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Cyclo-ssage Pro-Personal Therapy System (PPTS)
Positively impacts rehabilitation for post traumatic shoulder stiffness and instability.
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Introduction

The shoulder joints in conjunction with the upper limbs serve to propel the body during motion. Although shoulder injuries are graded mild to severe, any degree of shoulder injury will inhibit activities of daily living significantly. Rehabilitation for shoulder injuries is essential for rapid return of function and to prevent complications of prolonged joint immobilisation such as stiffness.
In this article we discuss the positive impacts that Cyclo-ssage PPTS contributes to in the rehabilitation of statistically significant post traumatic shoulder stiffness.
Infra glenoid ligamentous tightness and abduction restriction moments significantly compromise the return of normal range of motion post injury. Failure of the clinician to recognise the pathology, as well as inadequate rehabilitation, predisposes to chronic stiffness that impairs essential daily functions, throwing sports speed, pitch angles and generation of back pain.

Mechanisms of shoulder injuries

Mechanical falls, overuse from repetitive work and sports are the primary mechanisms of traumatic shoulder injuries that predispose to stiffness. Low energy mechanical falls result in a range of injuries, which are often classified as sprains of the shoulder soft tissues (muscles, joint capsule and ligaments). High-energy injuries result in fractures and dislocation.
Repetitive injuries are associated with attrition of the cuff tendons and eventual cuff tears.

Anatomy of the shoulder joint

The shoulder joint is composed of the head of the humerus bone in articulation with the glenoid fossa of the scapular bone. The glenoid labrum is a fibro-cartilaginous structure that serves to deepen the shoulder joint by its attachment to the bony rim of the glenoid, thus affording the shoulder a far more conforming articular surface. The capsule envelopes the shoulder joint, and receives fenestrations of the shoulder ligaments. The ligamentous support of the shoulder joint is both robust, and a delicate interlock of nutrition dependent sinews.
The rotator cuff muscles (supraspinatus, infraspinatus, teres minor and the subscapularis) are the adjacent lining of the shoulder joint capsule (the envelope of shoulder joint). They function alongside other stabilisers of the shoulder joint.

Stabilisers of the shoulder

Stability of the shoulder is dependent on dynamic and static mechanisms. Dynamic stability is a function of the several muscles. Firstly, the rotator cuff muscles, as they produce a concavity-compression effect on the shoulder joint. Secondly, a superficial muscle layer responsible for balancing the external torques around the shoulder joint. This layer consists of the biceps, deltoid, pectoralis major, triceps and latissimus dorsi. Thirdly, the scapulo-thoracic muscles that orientate the glenoid fossa of the scapular onto the head of the humerus in order to ensure optimal load transfer at the shoulder joint. This layer consists of the rhomboid major and minor, levator scapulae, trapezius and latissimus muscles. Static stability of the shoulder joint is a function of anatomical elements. An intact glenoid labrum, normal gleno-humeral version and a conforming gleno-humeral articulation are essential. Additionally, functionally balanced and intact ligaments are required for maintenance of shoulder stability. Finally, adhesion properties of the synovial fluid also contribute to ensure optimal static shoulder stability.

Pathophysiology of post traumatic stiffness of the shoulder joint

The joint capsule and the rotator cuff muscles exhibit exquisite pliability that deteriorates with the aging process. Several studies have reported the correlation of nutritional deprivation of the cuff tendons with the aging process as the highest risk index for post traumatic stiffness. As such the risk is highest in the age groups above 40 years old.

In the immediate injury period, the initial swelling and inflammation of the cuff tendon following injury is the primary cause of pain. The increased size of the (secondary to swelling) of the cuff tendons, ligaments and joint capsules reduces there excursion limits as well as impinging on adjacent bony prominences such as the acromion. The increased contact between the swollen shoulder soft tissues and the bony margins further deprives the tissues of their blood supply, compounding matters and increasing the patient's pain.

Defunctioning of the shoulder stabilisers develops subsequently and constitutes the initiation of the early phase of increased joint loading, increased wear and eventual osteoarthritis.
When repetitive injuries instigate attrition wear of the cuff tendons with the attendant complication of eventual cuff tears, the shoulder centre of rotation is displaced medially. This places the further demands on the second layer of shoulder stabiliser (pectorals major, deltoid, trapezius)

Cyclo-ssage PPTS rehabilitation for post traumatic shoulder stiffness and instability

Flow mechanics studies reveal that the PPTS firstly functions to restore blood flow to the injured cuff muscles preferentially. The rapid delivery of nutrition rich blood coupled with the removal of the high concentrations of cellular signal pain messengers relieves shoulder stiffness within the early phase treatment duration protocol.
Reduction in cuff diameter, predominantly due to resolution of cuff inflammation ensures less impingement in the acromial space and greater strength within the cuff tendon at the phase two stage of the treatment protocol. Realignment of collagen molecules within the ligamentous and tendinous sites of injury is unique to the Cyclo-ssage Cycloidal therapy as seen with the PPTS.
Ultrasound guided assessments of the orientation of the capsule, cuff tendons and ligaments serves to guide therapeutic pulsatile foci. Cuff insertion therapy is particularly successful in isolated post traumatic stiffness secondary to tendinopathy.

The combination of PPTS therapy and stretching exercises during PPTS generate highest success rates, and is the cornerstone of the stage three phase of the treatment protocol. However, commencement of stretching should only be initiated after completion of the initial two phases of the treatment protocol. Isolated stretching has been widely reported to exacerbate cuff tears, prolonging stiffness and healing times.
Uniquely, the PPTS are suited for treatments with the patient supine and prone, thus allowing insertion as well as mid-substance cuff treatments with the vertebral spine fully supported.

Deltoid muscle focus strengthening procedures on the PPTS ensures the cuff muscles continue to experience high flow mechanics while exertion of the deltoid generate improved mechanical strength and restoration of the shoulder centre of motion. Restoration of the shoulder centre of rotation is the priority for overcoming post traumatic instability. Combination augmentation procedures are undertaken with maximisation of the deltoid strength. These include PAD (Pectoral and Deltoid), PAL (Pectoral and Latissumus), LAP (Latissumus and pectoral).
Scapulo-thoracic training is essential on completion of augmentation protocols in order to optimise the orientation of the shoulder and further reduce the recurrence of post traumatic stiffness.

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