

Protective Taping and Wraps

After completing this chapter, you should be able to:

- § Identify the types of prophylactic tape and wraps and their uses in sports-injury management
- § Describe common principles used in the application of tape and wraps
- § Apply common taping and wrapping techniques to specific joints or body regions to prevent injury or reduce the risk of reinjury

Key Terms:

Maceration
Prophylactic

Proprioceptors
Spica

Taping or wrapping a body part provides support and protection while allowing functional movement. Although both techniques may be used as a **prophylactic**, or preventative measure, taping and wrapping are used extensively during rehabilitation to reduce the risk of reinjury. Providing support to an injured body part may allow early return to activity, yet control undesirable movement that may impede the healing process (1–3).

In this chapter, you will learn about the principles of taping and wrapping body parts, the different types of tape and wraps available, their various uses, and common techniques of application. Although many specific skills will be illustrated, these are presented as a guide and should not be viewed as the only method of application. Each strapping must be customized for the particular athlete and condition.

Prophylactic
Preventative or protective

PRINCIPLES OF TAPING AND WRAPPING



A high school soccer player has been experiencing mild to moderate bilateral medial tibial pain during pre-season practice. You suspect that the pain may be due to an overload on the athlete's arches. How will you provide arch support to reduce strain on the supporting structures?

The use of tape, braces, or other supportive devices should not be a substitute for complete rehabilitation of the injury

Spica

Figure-eight pattern to limit motion around two body parts of differing sizes

Proprioceptors

Specialized deep sensory nerve cells in joints, ligaments, muscles, and tendons sensitive to stretch, tension, and pressure, which are responsible for position and movement

Prior to any application of tape or a wrap, the injury must first be fully evaluated to determine the severity of injury. Injured anatomical structures must be identified and an appropriate therapeutic rehabilitation program should be developed to ensure safe return to activity (1,2). Too often, premature return to activity can lead to a chronic injury. Only those individuals who are in a supervised therapeutic exercise program should be braced or taped (4). The rehabilitation program, as discussed in Chapter 5, should focus on regaining full range of motion, proprioception and balance, strength, endurance, and power in the injured body part, while maintaining cardiovascular fitness. The individual should be able to complete all functional tests pain-free before being cleared for participation. At that time, the correct application technique can be selected and properly applied. A poorly applied strapping or wrap can lead to blisters or skin irritation, place stress on other body parts, and perhaps even increase the risk of injury to the region (**Fig. 7.1**).

Properly applied external support via taping or wrapping a joint can limit abnormal or excessive motion of an injured joint and the surrounding soft tissue structures. A **spica** is a common taping and wrapping technique whereby a figure-eight is applied around two body regions of differing sizes to limit motion. An example is a hip spica, commonly used with a groin strain (See **Figure 7.21**). This support is further enhanced through **proprioceptive** feedback. The body senses the external support and increases the athlete's conscious



Figure 7.1. This ankle strapping has several “windows” and wrinkles that can lead to blisters or skin irritation. In addition, the tension in applying the individual strips is uneven and can place the individual at risk for further injury.

awareness of the injured area. As a result, the individual often avoids motions or situations that place the injured area at further risk for injury.

Uses of Tape and Wraps

Tape and wraps are prophylactic devices used to (a) provide immediate first aid, (b) limit excessive joint movement, (c) allow for pain-free functional movement, (d) support an injured body part, (e) secure protective pads, and (f) allow early resumption of activity (5). Several of these uses are illustrated in **Figure 7.2**. Although the use of taping and wraps may allow the individual to resume early activity, their use should never take the place of a comprehensive rehabilitation program designed to strengthen the area so that supplemental support is no longer necessary.

Types of Tape and Wraps

Many companies manufacture a variety of tape used in sports injury management. In a general sense, tape can be made of an elastic or nonelastic material. Elastic tape is often used to hold protective pads in place or around joints that require maximum movement while allowing muscles to contract without impeding circulation or neurologic function (3,6). The level of elasticity varies from brand to brand. The more elastic the tape, the easier the application. Elastic tape should be stretched to one-half to one-third of its elastic capability before application. If it is applied too tightly, it can restrict circulation and function of the body part, leading to increased pain or discomfort. The product comes in a variety of widths and must be selected according to the size of the injury site and desired effect (**Fig. 7.3**) (6).

Nonelastic tape provides support to joints by restricting excessive motions, and may be porous or nonporous. Porous tape allows heat and sweat to pass through the tape through minute openings. This action allows the skin to remain cool. Nonporous tape makes the application more occlusive, thus increasing the potential for damage to the underlying skin from friction and retained heat. Like elastic tape, nonelastic tape comes in a variety of widths, primarily ranging from ½ to 3 inches wide (**Fig. 7.3**) (6). Nonelastic tape may be bleached or unbleached. Bleached tape tends to be more aesthetically pleasing, but is more expensive and does not offer better support than unbleached tape. Many athletic training classes prefer unbleached tape, as it saves money while students learn strapping techniques. Nonelastic tape is more difficult to apply. The body's natural contours increase the potential for wrinkles and excessive pressure from friction on underlying tissues, which can lead to blisters or cuts under the tape. An effective wrinkle-free nonelastic strapping requires extensive practice and patience.

If tape is applied too tightly, it can restrict circulation and function of the body part, leading to increased pain or discomfort

Wrinkles and excessive pressure from friction over underlying tissues can lead to blisters or cuts under the tape



Figure 7.2. Tape and wraps are used to provide immediate first aid (A), limit excessive joint movement (B), allow for pain-free functional movement (C), support an injured body part (D), secure protective pads (E), and allow early return to activity (F).

There are two major types of wraps, elastic and nonelastic. Both are made of cloth; however, the elastic wrap contains fibers that allow it to be stretched. The elastic wrap, as mentioned earlier, is used during acute care to secure ice to the body part or may be used to hold protective pads in place. Nonelastic wraps are typically used only to limit joint motion and provide support. Although they are often used in lieu of tape, largely due to fiscal concerns, they are not as effective. Nonelastic wraps may be used in combination with nonelastic tape for additional support. Cloth wraps, for example, are often used at the ankle; however, they do not contour well to the sharp angles in the region, nor do they “give” with muscle contractions (See **Figure 7.13**).

Application of Tape

Prior to application, the body part should be washed, dried, and free of hair (5). Any minor open wounds, such as blisters or cuts, should be cleaned with normal saline and covered with a dry sterile dressing. Areas sensitive to friction, such as the Achilles tendon or dorsum of the foot, should be protected with a pad and lubricant (5). Petroleum jelly or a commercial skin lubricant may be applied to a nonsterile gauze pad or a commercially available heel and lace pad. Hair should be removed with an electric shaver or a disposable razor that should be discarded after use (5).

Occasionally, the athlete is required to stand on a table with the hip and knee placed in slight flexion. This can be accomplished by placing the athlete's heel on a 1.5- to 2-inch heel lift. Old tape cores wound with tape or a commercial taping block may be used.

Prior to application, the body part should be clean, dry, and free of hair, and sensitive areas should be protected with a lubricated pad



Figure 7.3. Tape and wraps comes in a variety of sizes and may be either elastic or nonelastic.

Proper positioning of the athletic trainer is as important as proper positioning of the athlete

Tape rolls, while the appropriate height, will be compressed and become unusable.

When the skin has been appropriately prepared, a light layer of tape adherent is sprayed onto the skin surface and allowed to dry (5). This provides a somewhat sticky surface permitting the tape to adhere better to the skin. For individuals who are sensitive to tape, must be taped on a daily basis, or may be allergic to tape, a foam underwrap may be applied over the skin prior to tape application (**Fig. 7.4**) (5). It is critical that only one layer of underwrap be applied, as several layers may increase sweating under the tape, thus compromising the effectiveness of the strapping.

Proper positioning of the athletic trainer is as important as proper positioning of the athlete. To avoid unnecessary low back stress, use a table at an appropriate height to prevent having to bend over excessively at the waist (5). If it is necessary to reach above shoulder level, stand on a bench or have the athlete sit down. When several dozen athletes must be taped in a short amount of time, proper positioning is critical so as not to overtire the athletic trainer.

The athlete should be placed in a position of function to ensure the desired result. To avoid wrinkles in the tape, allow only a few inches of tape to be unrolled off the roll at one time (6). As the tape is guided around the contours of the body part, slight tension is applied. To tear the tape, the roll should be held in the dominant hand and pinched between the thumb and index finger of each hand (**Fig. 7.5**). A quick push of the roll away from the body while holding the nondominant hand still will result in the tape ends being evenly torn.



Figure 7.4. For individuals sensitive to tape or those who must be taped daily, a single layer of underwrap may be applied over the skin prior to tape application.

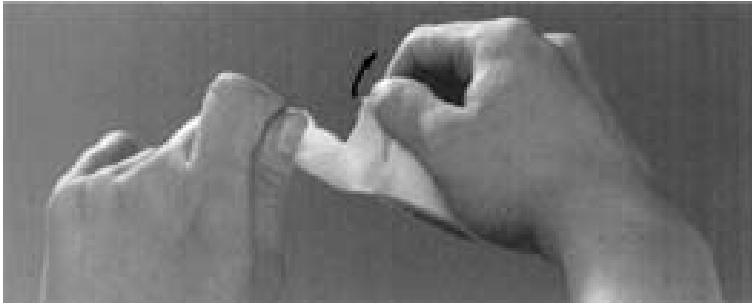


Figure 7.5. To tear tape, hold the roll in the dominant hand and pinch the thumb and index finger of each hand over the tear site. While holding the nondominant hand still, push the roll quickly away from the body.

Each subsequent strip of tape should overlap the previous strip by one-half or one-third the width of the tape (6). Apply the tape snugly, but do not impair circulation. To check circulation, take a pulse distal to the strapping, feel for skin temperature, or blanch the nails and check capillary refill. Skin color and skin temperature should be the same as the uninjured body part above and below the strapping. After tape application, have the athlete check the body part for support and function.

Tape should be removed immediately after the practice or competition. Prolonged contact with the skin may cause the skin to breakdown and bacteria to build up (5). The tip of the tape cutters or scissors can be dipped in a skin lubricant to facilitate removing the tape from the skin. The scissors or tape cutter should lift the tape up and away from the skin and then advance along the body's natural contours (**Fig. 7.6**). For example, with an injury to the lateral aspect of the ankle, start the tape cutters on the posteromedial aspect of the tape job (6,7). Slide the cutters distally around the posterior medial malleolus, extending through the arch toward the toes. In this manner, the tape cutter or scissors does not place any undue pressure on sensitive injured structures. Stabilize the skin and remove the tape in the direction of the natural hair growth (1). Tearing tape rapidly off the skin can lead to damaged skin, open wounds, and pain. After removal, the skin should be cleansed with tape remover, then washed with soap and water and dried thoroughly. Application of a skin moisturizer is suggested to prevent skin dryness and breakdown (5,6).

The skin should be inspected regularly for signs of irritation, blisters, or infection. Look for skin that is red, dry, hot, and tender (5). These signs indicate a possible allergic reaction to the tape or tape adherent. If the skin cannot be protected from irritation, it may be necessary to fit this individual with an appropriate brace rather than subject them to continued irritation. Refer to Chapter 6 for

The skin should be inspected regularly for signs of irritation, blisters, or infection



Figure 7.6. When cutting tape, lift the tape away from the skin and then advance the scissors or tape cutters along the body's natural contours, avoiding sensitive tissues.

discussion on appropriate braces for the various body regions. **Field Strategy 7.1** summarizes application techniques for taping a body part.

Although tape is useful in the prevention, management, and rehabilitation of sports injuries, its effectiveness is limited unless the individual subscribes to a comprehensive rehabilitation program. For discussion on rehabilitation exercises for the various body parts, refer to the individual joint chapters.

Application of Wraps

Application of elastic wraps should begin with the body part in a position of maximum muscle contraction. This ensures that movement and circulation will not be impaired during activity. Begin distal to the injured area and move proximal to the injury. This prevents any edema formation from settling in the distal digits and provides support against gravitational forces. The wrap should be stretched from one-half to one-third of its total elastic capability prior to application. Stretching it more may cause constriction of the circulation, compression of superficial nerves, and impairment of function. Each turn of the wrap should be overlapped by at least one-half of the previous underlying strip. The end of the wrap may be secured with elastic tape for added support. **Field Strategy 7.2** summarizes application techniques for wrapping a body part.



The high school soccer player needed additional arch support. After developing a rehabilitation program to strength the intrinsic muscles of the foot and the muscles that support the medial



Field Strategy 7.1. Application Techniques for Taping a Body Part

Prior to Application

The body part should be clean, dry, and free of hair
Cover open wounds with a sterile dressing
Apply a lubricated pad over sensitive areas, such as the dorsum of the foot, Achilles tendon, or popliteal space
Spray a light layer of tape adherent onto the skin surface
For individuals sensitive or allergic to tape, or who must be taped on a daily basis, apply a single layer of foam underwrap

During Application

To limit low back stress from bending over, use a table at an appropriate height
Place the body part to be taped in a position of function to ensure the desired result
If the hip and knee must be slightly flexed, place the heel on a 1.5- to 2-inch heel lift
Should it be necessary to reach above the shoulder level, stand on a bench or have the athlete sit down
Allow only a few inches of tape to be unrolled off the roll at one time, to prevent wrinkles
Guide the tape around the contours of the body part while applying slight tension
Each strip of tape should overlap the previous strip by one-half to one-third the width of the tape
When completed, check circulation

After Athletic Participation

Remove the tape immediately to prevent skin breakdown
Dip the tip of the tape cutters or scissors in a skin lubricant, lift the tape up away from the skin, and cut along the body's natural contours
Always cut on the side opposite the injury site
Remove the tape in the direction of the natural hair growth
Cleanse the skin with tape remover and then soap and water. Dry thoroughly
Apply a skin moisturizer to prevent dry skin
Inspect the skin regularly for signs of irritation, blisters, or infection

longitudinal arch, you can apply an arch pad or an X-arch strapping to support the area.

COMMON TAPING AND WRAPPING TECHNIQUES



A football lineman separated his right shoulder at the acromioclavicular joint. How will you limit motion at the joint to allow some mobility of the shoulder joint, yet prevent excessive painful motion?

The following taping and wrapping techniques are provided as a guide to application. When strapping or bracing a particular body part, adapt the technique to the individual's needs.



Field Strategy 7.2. Application Techniques for Wrapping a Body Part

- Cover open wounds with a sterile dressing and secure with tape
- To limit low back stress from bending over, have the athlete sit down on a stool, use a table at an appropriate height, or ask the athlete to stand
- Place the injured muscles in a shortened state, but have them maximally contracted
- If the hip and knee must be slightly flexed, place the heel on a 1.5- to 2-inch heel lift
- Begin distal to the injured area and move in a proximal direction lifting up against gravity
- Stretch the wrap one-half to one-third of its total elastic capability prior to application
- Overlap each turn of the wrap by at least one-half of the previous underlying strip
- Secure the end of the wrap with elastic tape for added support
- After participation, remove the wrap and wash it in a washing machine on a delicate cycle
- If possible, hang the wrap to dry to prevent losing its elasticity

Taping and Wrapping Techniques for the Lower Extremity

Great Toe Taping

This strapping is used to limit motion at the great toe, primarily because of a joint sprain. To begin, place anchor strips on the great toe just proximal to the nail and at the midfoot (**Fig. 7.7**) (5). To prevent hyperextension of the toe, a strip of tape is applied from the distal anchor to the proximal anchor on the plantar surface of the foot (3). Additional supportive strips are applied until the base of the first metatarsal is covered. This procedure is completed by re-anchoring the strips at midfoot. For hyperflexion injuries, the supportive tape strips run on the dorsum of the toe and foot. Occasionally, the athlete may have both a hyperextension and hyperflexion injury. In this case, the two tapings may be combined to limit motion in both directions.

Arch Support: Technique 1

Arch support may be necessary in individuals with plantar fasciitis, high arches, or in individuals who run or jump excessively. A simple arch support utilizes three to four circular strips of tape applied around the mid-foot region (**Fig. 7.8**) (6). The first strip is anchored on the dorsum of the foot and encircles the lateral border of the foot. As the strip moves across the plantar aspect, the strip is secured under the fifth metatarsal with one hand, while the other hand applies slight tension in an upward direction through the medial longitudinal arch. In this manner, tension is applied only through the arch area and will not constrict the blood vessels on the lateral aspect

Arch support may be necessary for individuals with plantar fasciitis, high arches, or for those who run or jump excessively

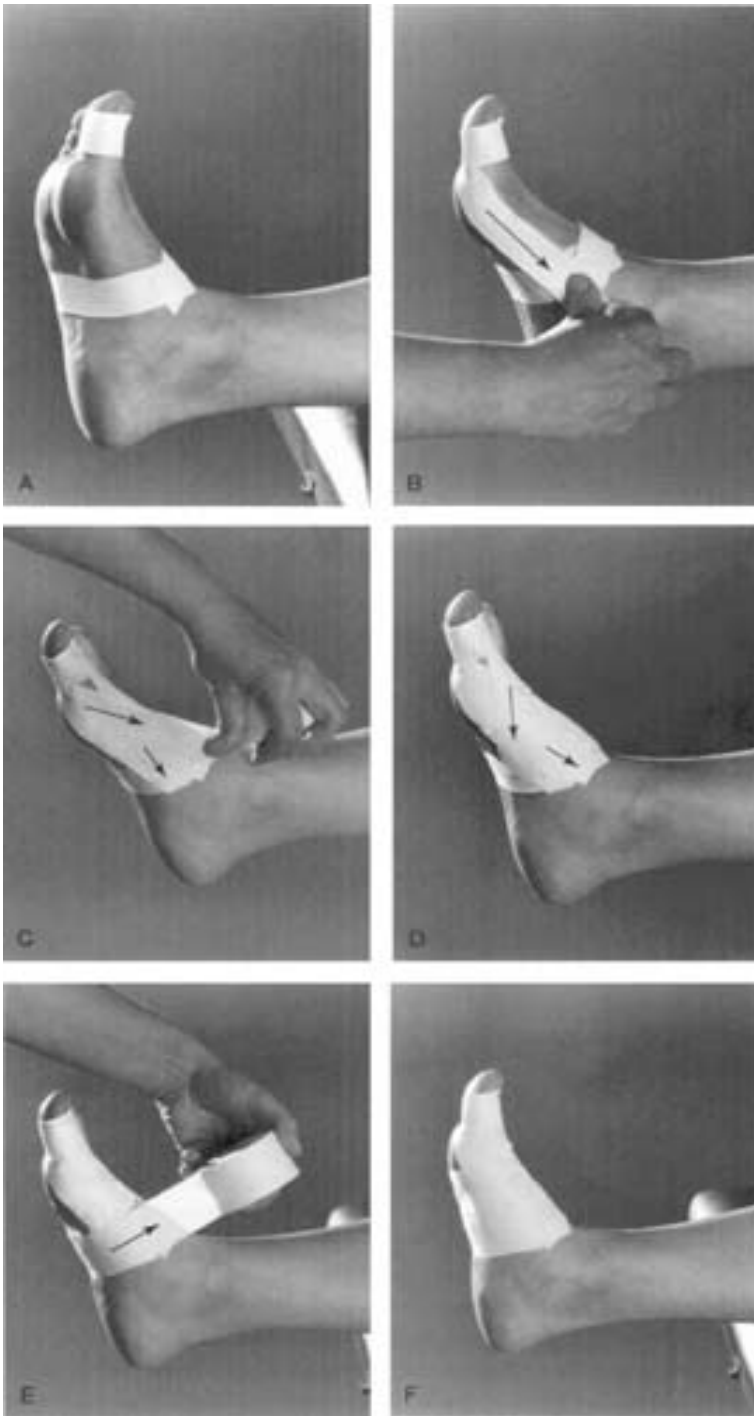


Figure 7.7. A–F. A great toe strapping may be used for turf toe.

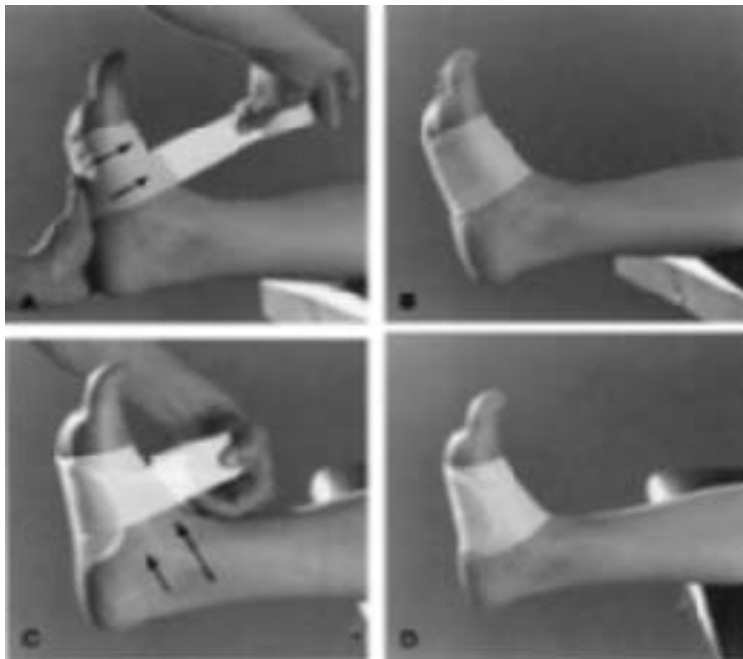


Figure 7.8. When applying circular bands to support the arch, do not constrict circulation to the toes. Rather, anchor the tape under the 5th metatarsal and lift only through the arch area (**A, B**). An arch pad may also be used under the circular straps for additional arch support (**C, D**).

of the foot. The next strip overlaps the previous strip by one-half, until the entire arch is covered. By moving distal to proximal, the exposed edges of the tape will not roll when socks are placed on the foot (6). An arch pad may be added to this technique for further support.

Arch Support: Technique 2

If additional support is required, an alternative “X-arch” strapping may be applied (**Fig. 7.9**) (6). An anchor strip is placed at the level of the distal metatarsal heads. To avoid constricting circulation, this strip should not encircle the entire foot. Beginning at the base of the great toe, the tape is pulled along the medial aspect of the foot, around the heel, and angled across the arch to end at the starting point. The second strip begins at the base of the fifth metatarsal, moves along the lateral aspect of the foot, around the heel, and is angled across the arch, back to its point of origin. Alternating subsequent strips of tape follow the same pattern until the entire arch is covered. The tape job is then closed using the simple arch taping technique. An alternative closing technique is to use elastic tape, being careful not to constrict circulation.



Figure 7.9. A–F. X-arch strappings provide additional arch support for individuals who do extensive running and jumping.

Open Basketweave Ankle Strapping

The open basketweave is used on an acute inversion or eversion ankle sprain to control swelling and limit motion (3,4). The athlete should sit on the table with the ankle flexed at 90°. Using nonelastic tape, apply one anchor 4 to 6 inches proximal to the ankle joint, and another anchor at the level of the metatarsal heads (3,6). Do not constrict circulation. These anchors help to secure the remaining strips of tape to the skin (**Fig. 7.10**).

A “stirrup” strip of tape is applied, beginning from the medial aspect of the proximal anchor. The strip extends behind the medial malleolus, under the heel, behind the lateral malleolus, and is secured

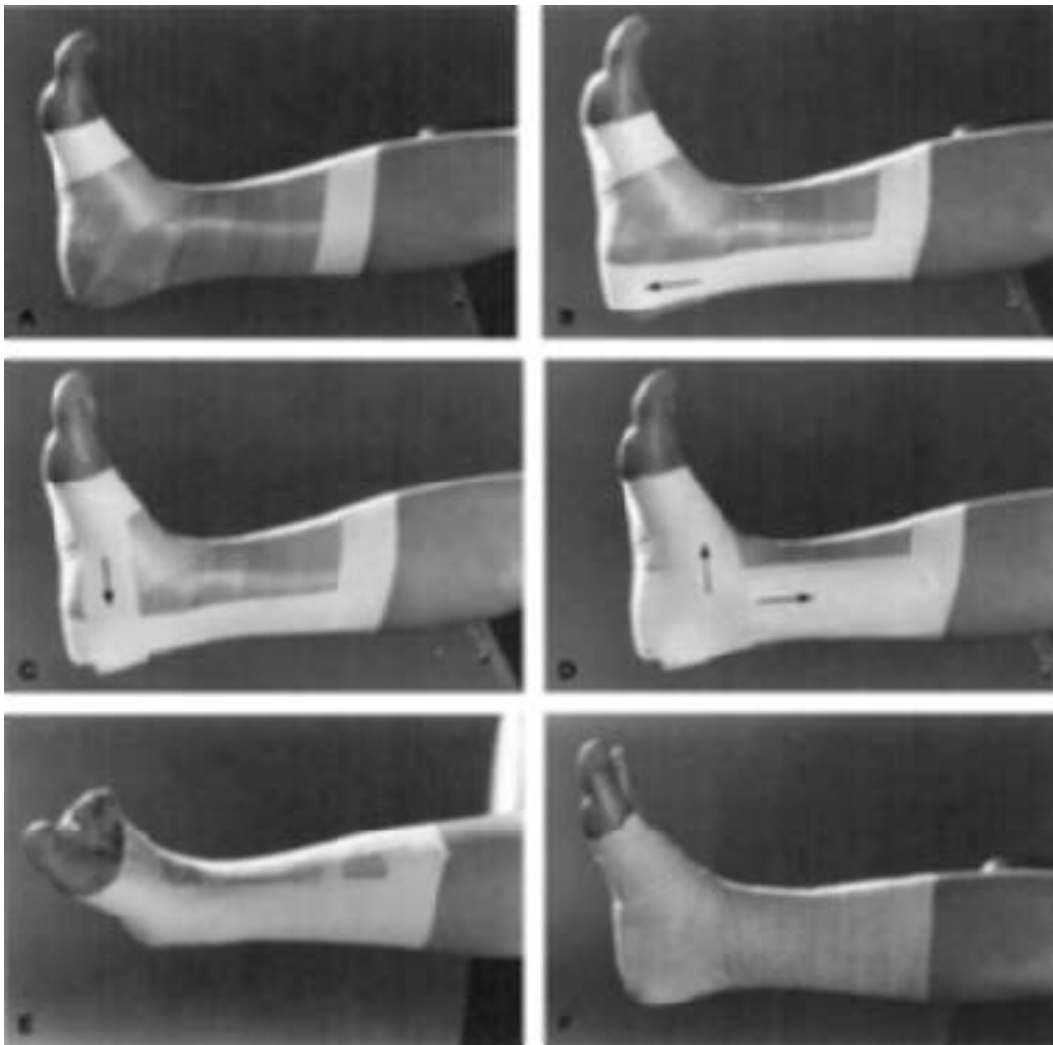


Figure 7.10. A–F. An open basketweave is used to control swelling and limit motion after an acute ankle sprain.

back to the proximal anchor. Next, a “horseshoe” strip of tape is applied, beginning on the medial aspect of the distal anchor. The horseshoe strip follows the base of the first metatarsal, travels behind the calcaneus, and continues to the base of the fifth metatarsal, ending on the distal anchor.

This process of alternating stirrups and horseshoes is continued, leaving approximately a ½- to 1-inch opening on the anterior aspect of the lower leg and foot (3). This opening allows for some swelling to occur, but limits gross effusion. The plantar aspect is then closed

with semicircular strips of tape and the tape edges are then re-anchored. Two to three horizontal pieces of tape may then be applied to secure the anchors. If further stability is needed, heel locks may be applied (See closed basketweave).

An elastic wrap may then be applied over the tape for additional compression; however, it should be removed at night to avoid circulatory compromise (3–5). Ideally, the tape should be replaced daily when the individual is doing rehabilitative exercises. The strapping, however, may be left on for up to 2 days, as long as the skin under the tape is intact and circulation is normal. Ice may be applied directly over the tape, but avoid getting the tape wet (5). Tape that becomes wet from perspiration, ice treatments, or bathing should be removed to avoid skin **maceration**. To avoid getting the tape wet,

the lower leg may be placed in a plastic bag during bathing. Any sign of skin maceration or breakdown warrants the immediate removal of the tape for further evaluation and treatment.

Maceration

Softening of tissues that may result in breaking, tearing, or wasting away

Closed Basketweave

The closed basketweave technique is used to provide external support to ankle ligaments during activity. Because most ankle sprains are caused by excessive inversion, this explanation will focus on providing support to the lateral ligaments. Adaptations can be made for eversion ankle sprains by reversing the pull of support.

The lower leg and foot should be clean, dry, and free of hair. Padding with a lubricant should be applied to the dorsum of the ankle and to the Achilles tendon area. The proximal anchor should be placed approximately 4 to 6 inches above the ankle joint, distal to the belly of the gastrocnemius. The distal anchor bisects the styloid process of the fifth metatarsal (**Fig. 7.11**) (6). Beginning on the medial aspect of the superior anchor, run a stirrup strip down behind the medial malleolus, under the heel, behind the lateral malleolus, and pull up on the lateral aspect, ending on the superior anchor.

Next, beginning on the medial aspect of the distal anchor, a horseshoe strip of tape is placed along the base of the first metatarsal, behind the heel, following the base of the fifth metatarsal, and ends on the lateral aspect of the distal anchor. The next stirrup overlaps the first by one-half to two-thirds of the previous stirrup. A second horseshoe is placed, working again from medial to lateral, overlapping one-half to two-thirds of the previous strip. This alternation occurs until there are at least three stirrups and three horseshoes in place. Alternating the directions of the tape will give the tape an appearance of a woven basket, hence the name. A figure-eight and heel locks are then applied. Finally, the strapping is closed from distal to proximal using horizontal strips, which overlap one-half to two-thirds of the previous strip. For additional support, a second figure-eight and heel locks may be applied (6).

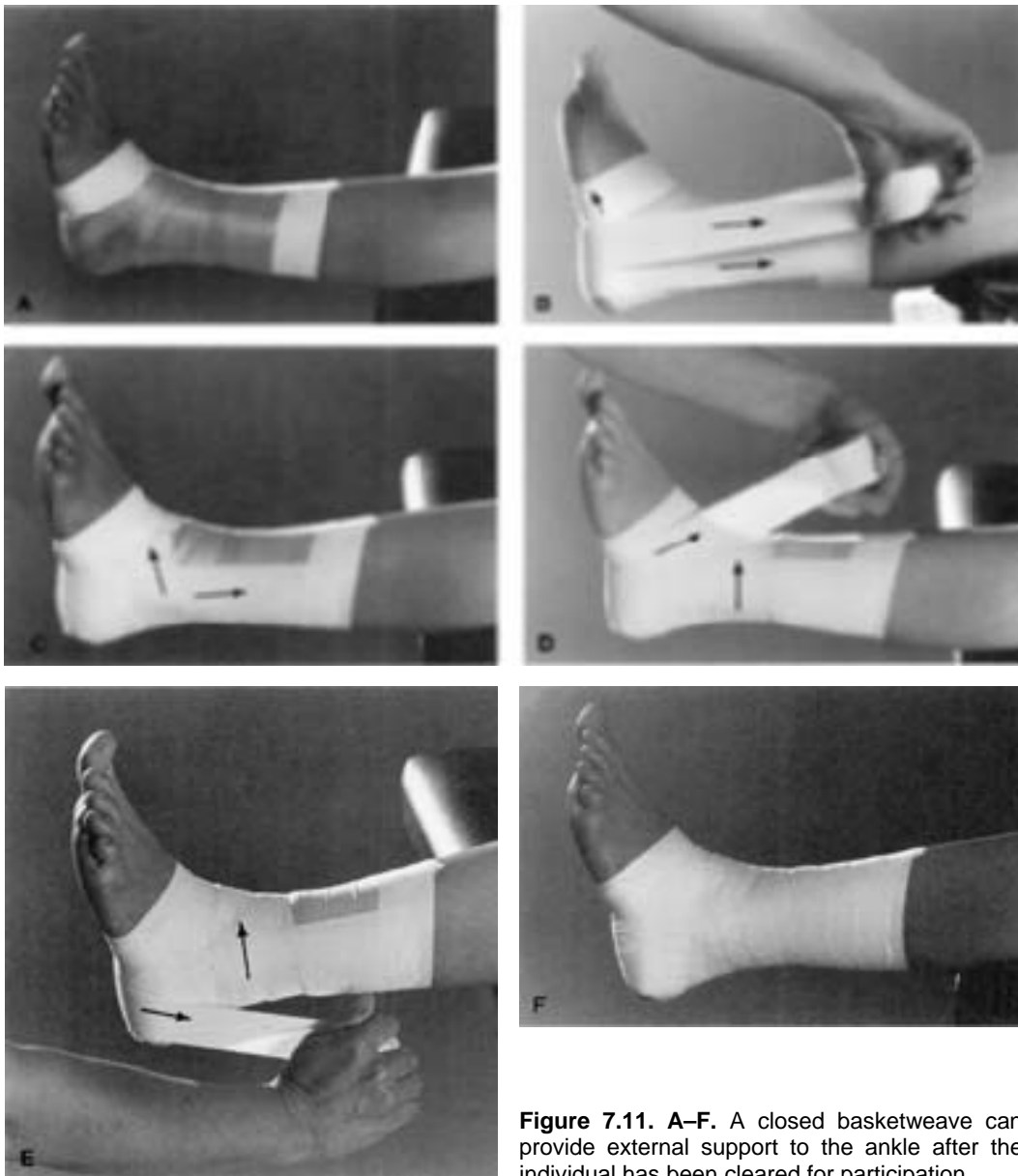


Figure 7.11. A–F. A closed basketweave can provide external support to the ankle after the individual has been cleared for participation.

The most common problem with tape application used to restrict motion is that it can be applied too tightly, leading to circulatory compromise and discomfort

The most common problem with applying tape that restricts motion is that it can be applied too tightly, so that it constricts circulation and causes discomfort. This is especially true with the distal anchor. To avoid this, place the distal anchor on the foot and do not apply any tension.

Game Strapping

This technique is fast and easy to apply, but provides only a moderate amount of support to the ankle. It is commonly used as both a preventive strapping and as a post-injury strapping for an individual who has completed the rehabilitation program. Athletes who require a more substantial amount of support can combine this taping with a brace or may wish to use the closed basketweave technique.

To begin, the foot is held at 90° of flexion. Anchors are applied to the foot, bisecting the styloid process of the fifth metatarsal. The second anchor is applied 4 to 6 inches above the ankle joint, just distal to the belly of the gastrocnemius. Three stirrups are placed, beginning on the medial aspect of the superior anchor (**Fig. 7.12**). These run posterior to anterior, each overlapping one-half to two-thirds of the previous stirrup, completely covering the malleoli. Next, beginning on the medial malleolus, apply a figure-eight with heel locks in a continuous fashion. Use caution when crossing behind the Achilles tendon, as tight tape may cause skin irritation and blisters. A second figure-eight is then applied. Finally, the strapping is closed using successive circular strips around the foot, continuing proximal to distal.

Cloth Ankle Wrap

Cloth wrap is available in large rolls that can be cut into 72 inch lengths. When combined with the support offered by a minimal amount of nonelastic tape, cloth wraps provide adequate support for the ankle (6). Although not as supportive as nonelastic tape, they are washable, reusable, and a cost-effective alternative to a game strapping.

The cloth wrap is applied over a white athletic sock while the ankle is held at 90° (4,6). The sock should be snug and free of wrinkles (5). Place the wrap just distal to the medial malleolus and complete a figure-eight (**Fig. 7.13**). Once completed, move directly into heel locks, pulling up on the lateral aspect of the ankle, and downward on the medial aspect of the ankle. Repeat the pattern until approximately 12 inches of the material is left. Then, secure this material in a circular fashion around the lower leg. Anchor the end of the material with nonelastic tape. Apply a figure-eight and heel locks over the cloth wrap with nonelastic tape to provide additional support (6).

Achilles Tendon Taping

Taping of the Achilles tendon limits excessive dorsiflexion, thus reducing tension on the tendon (6). Place the athlete in a prone position on the taping table with the lower leg extended over the table (6). Dorsiflex the foot and determine where the discomfort occurs. This indicates the point to which you allow motion, but restrict any further painful motion. The athlete holds the foot in a relaxed position

Although cloth ankle wraps are not as supportive as nonelastic tape, they are washable, reusable, and a cost-effective alternative to a game strapping

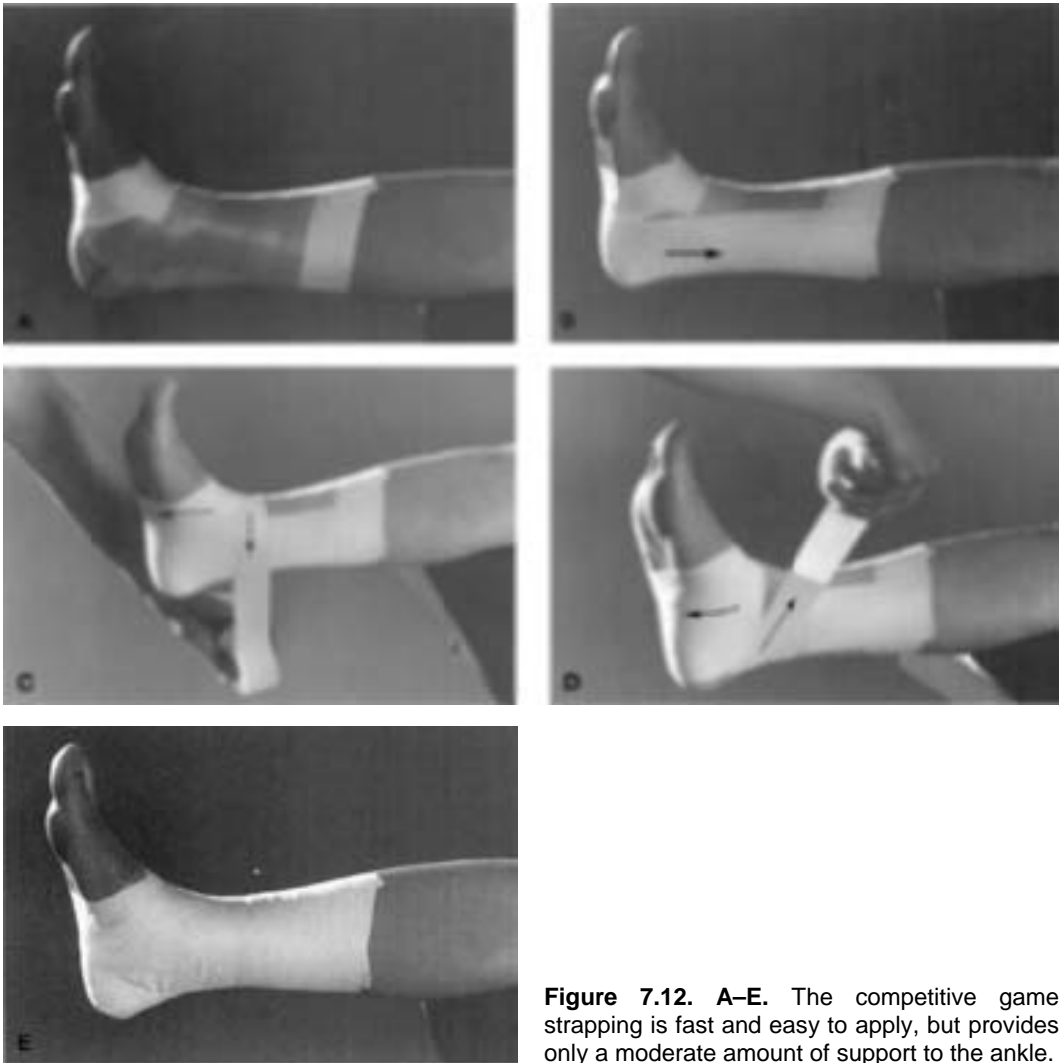


Figure 7.12. A–E. The competitive game strapping is fast and easy to apply, but provides only a moderate amount of support to the ankle.

(Fig. 7.14). Anchors, using nonelastic tape, are applied to the base of the metatarsals and 4 to 6 inches above the ankle joint, just distal to the belly of the gastrocnemius. A heel pad with lubricant is placed over the Achilles tendon. Using 2-inch elastic tape, three strips are applied in an “X” pattern from the distal to proximal anchor. The X is re-anchored distally and proximally with nonelastic tape. The athlete then moves to a seated position. Using elastic tape, a figure-eight and heel locks are then applied (3). Be careful not to apply added pressure over the irritated Achilles tendon area. Heel lifts may also be placed in the shoes to limit dorsiflexion; however, lifts should be placed in both shoes to prevent any undo stress on other body parts.

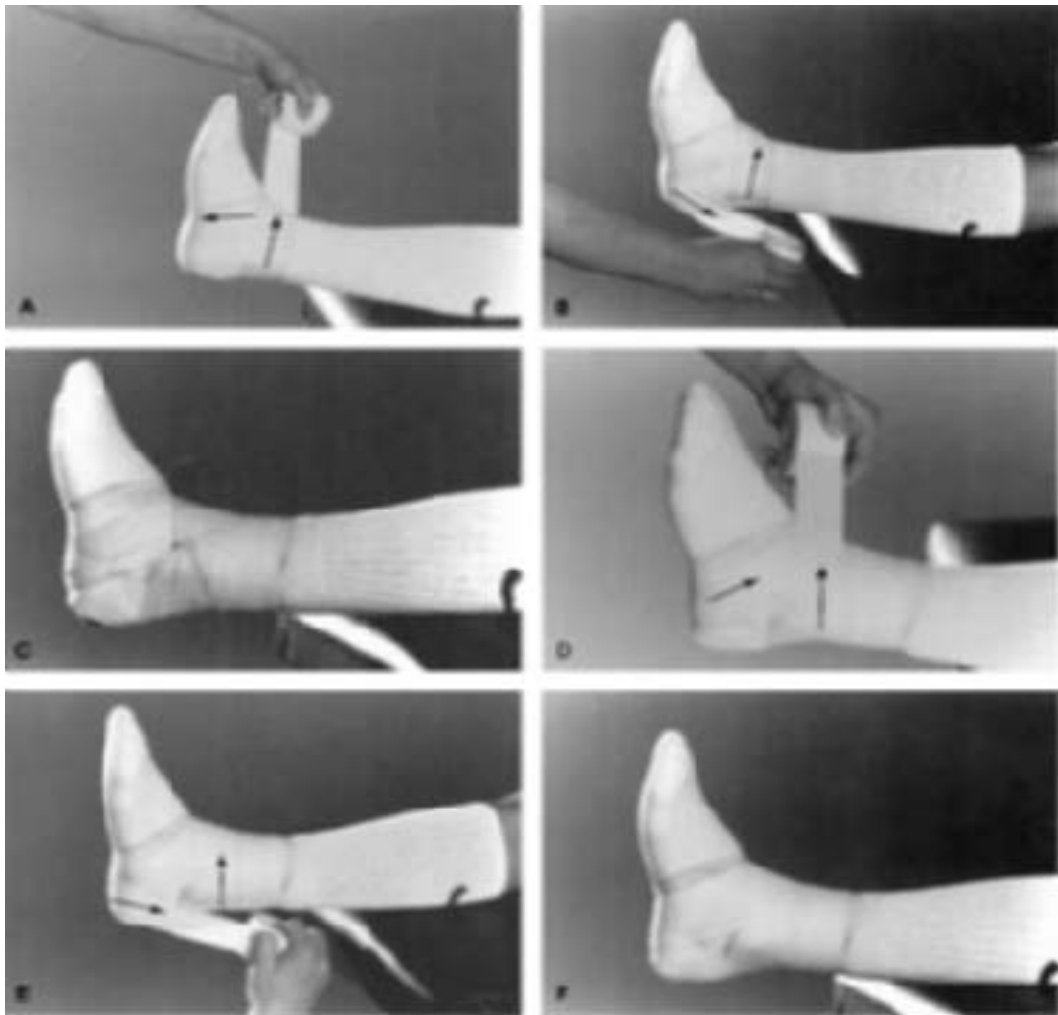


Figure 7.13. A–F. When combined with nonelastic tape, a cloth ankle wrap can provide adequate support to an ankle.

Shin Splints Taping

Shin splints is a generic term that refers to pain found on the anterior shin. Often, anterior shin pain is directly related to stress on the medial longitudinal arch; therefore, arch strappings may help alleviate symptoms. If the condition is related to tendinitis of the tibialis posterior muscle, strapping the ankle to limit eversion may provide some relief. Stress fractures and compartment syndromes will not benefit from strapping, and may actually be aggravated by compression from the tape. This strapping should not be applied until

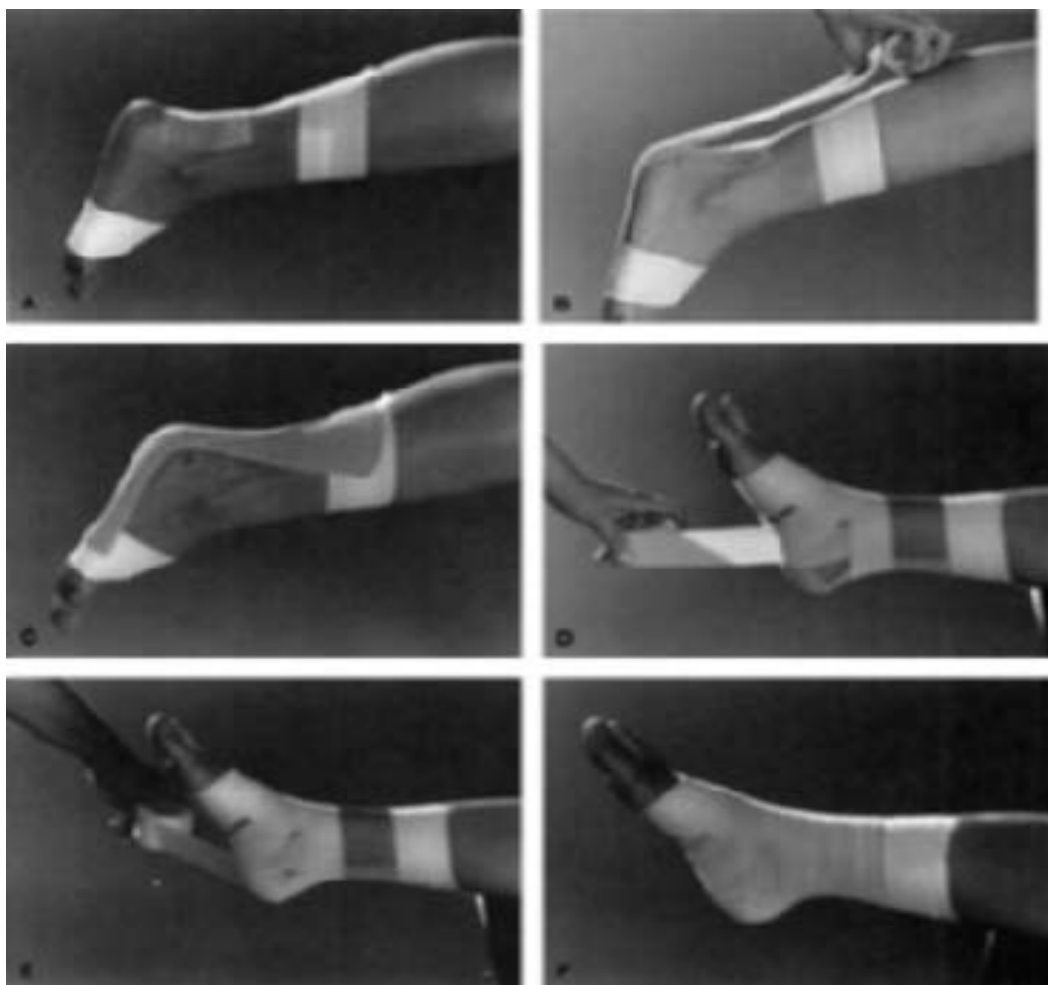


Figure 7.14. A–F. Taping of the Achilles tendon limits excessive dorsiflexion, thus reducing tension on the tendon. This strapping can also be combined with a heel lift placed in the shoe, to limit further stress on the tendon.

the actual source of pain has been identified by an experienced health-care provider.

Begin with the athlete standing on a table facing forward. A heel lift should be placed under the heel of the leg being taped to relax the muscles. Anchors are placed distally above the malleoli and proximally at the tibial tuberosity (6). Medial and lateral anchor strips are placed from distal to proximal, lifting up against gravity (**Fig. 7.15**). These should follow the line of the malleoli. Tape is applied in an alternating oblique direction, forming an X over the

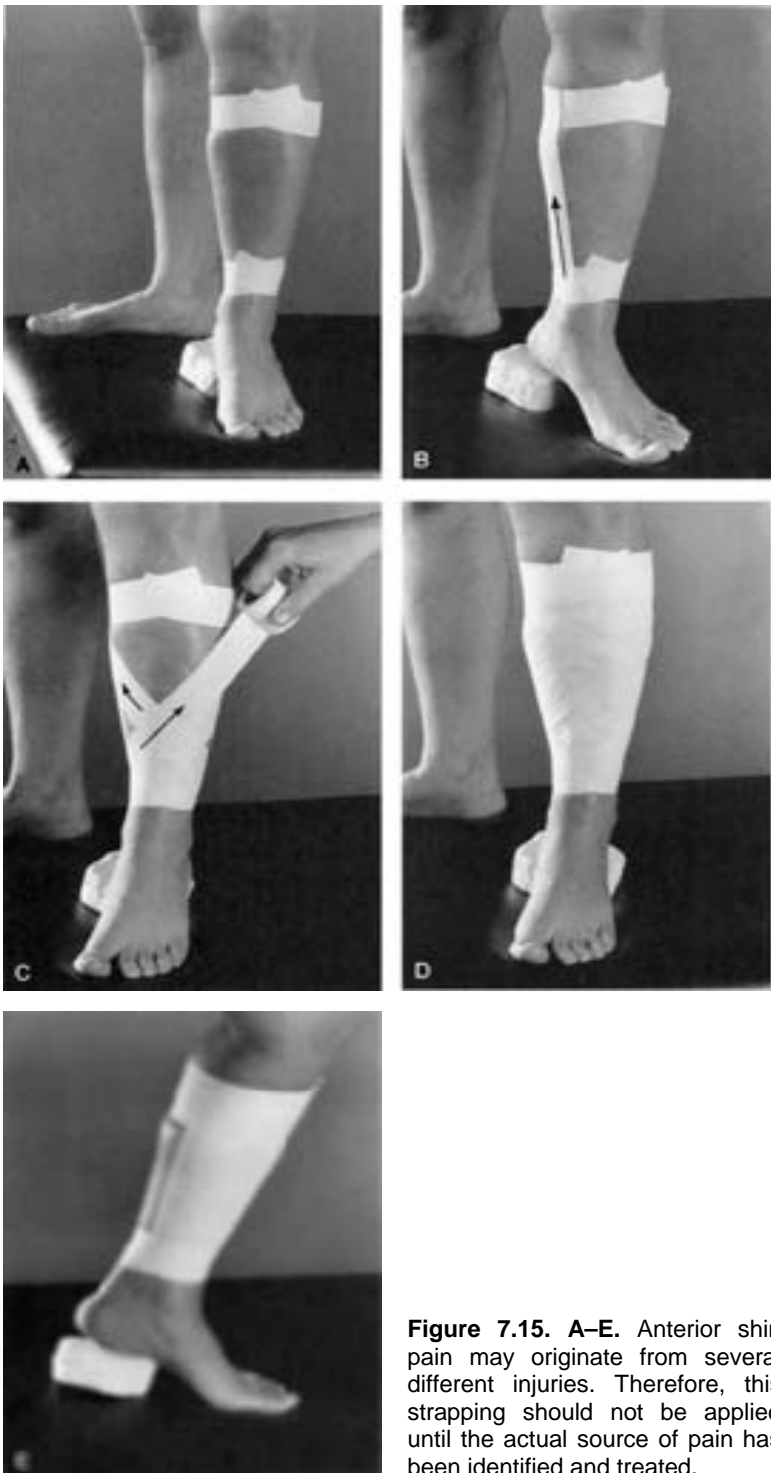


Figure 7.15. A–E. Anterior shin pain may originate from several different injuries. Therefore, this strapping should not be applied until the actual source of pain has been identified and treated.

anterior shin, working distal to proximal until the entire anterior shin is covered. Medial and lateral anchors are then placed, followed by distal and proximal anchors.

Collateral Ligament Support for the Knee

The athlete should be standing on a table with the affected limb resting on a 1.5- to 2-inch heel lift (3). Taping is most effective when done directly to the skin or with the use of minimal underwrap after the area has been properly prepared. Elastic tape is commonly used because of the musculature involved (3). Apply the distal anchor 2 inches below the level of the tibial tuberosity and apply the proximal anchor at the midpoint of the quadriceps muscle group (**Fig. 7.16**). Lateral and medial supportive strips are applied in an X fashion that outlines the medial and lateral collateral ligaments, but keeps the patella open (3). Successive interlocking Xs will give additional support to the collateral ligaments. The collateral taping may be further reinforced with nonelastic tape. Finally, the tape is closed off with successive circular strips, moving from the distal anchor to proximal anchor.

Rotary Knee Instability Taping

The athlete stands on the table with the heel elevated. Anchors are placed 2 to 3 inches below the tibial tuberosity and at the mid-quadriceps using elastic tape (**Fig. 7.17**). A pad with lubricant is placed in the popliteal space. A piece of elastic tape is cut in the middle at both ends and torn to form an X. The divided ends are then placed around the patella and interlocked (6). Beginning at the superior anchor, a piece of elastic tape is angled down behind the knee, through the popliteal space, ending on the inferior anchor. In an opposite direction, a second piece of tape spirals down behind the knee, through the popliteal space, ending on the inferior anchor. Three to four spirals in each direction provide the necessary support (6). Once in place, the taping is closed with circular applied strips of tape. Additional support may be provided by using nonelastic tape to reinforce the spiral pattern. If the collateral ligaments also need support, the collateral taping technique may be applied under the rotary instability strapping.

Knee Hyperextension

This taping limits hyperextension of the knee and may be applied with elastic or nonelastic tape. With the athlete standing on a table with the heel elevated, the superior anchor is placed at mid-thigh, encircling the entire thigh, with a second anchor applied 2 to 3 inches below the tibial tuberosity (**Fig. 7.18**) (5). A gauze pad with lubricant is placed in the popliteal space, thus reducing the friction of the nerves and circulatory supply to the knee (6). From the inferior anchor, apply tape strips in a X pattern over the gauze in the popliteal

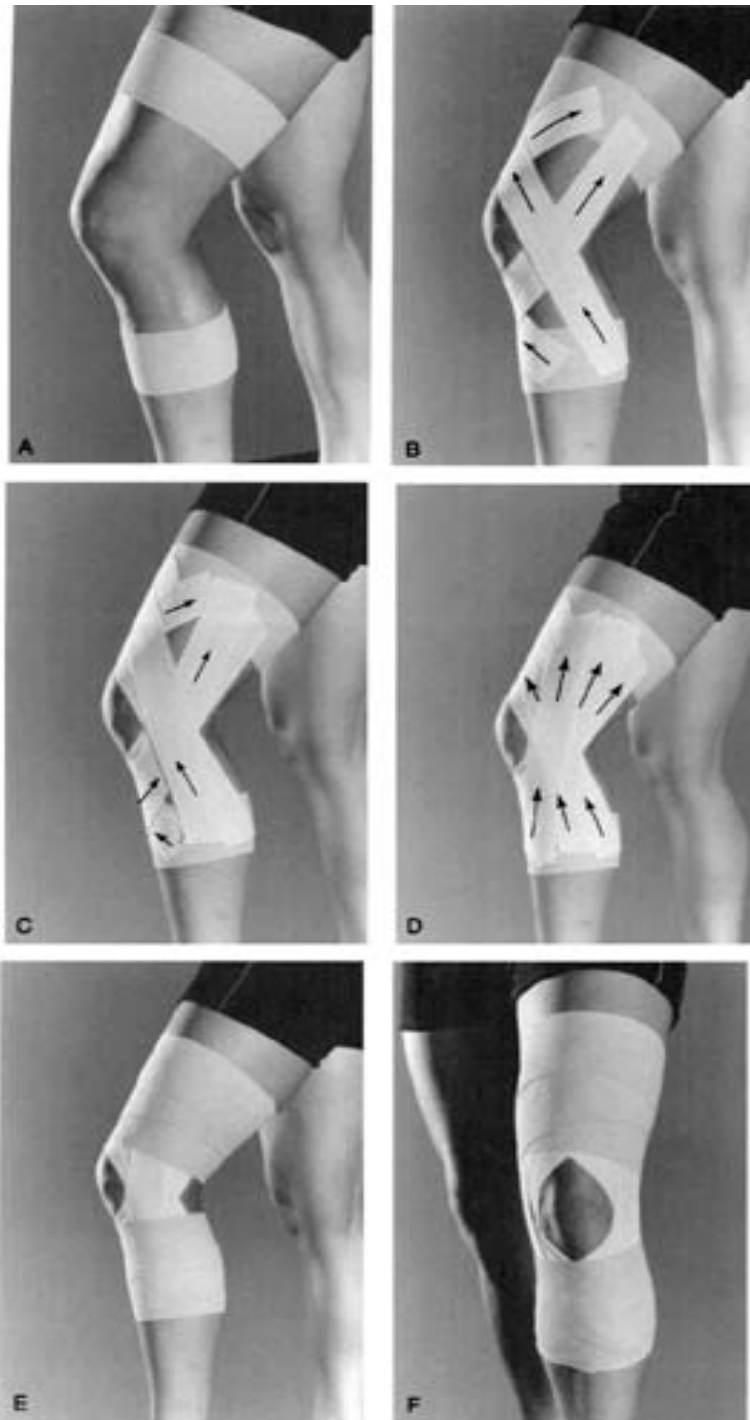


Figure 7.16. A–F. Knee collateral ligament support.



Figure 7.17. A–D. Rotary knee instability strapping.

space. The X pattern should begin wide and become narrower as the popliteal space is covered (6). The last strip will run perpendicular to the anchors. The strapping is completed by applying 2 to 3 anchors on the lower leg and 4 to 5 anchors on the thigh, each overlapping



Figure 7.18. A–C. Knee hyperextension strapping.

one-half to two-thirds of the previous strip. When completed, the taping should allow knee flexion and extension, but limit hyperextension.

Quadriceps and Hamstrings Wrap

A thigh strain may involve either the quadriceps or hamstrings muscle group. For the quadriceps muscles, the heel of the injured leg



Figure 7.19. A, B. Quadriceps wrap.

should be elevated 2 to 3 inches on a taping block. With the thigh in a neutral position, begin on the anterior aspect of the mid-thigh distal to the painful site. Apply the wrap in an upward and lateral direction, encircling the thigh (**Fig. 7.19**). Elastic tape is then applied over the wrap to provide additional support.

With a hamstring strain, two techniques may be used. The first technique is used when the strain is to the distal portion of the muscle group and is applied in a manner similar to the quadriceps wrap. The tension of the wrap is applied in an upward and lateral direction, encircling the thigh. Elastic tape is then applied over the wrap to provide additional support. The second technique may be used when the injury occurs in the proximal portion of the muscle group. The wrap is placed on the posteromedial aspect of the thigh, and encircles the thigh several times, pulling from a medial to lateral direction. The wrap is then pulled up across the greater trochanter, continues around the lower abdomen, is brought around the opposite iliac crest over the waist and gluteals, then crosses the greater trochanter, ending back on the anterior thigh, to encircle the thigh again, moving in a medial to lateral direction (**Fig. 7.20**). The wrap is then reinforced with elastic tape, which repeats the same pattern.

Groin Wrap

Although groin strains may refer to damage to the hip flexors, hip adductors, or hip abductors, this explanation will focus on preventing



Figure 7.20. A–D. Although the hamstrings strain may be wrapped in a manner similar to the quadriceps wrap, the technique shown is used when the strain is located in the proximal portion of the muscle belly.

stress on the hip adductors. When supporting the adductor muscles, the heel is elevated on a taping block, with the hip internally rotated. The wrap is then placed on the lateral aspect of the thigh, and encircles the thigh in a medial direction to further draw the thigh into internal rotation (**Fig. 7.21**) (5,6). The wrap continues around the thigh, crossing over the greater trochanter, continuing across the lower abdomen, covering the iliac crest, around the waist and gluteals, then crosses the greater trochanter, ending back on the thigh. The wrap is then reinforced with elastic tape, which repeats the same pattern.

Taping and Wrapping Techniques for the Upper Extremity

Acromioclavicular Taping

The nipple should be protected with a gauze pad and lubricant to prevent chaffing

The nipple should be protected with a gauze pad and lubricant to prevent chaffing (5). The arm is placed in a relaxed position and supported at the elbow. Begin with an anchor of elastic tape that encircles the mid-biceps region. A second anchor is placed just below the spine of the scapula, extends over the shoulder through the midclavicular line, and ends just under the nipple. A third anchor is placed just under the nipple and runs horizontally around the trunk, connecting the two ends of the second anchor (**Fig. 7.22**) (6). Beginning on the biceps anchor, a strip of tape is pulled from the anchor up and over the acromion process, ending on the midclavicular anchor. A second strip, also originating on the biceps anchor, is pulled up and over the acromion process to anchor on the posterior back. These two strips form an X over the acromion process (5,6). A midclavicular strip is then applied, followed by another horizontal anchor. Each of the anchors should overlap one-half to two-thirds of the previous piece of tape. The pattern is then repeated, first crossing over the acromion process with the Xs, then the midclavicular anchor, and finally the horizontal anchor, until the acromion process is covered. The horizontal anchors should stop just below the axilla and should not impede arm motion. This taping may be reinforced by covering it with an elastic bandage wrapped as a shoulder spica (7).

Shoulder Spica Wrap

The athlete should hold the injured arm in internal rotation. Begin by encircling the arm in a posterior to anterior direction at the mid-biceps (5). Cross the anterior chest in the region of the pectoralis major (**Fig. 7.23**). Wrapping in this direction maintains internal rotation of the glenohumeral joint and limits external rotation. The limitation of motion is determined by the amount of internal rotation the arm is placed in initially. The wrap is then brought under the opposite axilla, across the back, over the acromion process in an

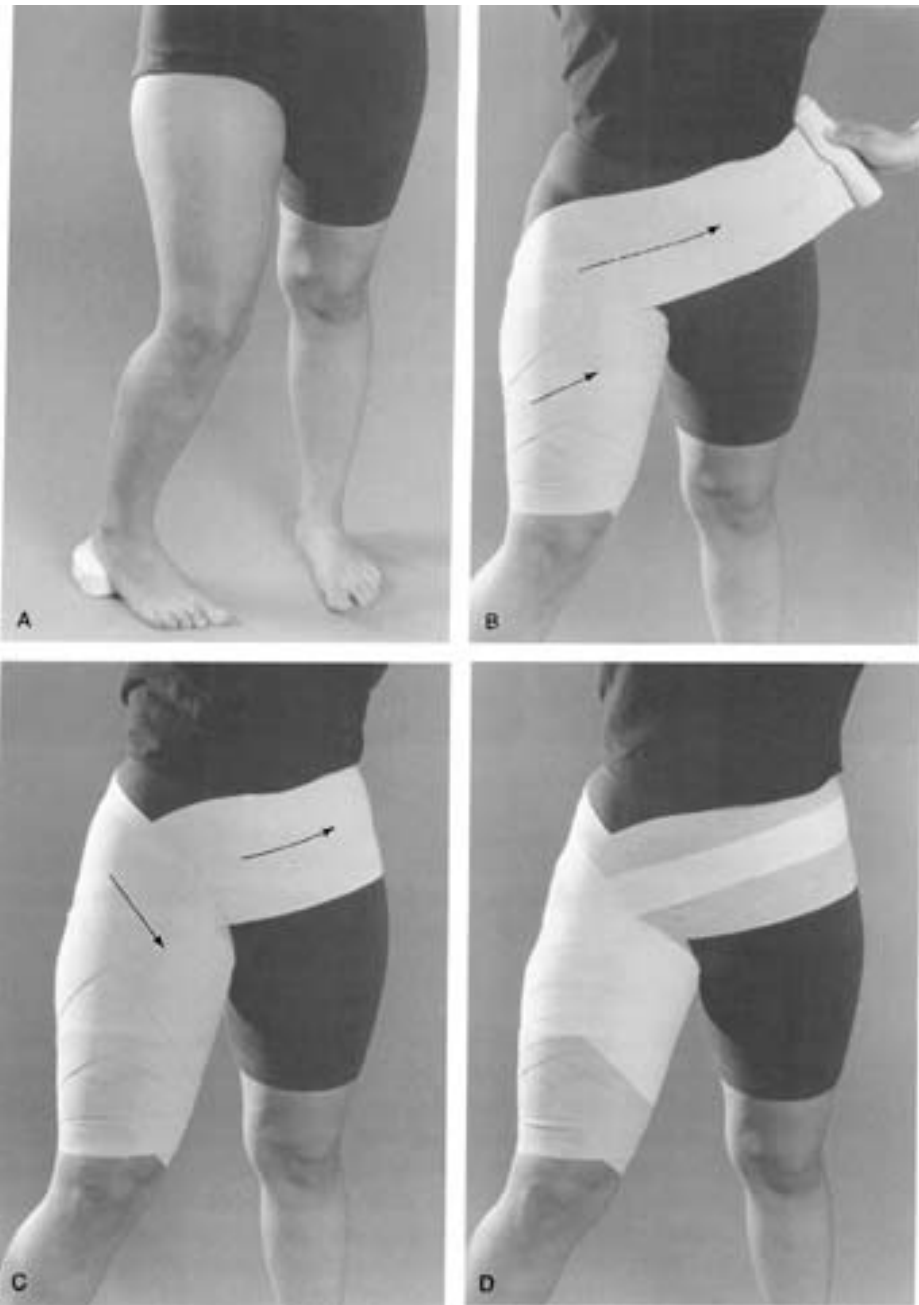


Figure 7.21. A–D. Hip spicas are often used for groin strains.

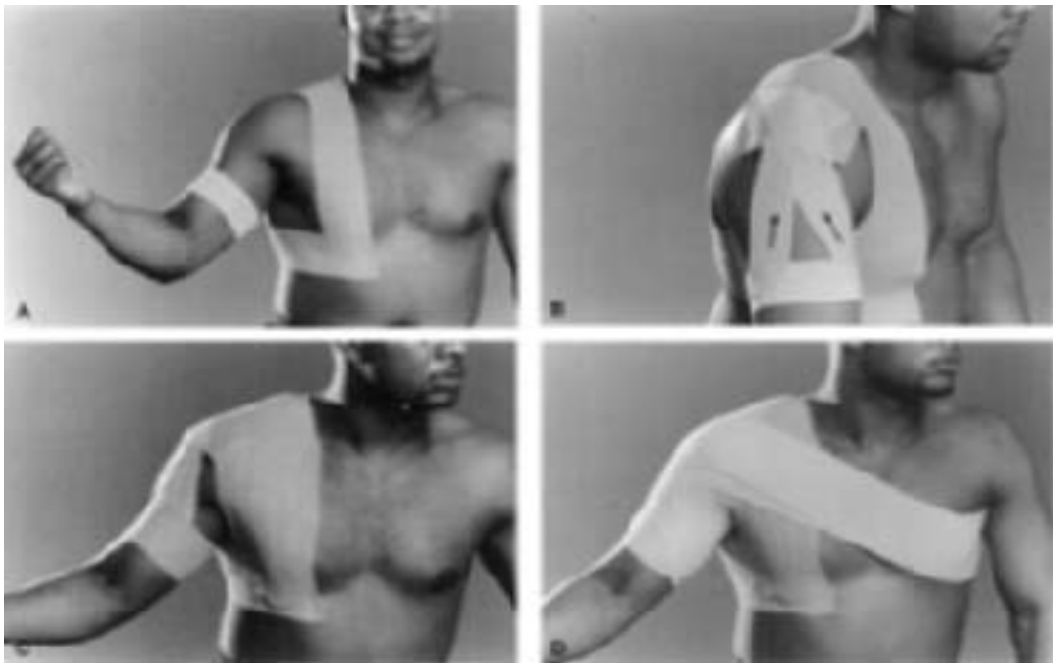


Figure 7.22. A–D. Acromioclavicular taping.

anterior direction. The wrap is then continued through the axilla, around the arm, and again across the anterior chest (6). The wrap is then secured with nonelastic tape.

Elbow Hyperextension

Flex the biceps brachii muscle and apply an anchor of either nonelastic tape or elastic tape just proximal to the muscle belly. The distance between the two anchors is approximated. Two pieces of tape approximately the same length are then torn from the roll. A checkrein is constructed by placing these two pieces of tape back to back then adding five to six additional pieces of tape over the template in an X fan shape (**Fig. 7.24**) (2,5,6).

The checkrein is then attached to the anchors by applying three to four additional anchors overlapping the previous anchor by one-half to two-thirds. A figure-eight with an elastic wrap may then be applied to further secure the taping and prevent slipping during competition. Check and monitor the radial pulse to determine if the tape is applied too tight.

Wrist: Technique 1

Hyperextension or hyperflexion of the wrist may damage the ligaments of the wrist. For a mild sprain, three or four circular strips

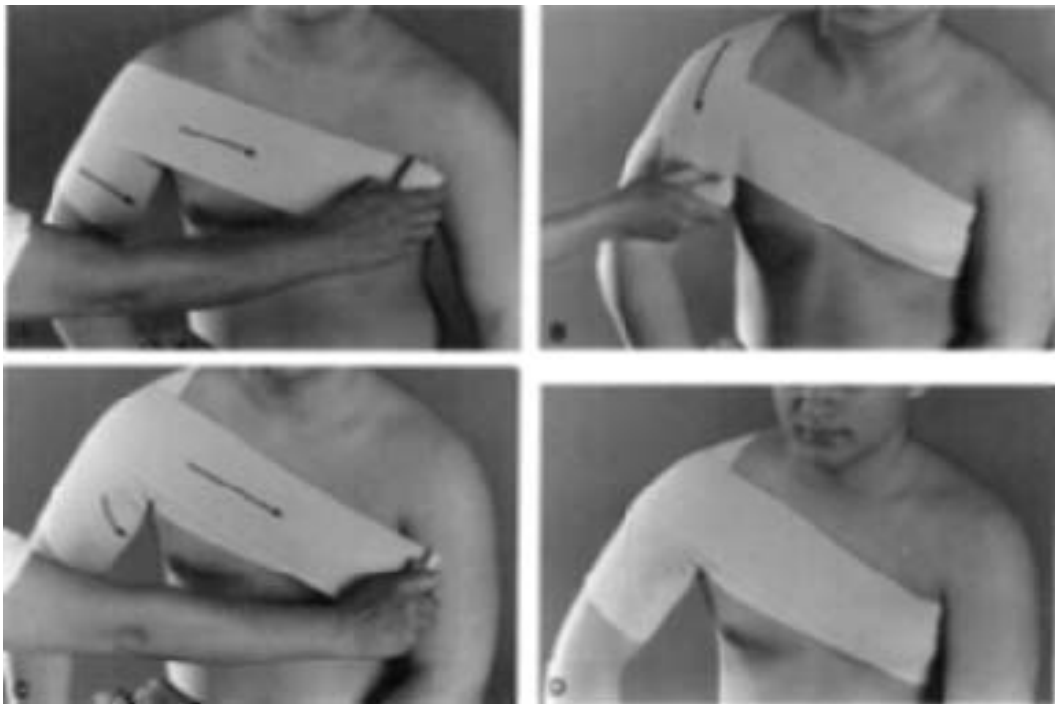


Figure 7.23. A–D. Shoulder spica.

of tape may be applied to the wrist, beginning distal to proximal. Overlap the previous strip by one-half to two-thirds of the width of the tape (**Fig. 7.25**) (2,5,6).

Wrist: Technique 2

If additional limitation of motion is needed, begin by placing an anchor strip around the wrist and at the heads of the metacarpals (**Fig. 7.26**). To limit hyperextension, 3 to 4 strips of tape are placed in an X pattern over the palmar aspect of the hand (5,6). To limit hyperflexion, place the X pattern over the dorsum of the hand. Using either elastic or nonelastic tape, a figure-eight is then applied around the wrist and hand. The figure-eight should begin on the radial aspect of the proximal anchor, travel across the dorsum of the hand around the metacarpal heads, travel across the palm of the hand, and end on the ulnar side of the proximal anchor (5). As the tape is brought through the web space of the thumb and index finger, the tape is crimped to prevent irritation of the skin.

Thumb

Most thumb injuries occur when the thumb is hyperextended (1). Using nonelastic tape, apply an anchor on the wrist and another on



Figure 7.24. A–D. Elbow hyperextension.

the metacarpophalangeal joint of the thumb (**Fig. 7.27**) (5). Next, apply a strip of tape beginning on the ulnar aspect of the proximal anchor and continue upward over the palmar aspect of the thenar eminence on the thumb. Cross over the metacarpophalangeal joint, encircling the thumb, and re-anchor the strip on the dorsal aspect of

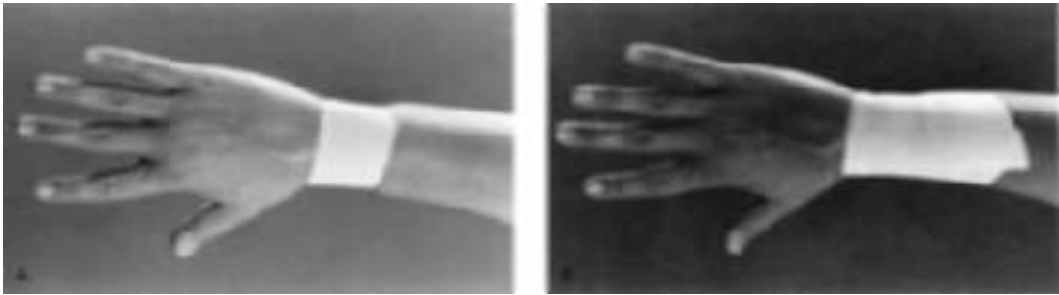


Figure 7.25. A, B. For a mild wrist sprain, three or four circular strips of tape may be applied to the wrist.



Figure 7.26. A–F. For a moderate wrist sprain, a more extensive strapping is necessary to limit painful motion.

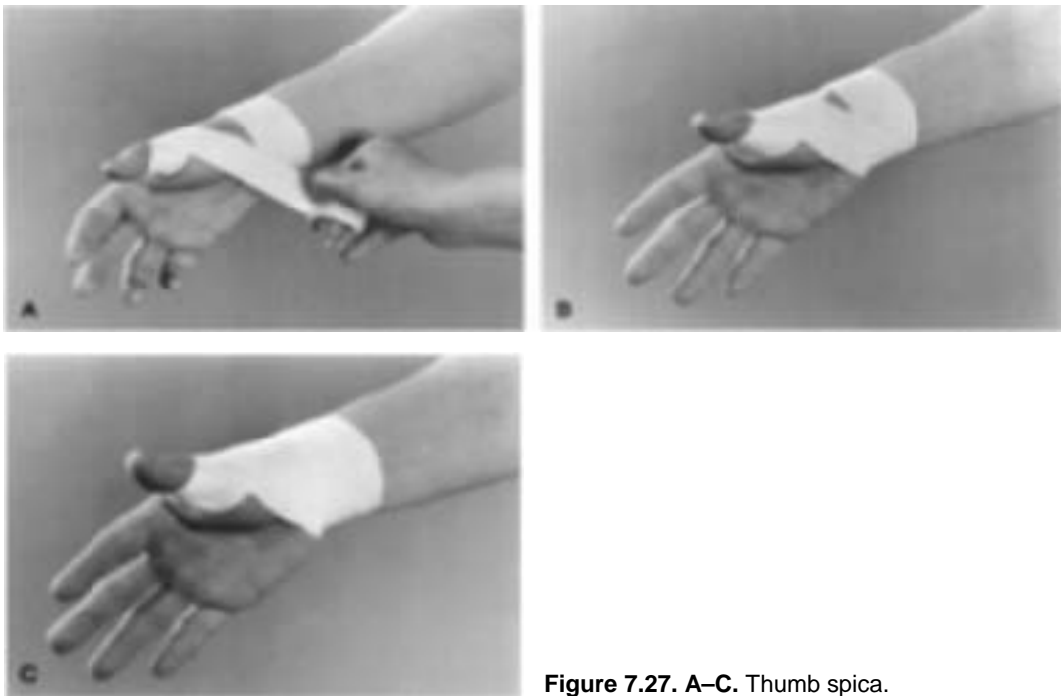


Figure 7.27. A–C. Thumb spica.

the anchor. This line of pull makes an X pattern. As the tape passes thru the web space of the thumb, adduct the thumb slightly. Do three to four Xs and finish the strapping with additional anchors (6).

Finger Taping Technique

The interphalangeal joints are often injured. “Buddy” taping for the fingers involves using an adjacent finger for support (5). Strips of narrow tape are applied around the proximal phalanx and distal



Figure 7.28. Buddy taping for the fingers.

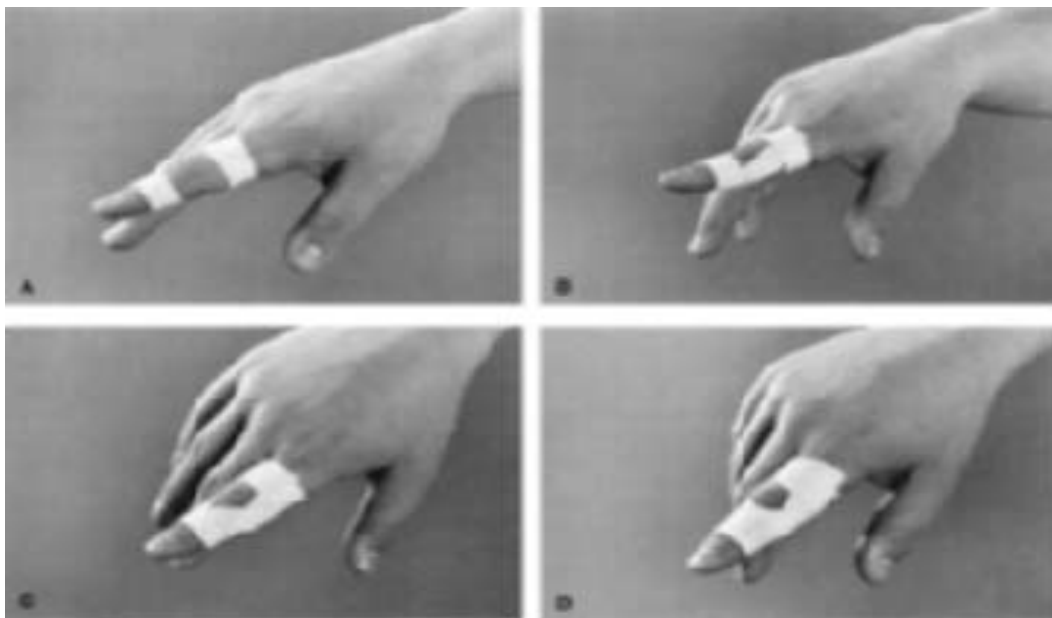


Figure 7.29. A–D. Added support for the collateral ligaments of the fingers can be provided by this strapping.

phalanx, leaving the joints uncovered to permit limited flexion and extension of the fingers (**Fig. 7.28**).

If additional support for the medial and lateral collateral ligaments is needed, anchors can be placed just proximal and distal to the injured joint (**Fig. 7.29**). Working from distal to proximal, apply two narrow strips of tape in an X pattern over the collateral ligaments, followed by a longitudinal strip to connect the two anchors. A figure-eight may be applied, using care not to impinge circulation. Capillary refill should be checked after taping, as the blood supply is very superficial and easily compressed.



The football lineman separated his right shoulder at the acromioclavicular joint. Did you determine that motion at this joint can be limited by applying restrictive strips of nonelastic tape in an X-like fashion over the joint and securing them to anchors around the biceps and midclavicular region? If so, you are correct. A shoulder spica elastic wrap can provide further support over the strapping

SUMMARY

Taping and wrapping a body part provides support and protection while allowing functional movement. They may be used to provide immediate first aid, support an injured body part, or provide pain-free

functional movement. Used in conjunction with a comprehensive rehabilitation program, tape or wraps can allow early resumption of activity without the threat of reinjury.

When using tape, the skin should be inspected regularly for signs of irritation, blisters, or infection. Look for skin that is red, dry, hot, and tender. These signs indicate a possible allergic reaction to the tape or tape adherent. If the skin cannot be protected from irritation, it may be necessary to fit this individual with an appropriate brace rather than subject them to continued irritation.

REFERENCES

1. Anderson MK, and Hall SJ. *Sports injury management*. Media, PA: Williams & Wilkins, 1995.
2. *Manual of athletic training*. Philadelphia: FA Davis, 1995.
3. Austine KA, Gwynn-Brejt KA, and Marshall SC. *Illustrated guide to taping techniques*. London: Mosby Year Book, 1994.
4. Mercier LR. *Practical orthopedics*. St. Louis: Mosby Year Book, 1995.
5. Kennedy R, and Berry D. *The sports therapy taping guide*. Ottawa, Ontario: Sports-medics, 1991.
6. Arnheim D. *Essentials of athletic training*. St. Louis: Mosby Year Book, 1995.
7. Starkey C, and Ryan JL. *Evaluation of orthopedic and athletic injuries*. Philadelphia: FA Davis, 1996.