Use of Taping for Support Following Clavicular Fracture

Colleen N. Gulick, BS (BioE), EIT (MechE), CSCS
Dawn T. Gulick, PhD, PT, ATC, CSCS

ABSTRACT
Numerous shoulder injuries require the use of a sling for support and protection. However, prolonged immobilization can result in joint and soft tissue limitations that can negatively influence mobility. The use of a clinical taping technique may have benefit with in providing support to the upper extremity and facilitating early mobilization.

Key Words: athletic taping, shoulder support, shoulder mobility

CLINICAL PROBLEM
Clavicular fractures, acromioclavicular separations, shoulder subluxations, rotator cuff, and labral injuries/repairs are just a few of the conditions for which a shoulder sling is recommended. The purpose of a sling is to facilitate healing by unweighting the injured structures. Yet a sling use does not always put the upper extremity in an optimal position. Shoulder adduction with internal rotation has been reported to increase soft tissue tension on several structures of the shoulder.

Studies have suggested that the positioning of traditional slings may inhibit healing. In addition, prolonged immobilization can result in the formation of adhesions and muscle shortening, causing restriction of both arthrokinematic and osteokinematic movements.

The application of various taping techniques can be used to support a joint or structure while it is in the process of healing. Theoretically, tape can serve as an elastic lever to absorb load, improve the length-tension relationship of a muscle, and provide postural correction. Although the technique described here applies to a clavicular fracture, the principles may be applied to other shoulder conditions that could benefit from dynamic assistance. Dynamic Tape (PosturePals Pty Ltd, Port Vila, Vanuatu, South Pacific) is an elastic tape that was specifically selected for this technique due to its strong recoil properties. The highly elastic, laminated construction stretches in all directions. Thus, when placed in a stretched form along the line of pull of a specific muscle, the recoil of the tape provides mechanical assistance to decrease the tension/load on the injured tissue. The tape is reported to store energy as elastic potential energy roughly equal to the amount of energy that was used to stretch it. The stored, elastic potential energy is then converted to kinetic energy as muscle shortening occurs.

The case presented is a mid-clavicular fracture in a 24-year-old elite, female cyclist involved in a velocodrome crash while racing (Figure 1). The athlete’s clavicle was repaired with an open reduction internal fixation procedure within 24 hours of injury (Figure 2). Following surgery, the athlete’s affected upper extremity was placed in a traditional sling. Though early mobilization and facilitation of local muscular activity are critical for a prompt return to sport, soft tissue stresses in the acute phase of healing can produce pain and inhibit early gains in motion and strength. Although typical sling use for a clavicular fracture is 1 to 3 weeks, through the application of Dynamic Tape, this athlete was able to increase her painfree shoulder range of motion and eliminate the use of the sling by postoperative day 6. With the application of the tape, the athlete was able to position her hands on the handlebars of a stationary bike to resume training. This task could not be safely performed with the sling. The technique used on this athlete was based on principles of kinesiology. The choice to tape the supraspinatus was based on the desire to maintain glenohumeral approximation, ie, superior pull on the humerus. The decision to tape the scapula was to optimize the position and enhance the length-tension relationship associated with normal scapulohumeral rhythm. To date, this taping technique has not been reported in the literature. The technique used was as follows (Figure 3):

INTERVENTION

Strip #1:
Position: sitting with arm is 90° of scapulation
Measurement: a measurement from the supraspinatus muscle proximal attachment (most medial portion of the supraspinous fossa) to the distal attachment (greater tubercle of the humerus) was taken and measured 24 cm. A piece of Dynamic Tape was cut to this length.

Tape application: the tape was secured approximately 2 cm distal to the greater tubercle and stretched along the path of the supraspinatus to approximately 2 cm medial to the suprascapular fossa (Figure 4). Total distance covered by the tape was 26.5 cm; this represented an estimated 10% stretch of the tape.

Strip #2:
Position: sitting with bilateral scapular adduction and retraction. This position was selected to place the rhomboids and scapular stabilizers in a shortened position.
Measurement: a measurement from the axillary border of the right scapula to the axillary border of the left scapula at the T4-5

Figure 1. Radiograph of a fractured clavicle.

1Graduate Student Clinical Exercise Physiology, California State University–Fullerton, Fullerton, CA
2Professor of Physical Therapy, Widener University, Chester, PA

Figure 1. Radiograph of a fractured clavicle.
level was taken and measured 26 cm. A piece of Dynamic Tape was cut to this length.

Tape application: the middle of the tape was secured at the T4-5 level of the spine. While holding the tape with the left hand, the tape was stretched laterally with the right hand to a position approximately 2 cm lateral to the axillary border of the right scapula. Then the right hand was used to secure the tape at midline while the left hand was used to stretch the tape approximately 2 cm lateral to the axillary border of the left scapula (Figure 5). Total distance covered by the tape was 30 cm, this represented an estimated 15% stretch of the tape. This is consistent with the 5% to 30% range recommended by other taping techniques.\textsuperscript{14,15}

**CLINICAL APPLICATION**

In summary, Dynamic Tape may be a valuable resource to facilitate early mobilization after a fracture and/or soft tissue injury. The components of this nylon and Lycra blended tape can be applied to soft tissue using the principles of position, leverage, and force vectors to support a limb, unload a tissue, and assist with postural correction.\textsuperscript{14,15} However, tape is not meant to replace rigid or absolute immobilization in cases where soft tissue needs to be completely rested. This technique is not intended for acute soft tissue injuries or fractures that are unstable. Yet, postural dysfunctions, surgically fixated fractures, and perhaps even hypotonic shoulders after a stroke, may lend themselves to this technique. At this time, research on Dynamic Tape for the upper extremity is limited but could have great potential.
REFERENCES


