been evidence that suggests it is a very powerful tool for helping athletes both improve performance vastly and decrease the risk of injury. Joint mobility and muscle movement can both be increased with the use of MET. MET is a technique that uses a contraction of the muscle that you are trying to stretch, followed by a relaxation of that same muscle and then a stretch of the muscle. The idea is that by contracting the muscle first, the nociceptors that occupy the area become desensitized and then the muscle is able to stretch further into its range, giving the overall increase. The other benefit from MET is that there is an opportunity to also work on improving strength through the muscle ranges by having the patient resist against the therapist's force. When using MET, it is especially important to always keep in mind the kinetic chain and think of the result after a treatment. Therapists should always check in to make sure that the right muscle groups were mobilized while others were stabilized where it was called for. Working with the body, it is always important to have a feel for what the body tissues are experiencing – knowing when a stretch is at it's end and also to determine if there is pain prior to the end of a stretch.

The kinetic chain is hugely important for overhead athletes due to the relationship between rotational and linear force production throughout the execution of an overhead movement. Throwers rely greatly on rotation from the hip and shoulder and require muscles in the entire area from hip to shoulder to be working with one another. MET can be used to assess where the restrictions are and can then be used to stretch the restrictions. External and internal obliques are

muscles that not many people realize are important in throwing but they both have a role in rotating the trunk which is needed to move along with the hips and shoulder. Similarly, the scapula is also very important in the movement of throwing or swinging a racquet and there are a number of muscles that are involved with the movement of the scapula (Oliver et. al., 2015). The trapezius, levator scapulae, biceps, serratus anterior, rhomboids and rotator cuff muscles, along with others all work to move the scapula in different directions. If the scapula is not moving properly, MET can be used to determine the muscles that are restricted and stretch them so the scapula can move freely and allow the overhead motion to be pain free (Cole et. al., 2015).

Joint mobility is affected largely by two factors; the joint capsule and the surrounding muscles. Each joint has either one predominant muscle or a group of muscles that move them so if the joint capsule is free, but those muscles are tight, there will still be limited movement. The knees have the quadriceps, hamstrings and gastrocnemius, the hips have the hip flexors, gluteus medius tensor fascia latae, the elbow has flexors and extensors, biceps and triceps, and the shoulders have the deltoitd, trapezius and the rotator cuff muscles. The point here is that for each joint, there are multiple muscles that can be causing restriction. MET and joint mobilizations work great together and they can be used as a tool for athletes who are worried about repetitive stress (all athletes) caused by using the same muscles repeatedly. Static stretching can help but by desensitizing the muscles, MET is much more effective and can double to also provide stability to muscles and joints where it is required (Moore et. al., 2011).

### **Conclusion**

Osteopathic techniques are very beneficial to overhead athletes by decreasing the time on the sideline due to injury and improving performance while in the game. Athletes are always looking for the next great advancement they can make but often forget to take care of their bodies, not realizing it is their greatest tool available to them. An osteopath can assess the muscles according to which sport an athlete plays and can give advice on how to isolate and strengthen those muscles while also increasing the range of motion in joints throughout the body and creating a faster, stronger and more flexible athlete. Manual therapy is proven to be effective when dealing with stiffness, tightness, and overall pain reduction. A body that moves in unison is a body that can function properly. Osteopathic treatment can do so much for athletes and it is only a matter of time before sports osteopaths are common place for both professional and amateur sports teams.

## References

- Cole, S., Sanderson, T., MacNeill, B., & Sum, J. (2015, June 15). A Proposal for Functional Screening of the Throwing Kinetic Chain in Baseball Pitchers to Assess Shoulder and Elbow Injury Risk. Retrieved June 10, 2018, from <https://openventio.org/Volume1-Issue5/A-Proposal-for-Functional-Screening-of-the-Throwing-Kinetic-Chain-in-Baseball-Pitchers-to-Assess-Shoulder-and-Elbow-Injury-Risk-SEMOJ-1-122.pdf>
- Laudner, K., Compton, B. D., McLoda, T. A., & Walters, C. M. (2014, February). Retrieved April 20, 2018, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3924602/>
- MacDonald, G., Penney, M., Mullaley, M., Cuconato, A., Drake, C., Behm, D. & Button, D. (2013, March). An Acute Bout of Self-Myofascial Release Increases Range of ... The Journal of Strength & Conditioning Research. Retrieved May 10, 2018, from [https://journals.lww.com/nsca-jscr/Fulltext/2013/03000/An\\_Acute\\_Bout\\_of\\_Self\\_Myofascial\\_Release\\_Increases.34.aspx](https://journals.lww.com/nsca-jscr/Fulltext/2013/03000/An_Acute_Bout_of_Self_Myofascial_Release_Increases.34.aspx)
- Moore, S. D., Laudner, K. G., Mcloda, T. A., & Shaffer, M. A. (2011). The Immediate Effects of Muscle Energy Technique on Posterior Shoulder Tightness: A Randomized Controlled Trial. *Journal of Orthopaedic & Sports Physical Therapy*, 41(6), 400-407. doi:10.2519/jospt.2011.3292
- Moraska, A. F., Stenerson, L., Butryn, N., Krutsch, J. P., Schmiede, S. J., & Mann, J. D. (2015, February). Retrieved June 13, 2018, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4286457/>
- Oliver, G., Weimar, W., & Plummer, H. (2015, June). Gluteus Medius and Scapula Muscle Activations in Youth... : The Journal of Strength & Conditioning Research. Retrieved June 21, 2018, from [https://journals.lww.com/nsca-jscr/Fulltext/2015/06000/Gluteus\\_Medius\\_and\\_Scapula\\_Muscle\\_Activations\\_in.5.aspx](https://journals.lww.com/nsca-jscr/Fulltext/2015/06000/Gluteus_Medius_and_Scapula_Muscle_Activations_in.5.aspx)
- Short, S., Short, G., Strack, D., Anloague, P., & Brewster, B. (2017, November). Retrieved April 20, 2018, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5675375/>
- Wilk, K., Arrigo, C., Hooks, T., & Andrews, J. (2016, March 11). Rehabilitation of the Overhead Throwing Athlete: There Is More to It Than Just External Rotation/Internal Rotation Strengthening. Retrieved May 10, 2018, from <https://www.sciencedirect.com/science/article/pii/S1934148215012058>