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Scapular Training Track

When treating patients with rotator cuff problems, it is important that patients have proper biomechanical function of the scapula to allow for proximal stability.

Many exercises and activities of daily living may cause repetitive strain to the shoulder girdle and cervical spine if the scapula does not provide dynamic stabilization when the arm is elevated. In one's ADLs or occupation, repetitive strain is also a problem due to excessive shoulder shrugging during driving, typing, or carrying objects.

Although most patients with shoulder lesions would likely benefit from exercises for the scapula, the shoulder abduction test may be used to document an abnormal movement pattern and to monitor improvement.

Shoulder Abduction Test

This test is of value in identifying poor scapular rhythm and imbalance in the scapular stabilizers.

In a seated position, with arms at side, elbows flexed to 90^{o} (thumbs up), the patient is told to slowly raise (abduct) the arms toward the ceiling.

The test is positive if there is prominent shoulder hiking (elevation) before 60^{o} of abduction.

What to Look For

1. Abduction occurs at the glenohumeral (GH) joint first; scapula should "set," but not appreciably rotate in the early phase of abduction. *Early rotation may suggest inhibited middle trapezius*.
2. Elevation of the shoulder girdle before 60^{o} of GH abduction suggests inhibition of lower trapezius as well as overactive upper trapezius and/or levator scapulae. Excessive tone along the ridge of the shoulder would have similar implications.
3. Scapular rhythm should be smooth and coordinated; if not, the patient may have poor scapular control.
4. Scapulohumeral ratio averages roughly 1:2 (1:1 when the scapula is actually rotating).
5. Winging of the scapula would suggest weak serratus anterior.

If the upper trapezius does not have a smooth contour along the ridge of the shoulder and instead is flat (so-called "Gothic shoulders"), the upper trapezius may be hypertonic.

Commentary

If the shoulder "hikes" during the initial phase of arm abduction, a typical imbalance is suggested. The levator scapula and upper trapezius may be overactive and/or contracting too early in the ROM.

The middle and lower trapezius may be inhibited or weak. Proximal stability is compromised, resulting in abnormal dynamic stresses to the shoulder girdle complex during either routine ADL (e.g., someone reaching into a cupboard) or repetitive activities related to work or sports. This may lead to shoulder impingement. Also, static loads may be altered thus affecting the neck.

Training Track for Inhibited Lower and Middle Trapezius

The patient is advanced through the following steps, which may span several weeks of treatment.

Step 1: Animate the target muscle and make patient aware of control.

Awareness is increased through facilitation of the lower and middle trapezius.
There are a variety of techniques to help the patient focus on the target muscle and to increase control.

- Gently scratch the muscle
- Alter the pressure on the inferior or superior angle of the scapula
- Verbal cues
- Tonal cues (or changing the pitch of your voice as you direct the patient)

The following are manual resistance exercises for improving kinesthetic awareness and conscious control of lower scapular muscles. These can be done with the patient prone or side-lying in the following sequence.

- Passive mobilization
- Active assisted mobilization
- Active self-mobilization
- Resisted isometric and concentric efforts
- Resisted eccentric efforts

Step 2: Teach home exercises emphasizing control.

Once patients have gained some body awareness and voluntary control, they are ready for home activities to drill the movement program into the nervous system. Exercises should progress from conscious perception to conscious control to automatic coordination.

A. *Shoulder rolls seated and standing for functional range exploration.*

B. *"Snow Angels" for lower and middle trapezius.* (Done with arms externally rotated, little fingers leading, in the following positions: supine, seated with back against a wall for biofeedback, standing with back against a wall, and standing without a wall.)

C. *Prone scapula retraction for middle trapezius.* This is done lying over a pillow placed lengthwise along the sternum. The patient slowly pulls the shoulder blades together. (Done with arms at side, arms at 90° abduction, and arms over head.)

Note: Exercises should be performed in a functional training range that maintains the quality of movement or proximal stability. Patients should limit themselves to a range of motion in which their shoulders *do not hike*. If they have trouble with hiking as they start shoulder abduction, have them do the angels supine with their shoulder passively prepositioned in a slight "hike" to further discourage recruitment of the upper trapezius.

Training hints: Patients must appreciate that the quality of the movement is more important than the number of re-petitions. This is very different from how most people view exercise and so time must be spent re-educating patients. It is very important that the movements prescribed are done properly with as little recruitment of other muscles as possible. The first goal for patients is to gain control. Later, they will work on increasing endurance. Increasing strength is not always necessary.

Also, remind patients that they can do as many repetitions as necessary to feel the burn of targeted muscle, but they must stop if the quality of the movement is altered in any way.

Patients should maintain good postural "sets," with no shoulder hiking or chin poking, while maintaining a sternal lift whenever possible.

Always have the patient demonstrate the exercise at the next office visit to correct any errors that may have been adopted.

Step 3: Emphasize exercises and positions that mimic work or sports.

Identify key shoulder movements used during frequently performed work or sports activities. Design repetitive exercises that mimic these activities, continuing to emphasize scapular stability.

Step 4: Give ergonomic advice.

Patients should be educated about poor postures that may be perpetuating factors. Examples include keyboard height and the use of armrests.

They should also be trained in the proper positions when using health club equipment.

- Rowing machine: Try to have axis of rowing machine above shoulder level, if possible.
- Lat Pull Down: Position body so that shoulders are back and head is not jutting forward. Pre-position shoulder blade with inferior glide. Pull down without pushing head forward or losing inferior position of scapulae.
- Other exercises: If the patient is performing other exercise activities, it may be necessary to reposition the scapula with each repetition, e.g., straight arm dips, biceps curls, or cable exercises for external rotation.

Troubleshooting for isolating lower trapezius

If progress is slow or there is difficulty in activating the lower trapezius, the following areas may need attention.

- AC, SC, GH, scapulothoracic, cervical, rib and upper thoracic joint restrictions may need to be addressed. Fixations in these joints may not only alter the normal mechanics of the shoulder girdle, but may also alter the proprioceptive feedback from these joints.

- Try relaxing the upper trapezius and levator scapula.

- Evaluate pec major and subscapularis for shortening; employ relaxation and stretching techniques as necessary.

Summary: Training Track for Inhibited Lower and Middle Trapezius

1. "Animate" the muscle by bringing it to the conscious attention of the patient.

2. Give exercises that require repetitive actions emphasizing control in a safe training range (a range which the patient shows the least amount of recruitment).

3. Train the patient in a number of different positions, eventually choosing positions that mimic work or sports demands.

4. Give patient ergonomic advice.

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References

Babyar, S. R., Excessive scapular motion in individuals recovering from painful and stiff shoulders: causes and treatment strategies. *Physical Therapy.* 1996;76(3):226-238.

Liebenson, C., ed. *Rehabilitation of the Spine: A Practitioner's Manual.* Baltimore, Md.: Williams & Wilkins; 1996.