

Serratus Anterior Training Track

Proper evaluation and training of a weak or inhibited serratus anterior is essential to the rehabilitation of many shoulder conditions.

Evaluate the patient for weakness or inhibition of the serratus anterior. Weakness may be detected by doing a serratus muscle test.

Weakness, as well as poor control and inhibition, can be seen with the shoulder-abduction and push-up tests (see Scapular Training Track). In this section, we will concentrate on the push-up test.

Push-Up Test

This test is of value in identifying serratus anterior weakness and poor coordination of the scapula stabilizers.

The patient is asked to lie, face down (or stand with palms on a wall) and slowly perform a standard push-up.

A test is positive if there is

- scapular retraction (indicating overactive rhomboids),
- scapular winging (indicating inhibited serratus anterior), and/or
- scapular elevation (indicating overactive upper trapezius and/or levator scapulae).

Training Track

The patient is advanced through a series of steps that may span several weeks of treatment.

1. “Animate” the target muscle

Improve patient’s kinesthetic awareness and conscious control of the serratus anterior. Have the patient do resistive “terminal” punch (protraction) and/or serratus “flare” and look for winging.

Stimulate the serratus during this activity (by applying resistance directly to the scapula, preventing protraction, and by goading the muscle directly) and continue until the patient can contract the serratus and reduce the winging to some degree. (Note: Serratus anterior is maximally active at the farthest reach, or “terminal” end of the punch.)

2. In-office and home exercises emphasizing control

Have the patient do resisted serratus terminal “punches” or push-ups with a plus, first isometrically, then through a range of motion, emphasizing concentric and eccentric control. Resisted PNF cross patterns can be introduced.

At home, patients should exercise within a safe functional range. Patients are advised to do multiple scapular protractions (“punches”) seated, standing, in wall-lean and quadruped positions, and serratus flares--stopping in each case when they lose “form.”

NOTE: All exercise activities should emphasize appropriate form (no recruiting, e.g., shoulder hiking) and a good postural set (chin tucked in, neutral spine, sternal lift).

3. Build endurance and strength

Once the patient can demonstrate good control, increase the repetitions or add these resistance exercises (still insisting on good form).

- Supine punches with hand weights (3-5 pounds) and/or tubing or cable punches, at home or in the gym
- Wall push-up with plus, slightly flexing and extending elbows
- Quadruped push-up with plus--slightly flexing and extending elbows

4. Build speed of contraction and coordination.

Give the patient activities that require balance and response to an unstable environment.

Continue Push-up Track.

- Quadruped push-up with plus--hand/heel rock
- Tripod “terminal” push-up plus position
- Push-up with plus on a gym ball or rocker board.

5. Emphasize exercises and positions that mimic work or sports.

Have patients demonstrate upper-extremity activities from their work or sport that require scapular stabilization (e.g., putting dishes away or serving a tennis ball). Turn these into repetitive, stylized home exercises—continuing to emphasize form.

Troubleshooting for Isolating the Serratus Anterior

If progress is slow or there is difficulty in isolating the serratus anterior, do the following:

- Check again for joint restrictions in upper and mid-thoracic spine, rib fixations, and scapulothoracic restriction. Adjust accordingly.
- Evaluate for antagonist tightness (rhomboid) or synergist overactivity (upper traps, levator scapulae, pecs). Use therapeutic stretching techniques in the office and as home care.
- Advise patient on avoiding slumped posture.

Summary of Treatment

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 in which the patient shows the least amount of recruitment).
3. Increase reps and resistance to build endurance and strength as well as control.
4. Add complex maneuvers on unstable surfaces to build coordination and speed of contraction.
5. Train the patient in a number of different positions, eventually choosing positions that mimic work or sports demands

(See Appendix.)

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REFERENCES

Abdulazeem K, Irrgang JJ, Whitney SL. Nonoperative management of secondard shoulder impingement syndrome. J Orthopaedic Sports Phys Ther 1993;17(5):212-24.

Paine RM, Voight M. The role of the scapula. J Orthopaedic Sports Phys Ther 1993;18(1):386-91.

Post M, ed. Surgery of the Shoulder. Belle RM, Hawkins RJ. Dynamic electromyographic analysis of the shoulder muscles during rotational and scapular strengthening exercises. St. Louis, MO: Mosby; 1990.

Saidoff DC, McDonough AL. Critical Pathways in Therapeutic Intervention: Upper Extremity. St. Louis, MO: Mosby; 1997.

The serratus anterior is most active at the terminal phase of shoulder protraction (or “punch”). It is important that the patient become “aware” of this muscle so that it fully engages while exercising.

The clinician can both facilitate an inhibited serratus and increase the patient’s kinesthetic awareness by goading the muscle or providing resistance to the anterior edge of the scapula while resisting the patient’s terminal punch.



Only after the muscle is properly facilitated can the patient be given terminal punches as a home exercise. Tubing (shown here) or a hand weight can be used to add resistance. It is important that the patient continue to *concentrate* on achieving activation of the serratus. The patient should stand erect with the sternum lifted up and out and should avoid hiking the shoulder or poking out the chin.



Terminal push-ups (AKA, push-ups with a “plus”) can be done against a wall (shown here) or on the floor from the knees or on toes. The patient fully protracts the arms, creating a slight arch to the mid back and then returns to neutral. It is not necessary to go down through a complete push-up. The clinician should carefully check to see that the middle trapezius and serratus anterior muscles are active.



A tripod or one-armed terminal push-up (remember, this is not a complete push-up) will create a labile environment. This will help train speed of contraction and overall coordination. As always, the clinician should periodically check that proper form is used and that the target muscles are activated.



Still more challenging is to do the push-up with a plus on a rocker or wobble board. By internally rotating the arms (not shown here), it is possible to create a further demand on the serratus anterior.

