

--A common orthopedic shoulder problem is rotator cuff and/or biceps tendinitis with associated Impingement of the tendons between the acromion and the head and greater tubercle of the humerus. Trauma or poor mechanics of the shoulder over time leads to wear on the cuff muscles and their tendons. This can be compounded by an acromial process which is downward sloping on its lateral margins. Trauma, occupational factors, fault posture, emotional factors leading to poor movement, and altered mechanics are all causes. With tendon swelling and Inflammation the subacromial joint space is effectively decreased and the compressive forces on the tendon Increase. Impingement of the supraspinatus tendon and the long head of the biceps is produced by forward elevation of the humerus against the anterior surface of the acromion and the coracoacromial ligament. This subacromial (subdeltoid) bursa rests on the upper surface of the supraspinatus muscle between it and the acromion and coracoacromial ligament, acting as an accessory joint, allowing movement of the humerus under the arch, especially an abduction. Bursitis and supraspinatus tendinitis are concomitant problems. Tendon impingement causes further shoulder range of motion loss. Pain ensues with associated muscle guarding and further restriction.

Cuff degeneration occurs in the area referred to as the critical zone. This is the area of vascular anastomosis within the conjoined tendon of the rotator cuff. The vascular anastomosis is created by the suprascapular and subscapular arteries that come from the muscle cephalad to the joint uniting with the branch from the anterior circumflex artery which enters from the bone. The traction on this vascular system from a dependent arm or from muscular pull stretches the conjoined tendon, mechanically affected this anastomosis and making the critical zone relatively ischemic. In treating large numbers of these patients, this author has noticed conventional physical therapy is often ineffective and occasionally harmful, especially when carried out with disregard for grace and higher quality of movement. Better results are achieved with spatial dynamic exercises and therapeutic eurythmy. The biomechanical understanding of this becomes clear if one understands shoulder and scapular mechanics. There are 6 movements of the scapula: Elevation (cephalad movement), depression (caudal movement), protraction (forward movement), retraction (pulling the shoulder blades together), upward rotation, and downward rotation. When the arm is flexed or abducted the scapula protracts and upward rotates. In upward rotation the glenohumeral fossa is tipped upward. The lateral angle moves laterally and anteriorly around the rib cage. Because the axis of rotation is at the level of the acromial clavicular joint, the majority of the scapula moves downward. (1) This synchronized movement of scapular rotation with arm movement is referred to as the glenohumeral rhythm. Without adequate scapular movement on the chest wall, the humeral head will impinge on the acromial process and the coracoacromial ligament limiting arm elevation at 90 degrees. In order for full arm range of motion to be achieved the humerus must externally rotate and the scapula upwardly rotate. (2) This is accomplished by the coordinated movement of the rotator cuff, the deltoid muscle, and the scapular stabilizers (primarily trapezius and serratus anterior). The levator scapula muscle is more active in downward rotation; as the arm moves back down to the side the levator scapula must elevate the scapula while rotating the glenoid cavity downward.

Pathological movement of the scapula appears to be a causative factor for chronic tendinitis. With arm elevation the majority of the scapula must move caudally and the inferior lateral angle should glide laterally, (figure 1) otherwise the acromion and coracoacromial ligament will block the movement of the head of the humerus and Impinge the tendons between these structures. Patients with rotator cuff and biceps

pathology, as well as scapulothoracic strain have all been seen to inappropriately use the levator scapula during upward rotation leading to its chronic tenderness, hypertrophy, and often myofascial trigger points. This further contributes to an abnormal lifting of the scapula. These patients have been noted with arm elevation and abduction to elevate the scapula as a unit (shrug shoulders), rather than permitting the scapula to drop and roll laterally as it should.

Classical physical therapy instructs the patient to stretch the involved muscles. Improve joint range of motion, and then strengthen the appropriate area. However in these patients where their quality of movement is wrong, with an inappropriate synchronization of muscle groups, repetitive shoulder movement and muscle strengthening with awkward mechanics only serves to further compound the pain and limitation. Joint range of motion must be done correctly followed by a coordinated muscle strengthening program to stabilize the area. This author has found it most beneficial to begin with spatial dynamics to develop the correct imagination of muscle movement and for strengthening then to progress on to a brief course of therapeutic eurythmy. Then, using these principals, do conventional muscle strengthening in a new way.

Spatial dynamics (developed by Jaimen McMillan) combines the in depth understanding of Bothmer exercises, joint mechanics, and movement gestalt (movement streams). Count Fritz von Bothmer was the individual who Rudolph Steiner asked to teach the gymnastics in the first Waldorf school. He developed approximately 30 exercises to practice the archetypal relationship of the free human being to space. (1) Spatial dynamics, the study of space, was more recently developed to study the human developmental stages of movement. It uses the Bothmer exercises and others for pedagogy and the development of free movement. Spatial dynamics also incorporates the movement streams described by M. Hauschka, M.D. (3) She illustrates the movement stream of the shoulder as a massage technique (figure 2). Here again it can be seen in a different way that with arm movement there must be a streaming down from the head into the arms and the scapula must drop and move laterally.

The movement stream, or direction of movement intent, of the scapula is a current which comes down from the head across the scapula, down the arms, extending out the 5th digit. There is a counter movement that comes back to the head which begins in the thumb and extends up the lateral aspect of the arm. The axis of movement of the scapula (and metabolic limb movement in general) originates from the solar plexus. Correct movement should be bi-directional. When one reaches for an object there is a movement from the patient's center to the periphery towards the object. When only this half of the movement is accomplished the scapula will rise, tend to follow the shoulder and hand towards the object of one's intent, creating poor mechanics. This must be counterbalanced by the counter movement which occurs as the patient invokes the movement gestalt from the object (periphery) to their center. This is the picture of the will moving from the periphery towards us.

This illustrates the limbs as outlined by Rudolf Steiner in Study of Man, (figure 3) "The limbs system has its center in the whole circumference. The center of the limb system is a sphere; namely; the opposite of a point, the surface of a sphere. The center is really everywhere; hence you can turn in every direction and radii ray in from all sides. They unite themselves in you". (4) This understanding of bi-directional movement can also be understood through eurythmy gesture M. This brings balance between the metabolic will and nerve sense systems

and through this the will is strengthened.

In patients with altered scapular mechanics, instead of correctly moving from the metabolic will center in the solar plexus they displace this entire axis of movement up to the head and therefore move the entire arm and shoulder girdle, as if the movement was originating there. This is often further augmented by significant anterior neck carriage. Here, a process that should be metabolic limb has been deviated to the nerve sense pole. This appears due to a weakness in the middle or rhythmic system area. The chest is held back, the ribs often compress downward, there is poor respiratory excursion. Physiologically this picture of rhythmic system weakness is also seen with the ischemia of the shoulder tendons as the vascular anastomosis in the critical zone is compromised. This is a "heart attack picture" of the shoulder. This is seen in the lack of rhythm and fluidity of the shoulder, which as it progresses can move as far as adhesive capsulitis, where the shoulder is cold, fixed, and painful. This illustrates a nerve sense process in the wrong place. The soul gesture of the patient usually mirrors this disturbed relationship of the periphery to the center. They are frequently pushing out from their center and forcing their will activities at the world without allowing their interest or intent to draw their movements from the periphery. In order to allow the tendons to heal, the continual trauma of altered mechanics must be corrected by the patient. First, depression must be treated if present. Severe depression causes all movement to be centrifugal-towards the self. Learning to reach in a way which allows the will to be drawn with one's own intent from the periphery and the world can help the milder cases of depression but often medications are needed first. When both movement streams, the one originating from the center and the other from the periphery, can be done at the same time the scapula will begin to drop and move laterally with arm movement. A rich imaginative picture must be developed with the patient in order for them to achieve this. Joint positions can be achieved through the intellect but muscles are fluid and can only be moved correctly through imagination. (5)

After learning to reach correctly, several other basic Spatial Dynamics exercises are needed to reestablish a balance in 3-fold man. The power of the metabolic limb system needs its axis moved down from the head to the solar plexus area. The head must rest quietly on the shoulder and the rib cage and chest area must expand and become fluid in movement to allow the harmonizing of these 2 poles. Some specific exercises are beneficial:

1. Correction of the arch of the foot. Flat feet are associated with anterior compression of the chest. Increased thoracic kyphosis, and limited scapular movement.
2. Develop a relaxed upright posture. This can be done by learning to push down against the earth with the feet. This particular movement will unlock the knees. Locked knees cause increased lumbar lordosis and often increased thoracic kyphosis.
3. Instruction in correct etheric streams of movement. This includes the stream from the medial arch of the foot to the knee, along the sartorius muscle to the ASIS of the pelvis, across the flank and out the arms. The patient also needs to experience the stream from the head down to the chest, giving the scapulas weight.

4. Correct the posture of the pelvis, rib cage, neck, etc.
5. Give weight to the elbows.

Shoulder range of motion exercises are also necessary but need to be coupled with spatial dynamic awareness including moving from the solar plexus, being drawn to the periphery, experiencing the arc of movement with shoulder stretches in each plan; Then progression onto light weights or Theraband with this same awareness. Because of the frequent associated involvement of the cervical and thoracic area, spatial dynamic neck rolls are also indicated. It has been this author's experience that in order for the patient to be able to do spatial dynamics they need a rich imaginative life or have participated actively in sports. At times training in high school athletics can give images that can be called upon to relearn correct body mechanics. After 4-6 spatial dynamic sessions the patient is usually able to progress on to therapeutic eurythmy, the details of which will be outlined in a later article. In order for these exercises to be effective, the patient needs a strong desire to get well and a willingness to make the necessary movement changes.

Although frequently prescribed, non-steroidal anti-inflammatory agents are seldom beneficial. The initial problem is a cold, hardened joint. The inflammatory response is only a secondary reaction. Cortisone injections to the biceps tendon sheath or subacromial bursa can give some patients immediate palliative relief but if altered shoulder mechanics persist the problem will recur. Occasionally acromioplasty is necessary to increase the joint space giving the tendon more room.

Onopordon comp (Onopordon, Primula, Hyocyamus) is a good constitutional remedy for this condition. It strengthens the heart and rhythmic systems so they can balance the metabolic limb impulses with those of the nerve sense pole. Aurum comp ointment (aurum, myrrha, olibanum) over the chest and shoulder joint also strengthens the middle sphere, improves fluidity, etc. The organ prep musculus deltoideus complex D6, Injected sub Q over the shoulder joint gives the body the correct picture of the shoulder and its associated muscles and is given by this author 1-3 times per week. When there is a cold frozen shoulder, Viscum Mali 3% ointment is beneficial, or in the more severe cases Potency series 1 sub Q in the shoulder area will improve flexibility and decrease contractures. In this author's experience Tendo Allium Cepa injectable has rarely been beneficial. Osteopathic manipulation to the chest, shoulder girdle, and neck is a good adjunct to treatment.

The simplistic notion that remedies, massage, and manipulation alone are therapeutically adequate belies the tremendous insight and anthroposophical scope of understanding of shoulder mechanics and rehabilitation. For adequate recovery the patient must become a conscious active participant through the addition of movement therapy through spatial dynamic exercises. Once the patient has developed correct quality of movement they then have the imagination

to progress on to therapeutic eurythmy or a strengthening program.

References

1. Von Bothmer, Fritz, *Gymnastic Education Philosophisch-Anthroposophischer Verlag Dornach Switzerland 1959*
2. Callitet, Rene, *Shoulder Pain Edition 2, pp 4-37 F.A. Davis Company*
3. Hauschka, Margarethe, *Rhythmical Massage as Indicated by Ita Wegman, M.D., p 95, Mercury Press, Spring Valley 1990.*
4. Steiner, Rudolf , *Course for Young Doctors (GA 3 If lecture VI), Mercury Press, Spring Valley, New York 1994*
5. Steiner, Rudolf, *Study of Man (GA 293) pp 139-141 Rudolph Steiner Press London 1966*