

Chapter 4

Protective Taping and Wrapping

OUTCOMES

1. Identify the types of prophylactic tape and wraps and list their uses in musculoskeletal injury management.
2. Explain common principles used in the application of tape and wraps.
3. Describe common taping and wrapping techniques to specific joints or body regions to prevent injury or reduce the risk of reinjury.
4. Describe the general principles in applying soft playing casts and hard immobilizing splints or cast.

Taping or wrapping a body part can provide support and protection while allowing functional movement. Although these techniques may be used as a **prophylactic**, or preventative measure, taping and wrapping is used extensively during rehabilitation to reduce the risk of reinjury. Providing support to an injured body part may allow early return to activity, while controlling undesirable movement that may impede the healing process.

In this chapter, the principles of taping and wrapping as well as the types of tape and wraps available, their various uses, and common techniques of application are addressed. Although many specific skills are illustrated, these are presented as a guide and should not be viewed as the only method of application. Each technique must be customized for the particular patient and condition.

PRINCIPLES OF TAPING AND WRAPPING

Q A high school soccer player has been experiencing mild to moderate bilateral medial tibial pain during preseason practice. You suspect that the pain may result from an overload on the individual's arches. How can you provide arch support to reduce strain on the supporting structures?

Tape and wraps are devices used to (1) provide immediate first aid, (2) limit excessive joint movement, (3) support an injured body part, (4) provide compression, (5) provide proprioceptive feedback, (6) secure protective pads and dressings, (7) allow early resumption of activity, (8) reduce

the chance of reinjury, and (9) prevent injury (1). Several of these uses are illustrated in **Figure 4.1**.

An injury must be fully evaluated to determine the pathology and severity of injury before any application of tape or a wrap. Injured anatomical structures must be identified and an appropriate therapeutic rehabilitation program should be developed to ensure safe return to activity. Too often, premature return to activity can lead to reinjury or a chronic injury. Only those individuals who are in a supervised therapeutic exercise program should be taped or wrapped. Although the use of tape and wraps may allow the individual to resume early activity, their use should never take the place of a comprehensive



► **Figure 4.1. Tape and wraps.** Tape and wraps are 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 return to activity.



► **Figure 4.2.** 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.

rehabilitation program. The rehabilitation program, discussed in Chapter 8, should focus on regaining full range of motion, **proprioception**, 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. In each phase of activity, the correct application technique should be selected and properly applied. It is also important to note that when improperly or poorly applied, a taping or wrapping technique can cause damage, including blisters or skin irritation, abnormal stress on body parts, and increased risk of injury to the region (**Figure 4.2**).

Types of Tape and Wraps

Many companies manufacture a variety of tape used in sports injury management. In general, tape can be made of an elastic or nonelastic material. Elastic tape can be used to hold protective pads and dressings in place, provide compression, give proprioceptive feedback, and provide support. One advantage of elastic tape is that it allows muscles to contract without impeding circulation or neurologic function. The level of elasticity in tape varies from brand to brand. The more elastic the tape, the easier the application. Elastic tape should be stretched to one-third to one-half 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. Products come in a variety of widths and tensile strengths. A product must be selected according to the injury pathology and desired effect (**Figure 4.3**) (2).

Nonelastic tape provides support to joints by restricting excessive motions. The tape may be porous or nonporous. Porous tape allows heat and sweat to pass through the

minute openings in the tape. 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 1/2 to 3 inches wide. 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. Nonelastic tape is more difficult to apply than elastic tape. 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 if applied incorrectly. An effective wrinkle-free nonelastic taping technique requires extensive practice and patience.

There are two major types of wraps, elastic and nonelastic. Both types are made of cloth; however, the elastic wrap contains fibers that allow it to be stretched. Elastic wraps can be used to secure pads and dressings, provide compression and support, and give proprioceptive feedback. Nonelastic wraps typically are used only to limit joint motion and provide support. Nonelastic wraps sometimes are used in place of tape for cost-saving reasons; however, they are not as effective. Nonelastic wraps may be used in combination with nonelastic tape for additional support. For example, cloth wraps often are 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 4.16**).

Application of Tape

The body part should be clean, dry, and free of hair before application. Hair should be removed with an electric shaver or disposable razor that should be discarded after use. Any minor open wounds, such as blisters or cuts, should be cleaned with normal saline and covered with a



► **Figure 4.3.** Tape and wraps comes in a variety of sizes, and may be either elastic or nonelastic.

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 (3). Petroleum jelly or a commercial skin lubricant may be applied to a gauze or foam pad.

Occasionally, the patient is required to stand on a table with the hip and knee placed in slight flexion. This can be accomplished by placing the patient's heel on a 1½- to 2-inch heel lift. Old tape cores wound with tape or a commercial taping block may be used. Tape rolls, although the appropriate height, compress and become unusable.

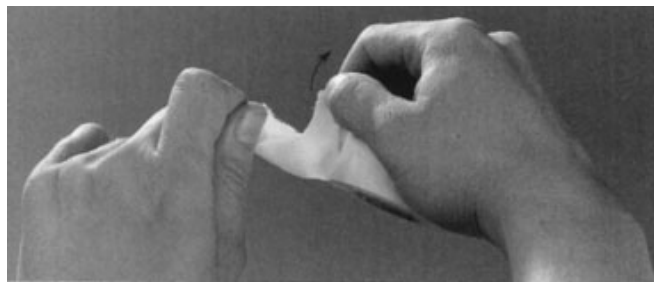
When the skin has been appropriately prepared, a light layer of tape adherent is sprayed onto the skin surface and allowed to dry. This provides a sticky surface permitting the tape to adhere better to the skin as well as providing a layer of protection for the skin. For individuals who are sensitive to tape, taped on a daily basis, or allergic to tape, a single layer of foam underwrap may be applied over the skin prior to tape application (**Figure 4.4**). It is critical that only one layer of underwrap be applied, as several layers may increase sweating under the tape, and, in doing so, compromise the effectiveness of the taping technique.

Proper positioning of the athletic trainer is as important as proper positioning of the patient. To avoid unnecessary low back stress, a table of an appropriate height should be used to prevent excessive bending at the waist. If it is necessary to reach above shoulder level, the athletic trainer should stand on a bench or have the patient sit down. When several dozen patients must be taped in a short amount of time, proper positioning is critical to prevent overtiring of the athletic trainer.

The patient should be placed in a position of function to ensure the desired result. To avoid wrinkles in the tape, only a few inches of tape should be unrolled at one time (3). As the tape is guided around the contours of the body



► **Figure 4.4.** 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 4.5.** 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.

part, slight tension should be applied. In tearing the tape, the roll should be held in the one hand and pinched between the thumb and index finger of each hand (**Figure 4.5**). A quick push of the roll away from the body while holding one hand still results in the tape ends being evenly torn.

In most taping techniques, each subsequent strip of tape should overlap the previous strip by one-half to one-third the width of the tape. The tape should be applied snugly, but without impairing circulation. Circulation can be assessed by taking a pulse distal to the tape application, feeling for skin temperature, or blanching the nails to check capillary refill. Skin color and temperature should be the same bilaterally above and below the taping. Following the tape application, the patient should check the body part for support and function.

Removal of Tape

Tape should be removed immediately after activity. Prolonged contact with the skin may cause tissue breakdown and bacteria formation. 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 (**Figure 4.6**). For example, with an injury to the lateral aspect of the ankle, the initial position of the tape cutter is the postero-medial aspect of the tape application. Next, the cutter is moved 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. In removing the tape, the skin must be stabilized while the tape is pulled in the direction of the natural hair growth. Tearing tape rapidly off the skin can lead to damaged skin, open wounds, and pain. Following removal of the tape, the skin should be cleansed with a de-adhesive, then washed with soap and water and dried thoroughly. In addition, application of a skin moisturizer is suggested to prevent skin dryness and breakdown (1,3).

The skin should be inspected regularly for signs of irritation, blisters, or infection, including areas that are red,



► **Figure 4.6.** 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.

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 the patient with an appropriate commercial brace rather than subject him or her to continued irritation.

Field Strategy 4.1 summarizes application techniques for taping a body part.

Although tape is useful in the prevention and management of musculoskeletal injuries, its effectiveness is limited unless the individual adheres to a comprehensive rehabilitation program. For discussion on rehabilitation exercises for 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 are not impaired during activity. A wrap should be started distal to the injury site and continue to the area 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. Excessive stretching may constrict circulation, compress superficial nerves, and impair 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

FIELD STRATEGY 4.1

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 1½- 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.

FIELD STRATEGY 4.2 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 then have them maximally contracted. If the hip and knee must be slightly flexed, place the heel on a 1½- 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.

be secured with elastic tape for added support. **Field Strategy 4.2** summarizes application techniques for wrapping a body part.

A The high school soccer player needed additional arch support. After developing a rehabilitation program to strengthen the intrinsic muscles of the foot and the muscles that support the medial longitudinal arch, a pad and arch taping can be applied to support the area.

COMMON TAPING AND WRAPPING TECHNIQUES

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

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

Taping and Wrapping Techniques for the Lower Extremity

► Great Toe Taping

This taping technique is used to limit motion at the 1st metatarsal-phalangeal joint. Preparation for this taping includes placing an adhesive dressing (e.g., Band-Aid®) over the nail of the great toe for protection purposes. This technique begins with the placement of anchor strips on the great toe and at the midfoot (**Figure 4.7**). If prevention of hyperextension of the toe is desired, 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 reanchoring the strips at the great toe and midfoot. If the injury involves hyperflexion, the supportive tape strips run on the dorsum of the toe and foot. Occasionally, the patient may

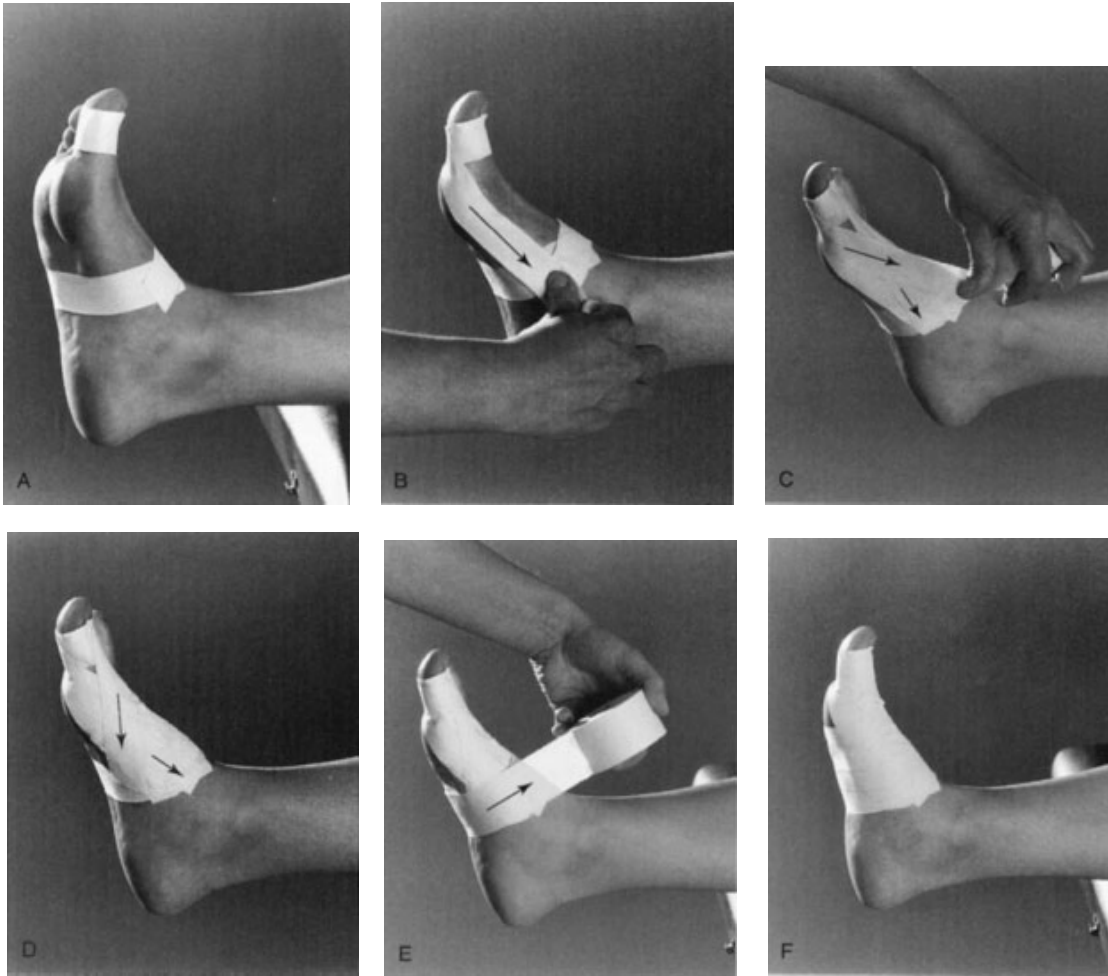
have both a hyperextension and hyperflexion injury. In this case, the two tapings may be combined to limit motion in both directions.

► Arch Support

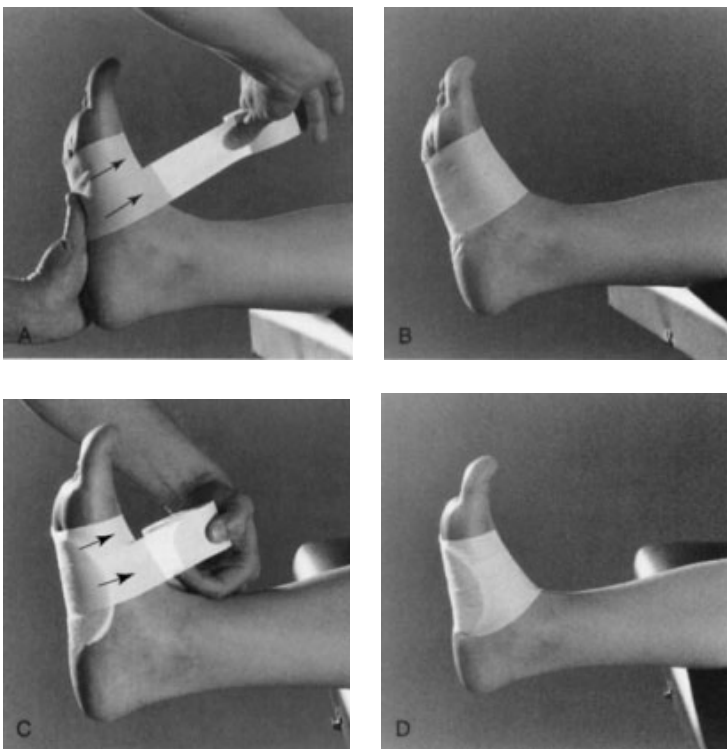
Arch support may be necessary in individuals with plantar fasciitis, high arches, fallen arches, arch sprains and strains, or those who run or jump excessively. There are several techniques that can be used to support the arches of the foot. In taping the arches, the patient's foot should be in a position of slight plantar flexion.

Arch Support: Technique 1. A simple arch support utilizes three to four circular strips of tape applied around the midfoot region (**Figure 4.8**). 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 (**Figure 4.8A**), whereas 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 does not constrict the blood vessels on the lateral aspect of the foot. Each subsequent strip overlaps the previous strip by one-half, until the entire arch is covered. In addition, by applying the strips from the distal to proximal aspect of the foot, the exposed edges of the tape do not roll when socks are placed on the foot. An arch pad may be added to this technique for additional support.

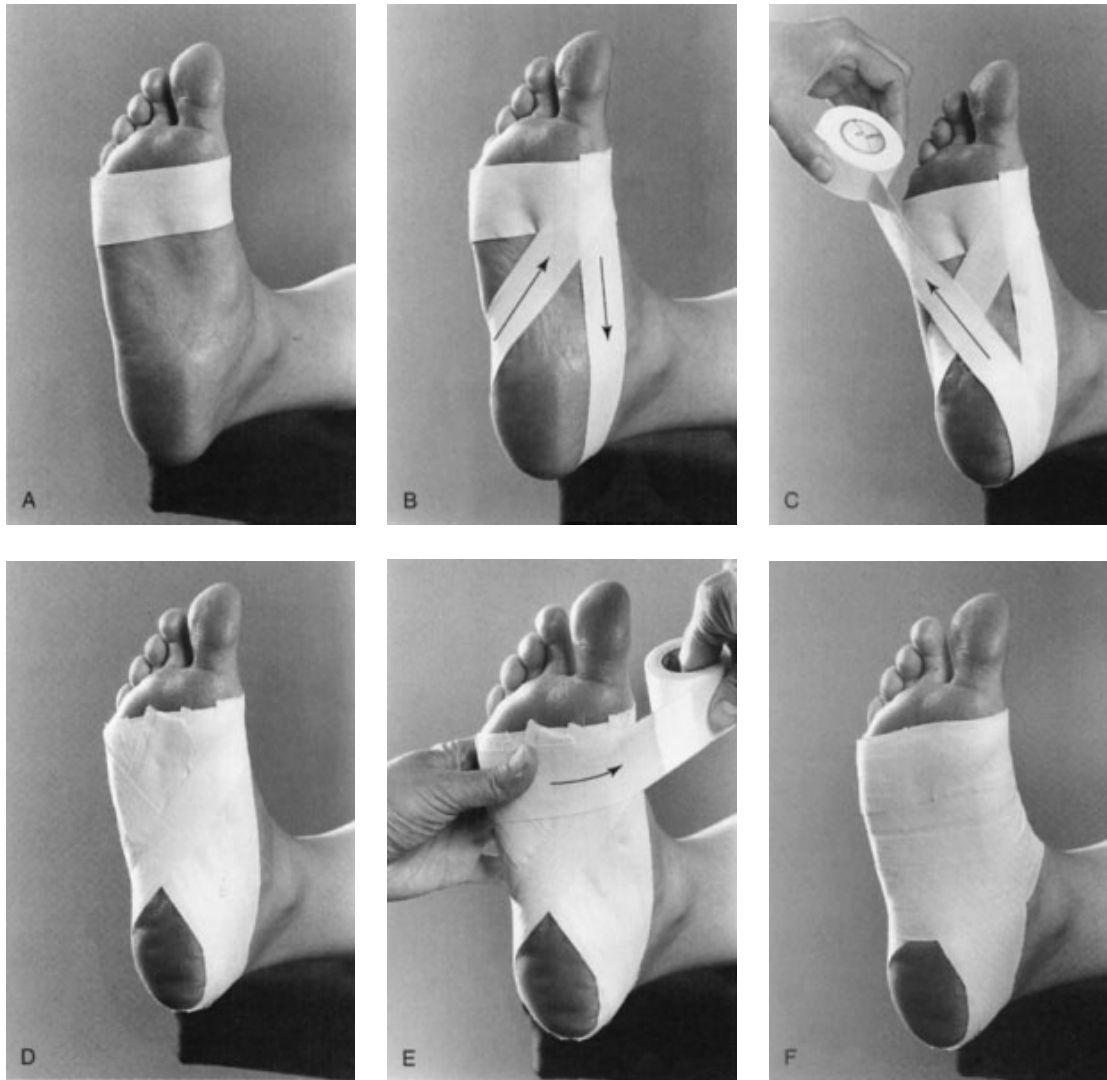
Arch Support: Technique 2. If additional support is required, an alternative "X-arch" technique may be applied (**Figure 4.9**). In particular, this technique can be useful providing support for the plantar fascia. An anchor strip is placed at the level of the distal metatarsal heads. Beginning at the 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,



▶ **Figure 4.7.** A great toe strapping may be used for turf toe.



▶ **Figure 4.8.** When applying circular bands to support the arch, do not constrict circulation to the toes. **A, B,** Rather, anchor the tape under the 5th metatarsal and lift only through the arch area. **C, D,** An arch pad may also be used under the circular straps for additional arch support.



► **Figure 4.9.** X-arch strappings provide additional arch support for individuals who do extensive running and jumping.

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, the same pattern is followed until the entire arch is covered. The technique is closed using the simple arch taping technique. An alternative closing technique is to use elastic tape.

Arch Support: Technique 3. This technique provides additional support to the medial longitudinal arch. This technique differs from the previous taping in the direction of pull of the support strips. Following the application of the distal anchor, the tape is pulled from the base of the great toe along the medial aspect of the foot, around the heel, and angled across the arch to end at the starting point. The next strip of tape initially follows the same pattern, but from underneath the foot, the tape is angled toward the medial longitudinal arch proximal to the previous strip (**Figure 4.10**). The process is repeated

until the arch is covered. The technique is closed by applying a simple arch taping.

► *Metatarsal Arch Taping*

This technique can be advantageous in the management of metatarsalgia and Morton's neuroma (see Chapter 17). It is designed to provide support for the metatarsal arch. A teardrop-shaped felt pad is placed slightly proximal to the heads of the 2nd through 4th metatarsals (**Figure 4.11**). The pad is held in place by anchoring it with elastic tape. Caution must be taken to avoid applying the tape too tightly, resulting in restriction of normal foot movement.

► *Heel Contusion Taping*

This taping helps to reinforce the calcaneus fat pad. The patient's ankle should be placed in a neutral position.



► **Figure 4.10.** Alternate arch support taping.

Anchor strips are applied behind and below the heel (**Figure 4.12**). Using a basket weave technique, strips of tape are applied until the heel is covered. Anchors are reapplied to close the taping.

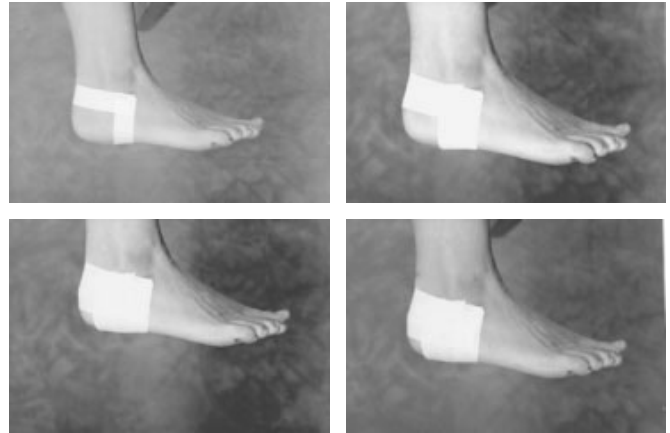
► *Open Basket Weave Ankle Taping*

The open basket weave is used to control swelling and limit motion associated with an acute inversion, eversion, or syndesmotic ankle sprain (4,5). The patient should sit on the table with the ankle flexed at 90°. Using nonelastic tape, one anchor is applied 4 to 6 inches proximal to the ankle joint and another anchor at the level of the metatarsal heads. These anchors help to secure the remaining strips of tape to the skin (**Figure 4.13**). It is important to apply the anchors without constricting circulation.

The next step is the application of a “stirrup” strip. The tape is placed on the medial aspect of the proximal anchor, extends behind the medial malleolus, under the heel, behind the lateral malleolus, and secured back to the proximal anchor. Next, a “horseshoe” strip of tape is



► **Figure 4.11.** Metatarsal arch taping for metatarsalgia and Morton’s neuroma.



► **Figure 4.12.** Heel contusion taping.

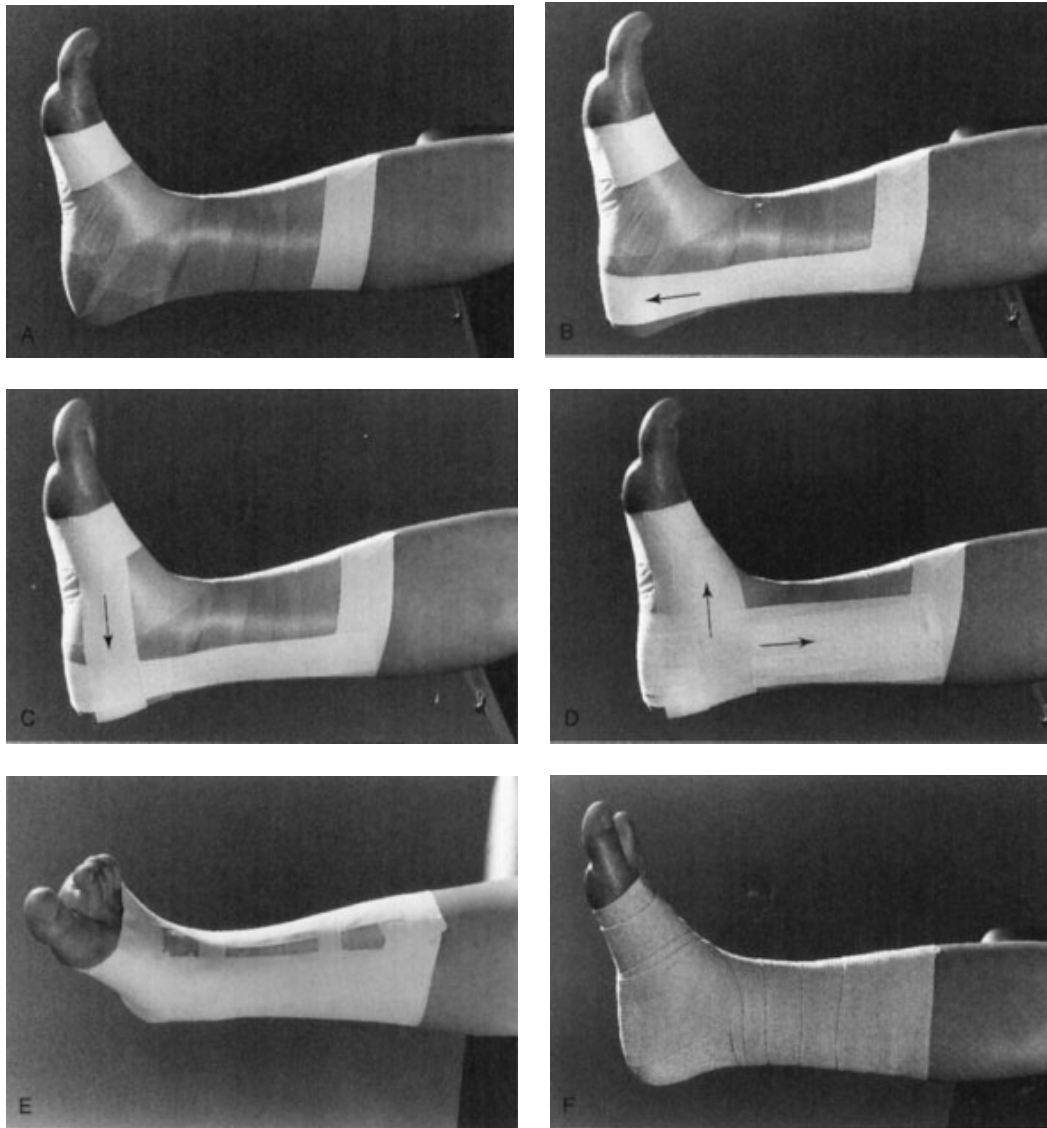
applied. Beginning on the medial aspect of the distal anchor, the horseshoe strip follows the base of the first metatarsal, travels behind the calcaneus, continues to the base of the fifth metatarsal, and ends on the distal anchor.

This process of alternating stirrups and horseshoes is continued, leaving approximately a one-half inch opening on the anterior aspect of the lower leg and foot. This opening allows for some swelling to occur, but limits gross edema. The plantar aspect is then closed with semicircular strips of tape and the tape edges are then reanchored. 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 basket weave).

An elastic wrap then may 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 performing rehabilitative exercises. However, the tape may be left on for up to 2 days, as long as the skin under the tape is intact and circulation is normal. Application of cold directly over the tape is permissible, but measures should be taken to avoid getting the tape wet. Typically this can be accomplished by placing the leg in a plastic bag during the cold treatment. Tape that becomes wet from perspiration, ice treatments, or bathing should be removed to avoid skin **maceration**. Any sign of skin maceration or breakdown warrants the immediate removal of the tape for further evaluation and treatment.

► *Closed Basket Weave*

The closed basket weave technique is used to provide external support to ankle ligaments and joint proprioception during activity (**Figure 4.14**). Because most ankle sprains are caused by excessive inversion, this explanation focuses on providing support to the lateral ligaments. Adaptations can be made for eversion ankle sprains by neutralizing the pull of the stirrups for support.

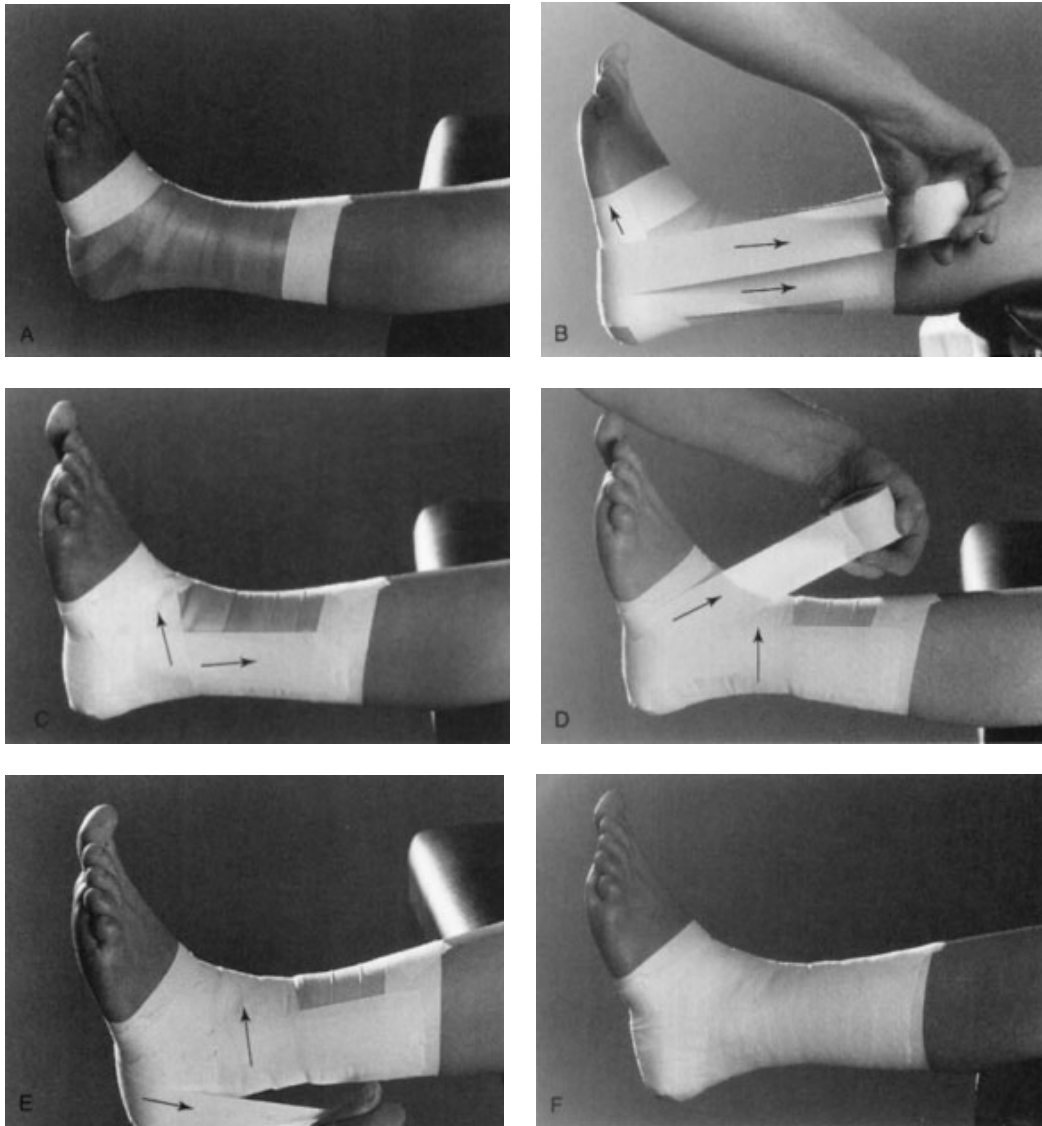


► **Figure 4.13.** An open basket weave is used to control swelling and limit motion after an acute ankle sprain.

The lower leg and foot should be clean, dry, and free of hair. A gauze or foam pad with a lubricant should be applied to the dorsum of the ankle and Achilles tendon area. The patient is positioned in subtalar neutral with the foot held at 90° of flexion. A proximal anchor should be placed approximately 4 to 6 inches above the ankle joint, distal to the belly of the gastrocnemius. The distal anchor is positioned so that it bisects the styloid process of the fifth metatarsal. Beginning on the medial aspect of the superior anchor, a stirrup strip is applied so that it runs down behind the medial malleolus, under the heel, behind the lateral malleolus, pulls up on the lateral aspect, and ends 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 applied, working again from medial to lateral, overlapping one-half to two-thirds of the previous strip. This alternation continues until there are at least three stirrups and three horseshoes in place. The design of this technique gives the tape an appearance of a woven basket and increases the overall strength on the taping. A figure-eight and heel locks are then applied. The figure-eight starts on the lateral malleolus, crosses over the dorsum of the foot to the medial arch, follows under the foot and up on the lateral aspect of the foot, crosses over the top of the foot to the medial malleolus, continues behind the lateral malleolus and back to the starting point. The technique continues by



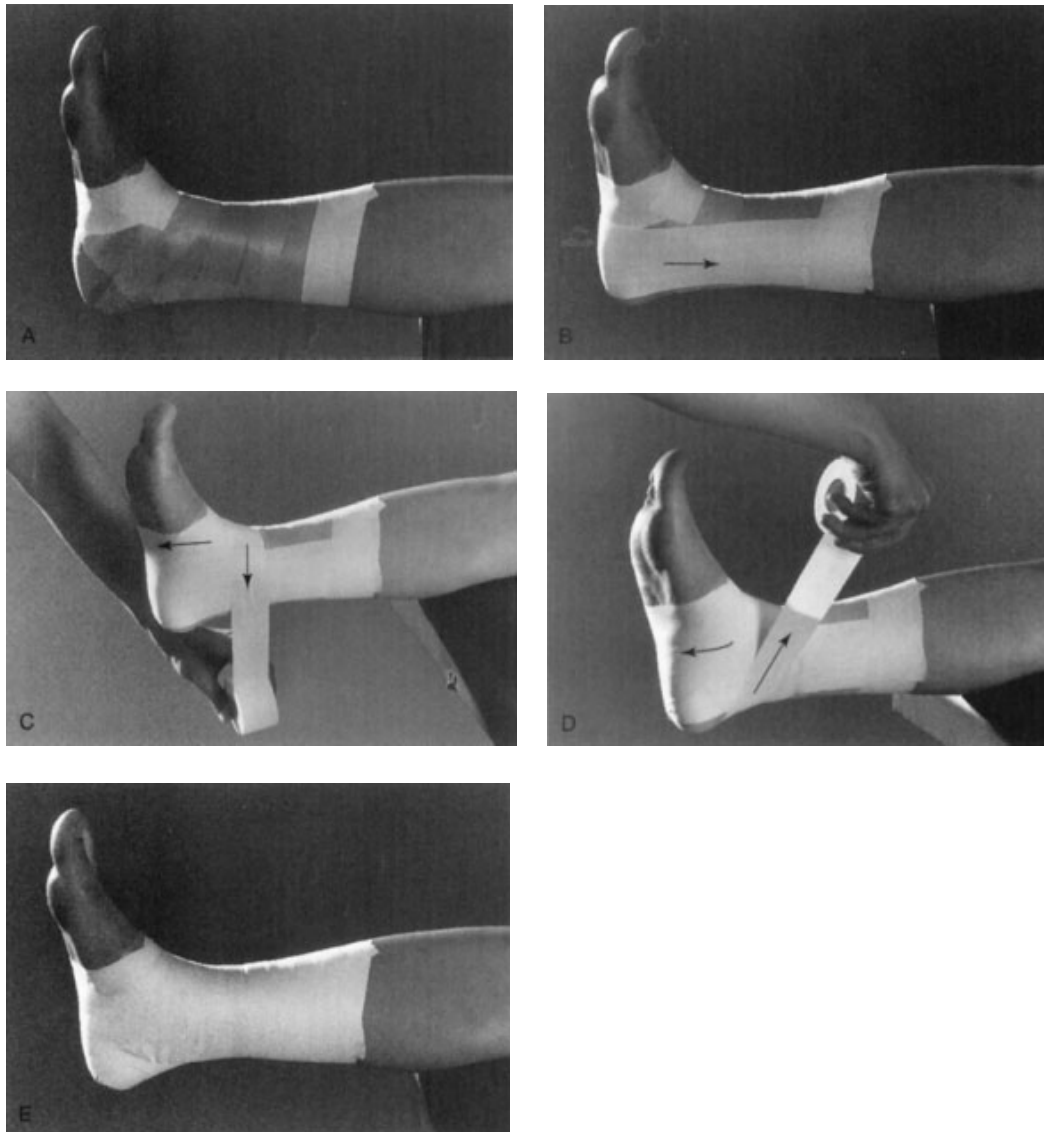
► **Figure 4.14.** A closed basket weave can provide external support to the ankle after the individual has been cleared for participation.

initiating the application of the heel locks. The tape is directed over the dorsum of the foot and down the medial arch, angled back toward the heel as it crosses the bottom of the foot, pulled up on the lateral aspect of the heel so that it runs behind the lateral malleolus and around the heel to the medial malleolus. From the medial malleolus, the tape is directed over the dorsum of the foot and down the lateral side, angled back toward the heel as it crosses the bottom of the foot, pulled up on the medial aspect of the heel so that it moves behind the medial malleolus and around the heel to the lateral malleolus. Finally, the taping technique is closed from distal to proximal using horizontal anchor 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.

The most common problem with applying tape that restricts motion is that it can be applied too tightly, resulting in constriction of circulation and discomfort. This is especially true with the distal anchor. This can be avoided by placing the distal anchor on the foot without applying tension.

► *Modified Ankle Taping*

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 and postinjury taping for an individual who has completed the rehabilitation program. Patients who require a more substantial amount of support can combine this taping with a brace or use the closed basket weave technique.



► **Figure 4.15.** The competitive game strapping is fast and easy to apply, but provides only a moderate amount of support to the ankle.

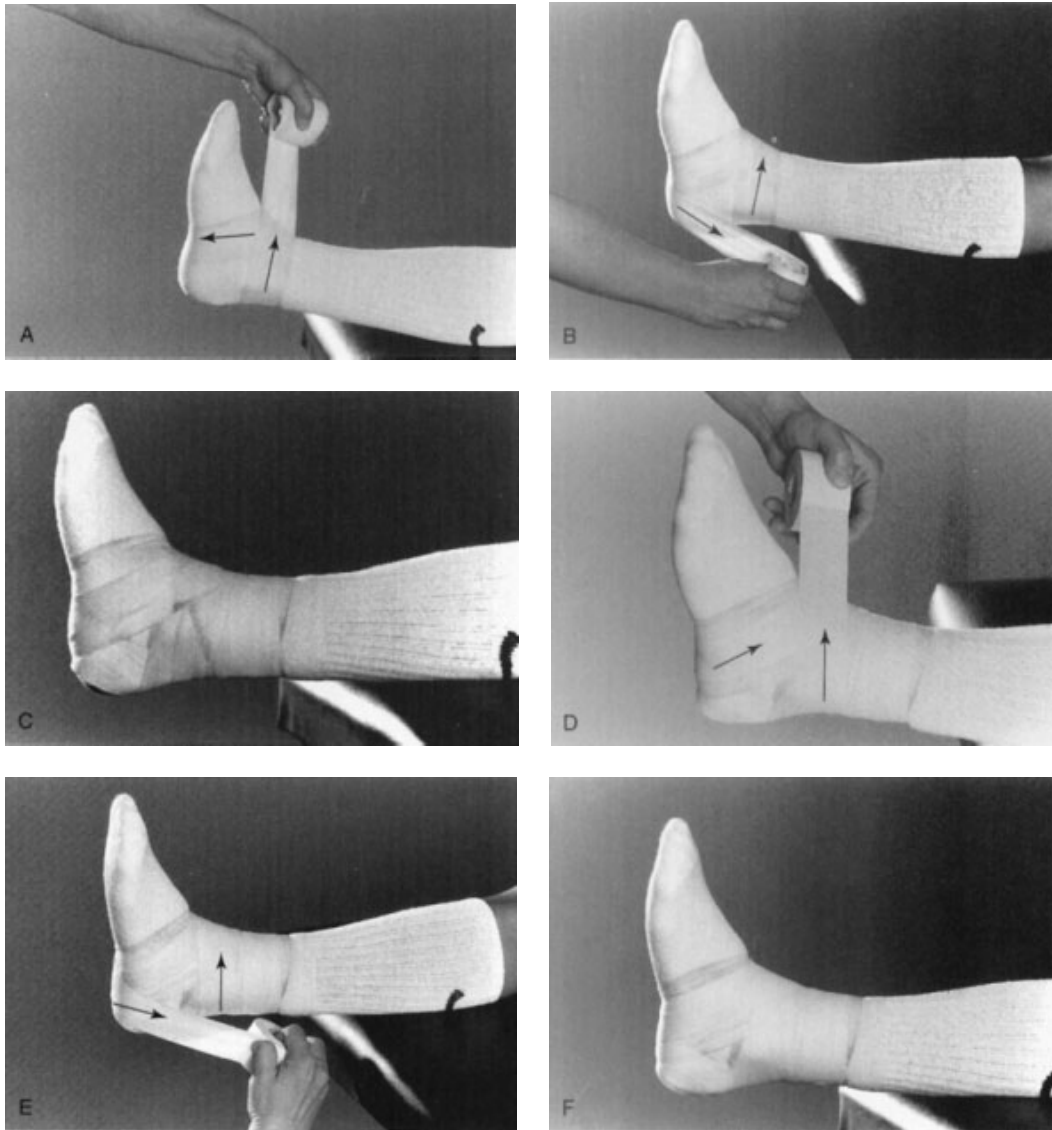
The skin is prepared in the same manner as the closed basket weave taping. The patient is positioned in subtalar neutral with the foot held at 90° of flexion. Anchors are applied to the foot, bisecting the styloid process of the fifth metatarsal. The second anchor is applied 4 to 6 inches above the ankle joint, slightly distal to the belly of the gastrocnemius. Next, beginning on the medial aspect of the superior anchor, three stirrups are applied (**Figure 4.15**). These strips run posterior to anterior, each overlapping one-half to two-thirds of the previous stirrup, so that the malleoli are completely covered. The technique continues by applying a figure-eight with heel locks in a continuous fashion. Caution should be used when crossing behind the Achilles tendon, because tight tape may cause skin irritation and blisters. A second figure-eight is then applied. Finally, the taping 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. 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 sock while the ankle is held at 90°. The sock should be snug and free of wrinkles. Starting at a position slightly distal to the medial malleolus, a series of figure-eight and heel locks are completed with the cloth wrap (**Figure 4.16**). When



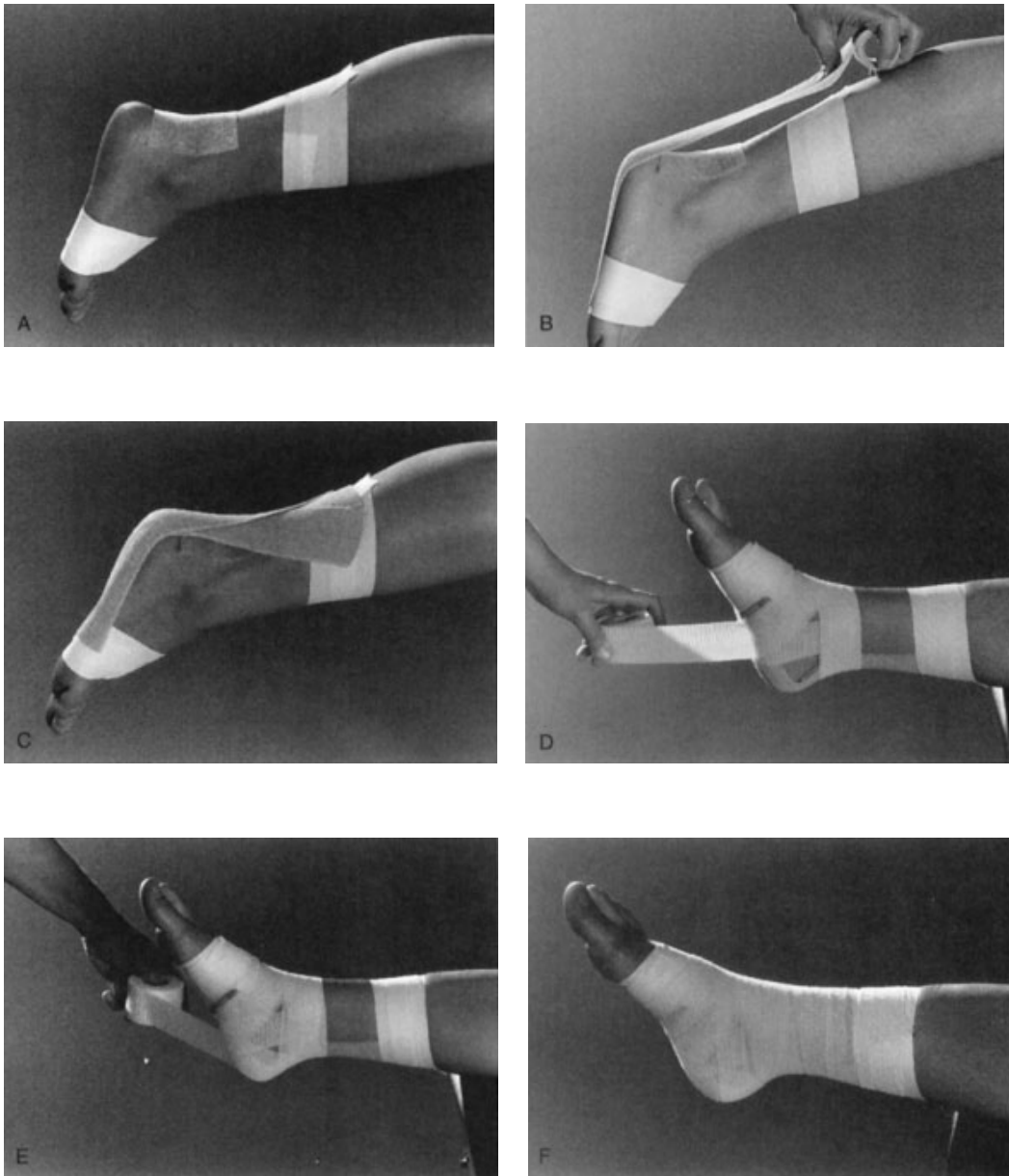
► **Figure 4.16.** When combined with nonelastic tape, a cloth ankle wrap can provide adequate support to an ankle.

approximately 12 inches of the material remains, it should be wrapped in a circular fashion around the lower leg. The end of the material is anchored with nonelastic tape. If additional support is desired, apply a figure-eight and heel locks over the cloth wrap with nonelastic tape.

► *Achilles Tendon Taping*

Taping of the Achilles tendon limits excessive dorsiflexion, and, in doing so, reduces the tension placed on the tendon. The patient lies in a prone position on the taping table with the lower leg extended over the table. The foot is passively dorsiflexed to determine the spot of discomfort. This indicates the point to which motion is to be allowed, while restricting any further painful motion. While the patient holds the foot in slight plan-

tar flexion (**Figure 4.17**), using nonelastic tape, anchors are applied at the base of the metatarsals and 4 to 6 inches above the ankle joint, slightly distal to the belly of the gastrocnemius. A heel pad with lubricant is placed over the Achilles tendon. Using 2-inch elastic tape, three to five strips are applied in an X pattern from the distal to proximal anchor forming a check rein. The X is reanchored distally and proximally with nonelastic tape. The patient then moves to a seated position. Using elastic tape, a figure-eight and heel locks are then applied. Caution should be taken to avoid applying added pressure over the irritated Achilles tendon area. In addition, a heel lift also may be placed in the shoe to limit dorsiflexion; however, lifts should be placed in both shoes to prevent any undue stress on other body parts.

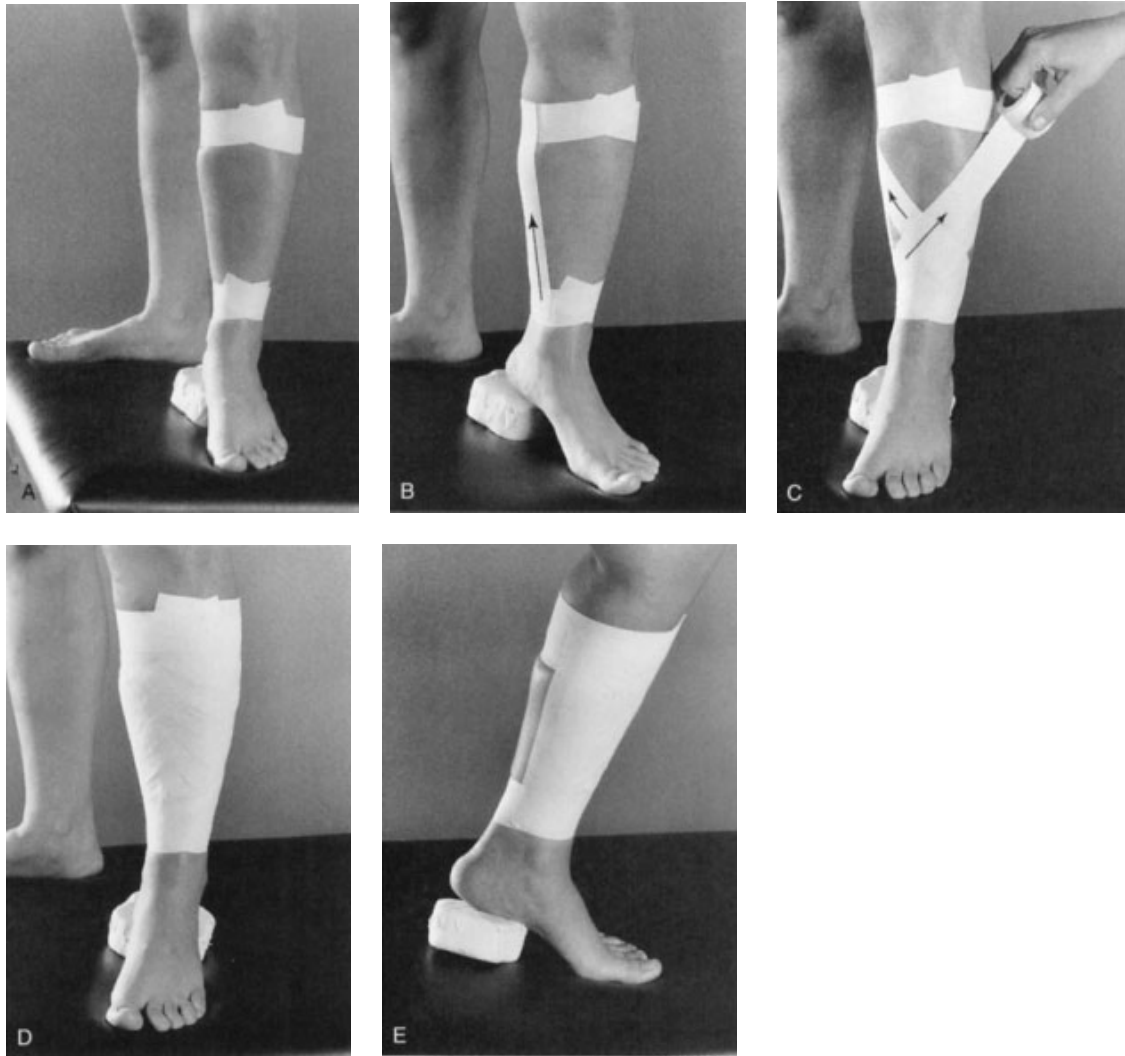


► **Figure 4.17.** Taping of the Achilles tendon limits excessive dorsiflexion, thus reducing tension on the tendon. This strapping also can be combined with a heel lift placed in the shoe to limit further stress on the tendon.

► *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 taping may help alleviate symptoms. If the condition is related to tendinitis of the tibialis posterior muscle, taping the ankle to limit eversion may provide some relief. Stress fractures and compartment syndromes do not benefit from taping, and actually may be aggravated by compression from the tape. This technique should not be applied until the actual source of pain has been identified by an experienced health care provider.

The patient stands on a table facing the athletic trainer. A heel lift is 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. Medial and lateral anchor strips are placed from distal to proximal, lifting up against gravity (**Figure 4.18**). These should follow the line of the malleoli. Tape is applied in an alternating oblique direction, forming an X over the anterior shin, and working distal to proximal until the entire anterior shin is covered. Then medial and lateral anchors are applied, followed by the placement of distal and proximal anchors.



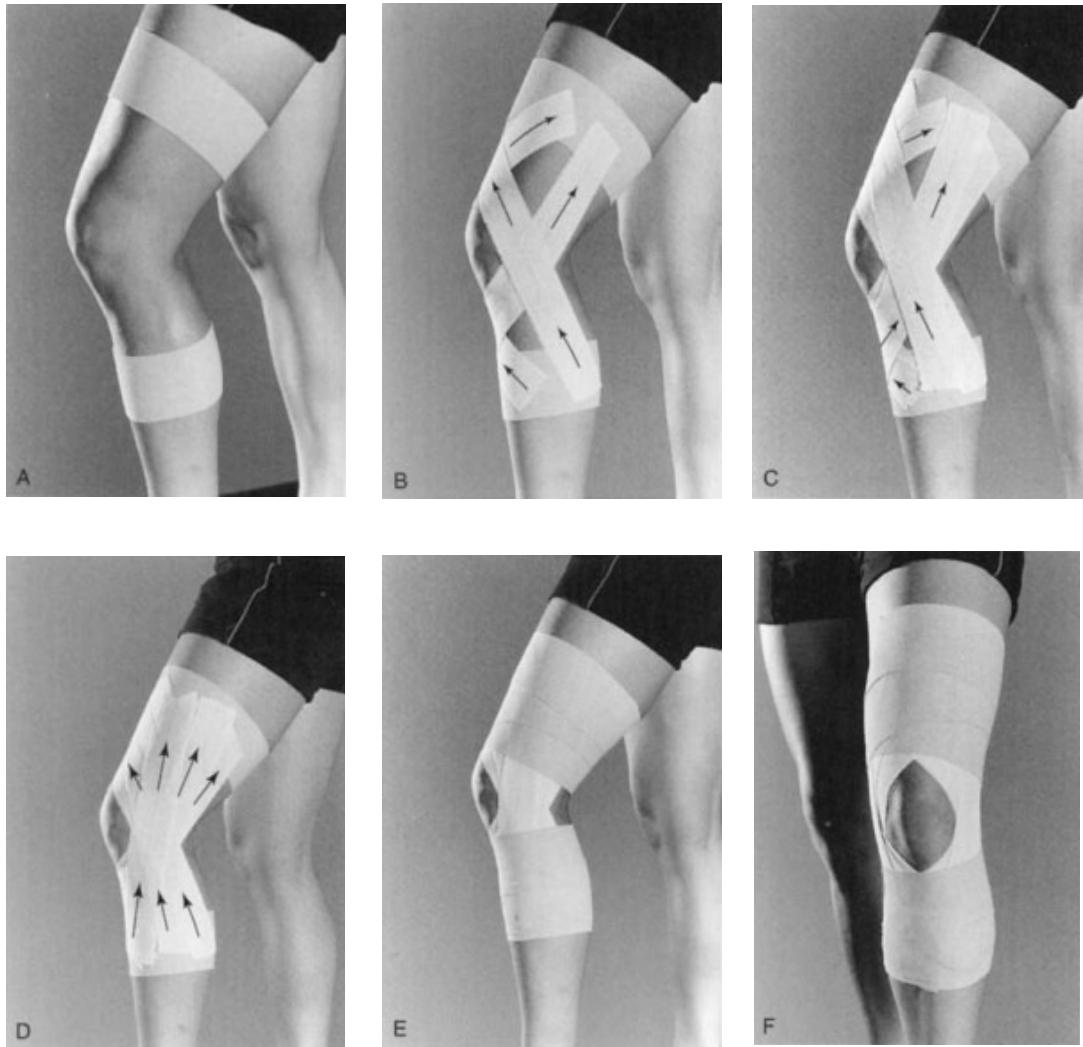
► **Figure 4.18.** Anterior shin pain may originate from several different injuries. Therefore, this strapping should not be applied until the actual source of pain has been identified and treated.

► *Collateral Ligament Support for the Knee*

This taping is designed to provide support and stability to the collateral ligaments of the knee. The patient should be standing on a table with the affected limb resting on a 1½- to 2-inch heel lift. Elastic tape is commonly used because of the dense musculature involved. A distal anchor is applied 2 to 3 inches below the level of the tibial tuberosity; a proximal anchor is placed at the midpoint of the quadriceps muscle group (**Figure 4.19**). Lateral and medial supportive strips are applied in an X fashion that outlines the medial and lateral collateral ligaments, but keeps the patella exposed. Successive interlocking Xs 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 purpose of this taping is to provide support and stability to the anterior cruciate ligament. The patient stands on the table with the heel elevated. Using elastic tape, anchors are placed 2 to 3 inches below the tibial tuberosity and at the midquadriceps (**Figure 4.20**). 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 placed around the patella and interlocked. 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. Once in place, the taping is closed with circular



► **Figure 4.19.** Knee collateral ligament support.

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 technique.

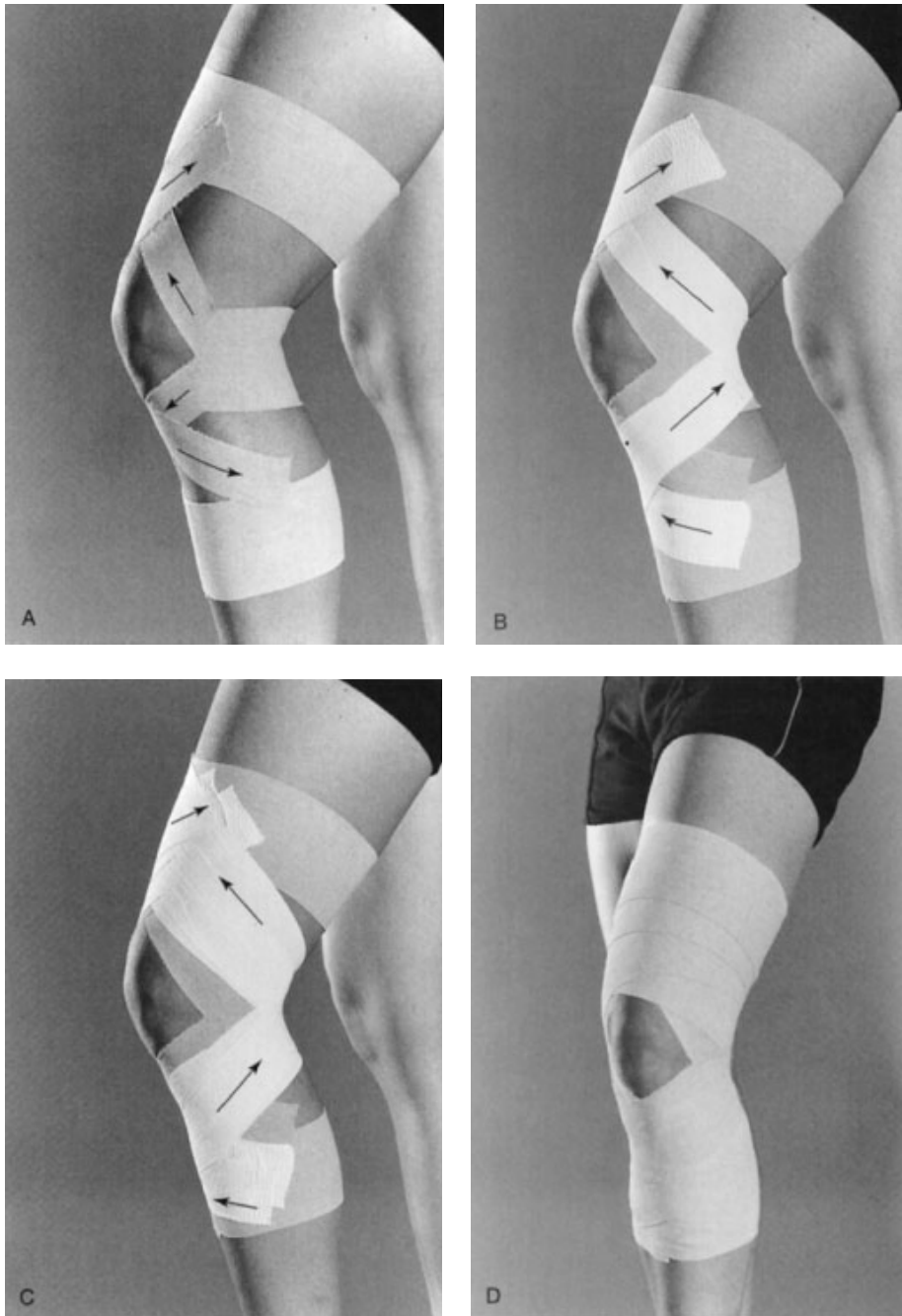
► *Knee Hyperextension*

This taping limits hyperextension of the knee and may be applied with elastic or nonelastic tape. With the patient standing on a table with the heel elevated, a superior anchor is placed at midthigh, encircling the entire thigh; an inferior anchor is applied 2 to 3 inches below the tibial tuberosity (**Figure 4.21**). A gauze pad with lubricant is placed in the popliteal space, reducing the friction of the nerves and circulatory supply to the knee. From the inferior anchor, apply tape strips in an X pattern over the gauze in the popliteal space. The X pattern should begin

wide and become narrower as the popliteal space is covered. The last strip runs perpendicular to the anchors. The technique is completed by applying two to three anchors on the lower leg and four to five anchors on the thigh, each overlapping one-half to two-thirds of the previous strip. When completed, the taping should allow knee flexion and extension, but limit hyperextension.

► *Patellofemoral Taping: McConnell Technique*

This technique is designed to treat patellofemoral pain by correcting patella alignment (**Figure 4.22**). The purpose of this taping is to provide a sustained stretch of tight lateral structures and improve lower limb mechanics. An essential component of this taping is an evaluation of the patella orientation, including the components of gliding, tilt, rotation, and anterior-posterior orientation (6).

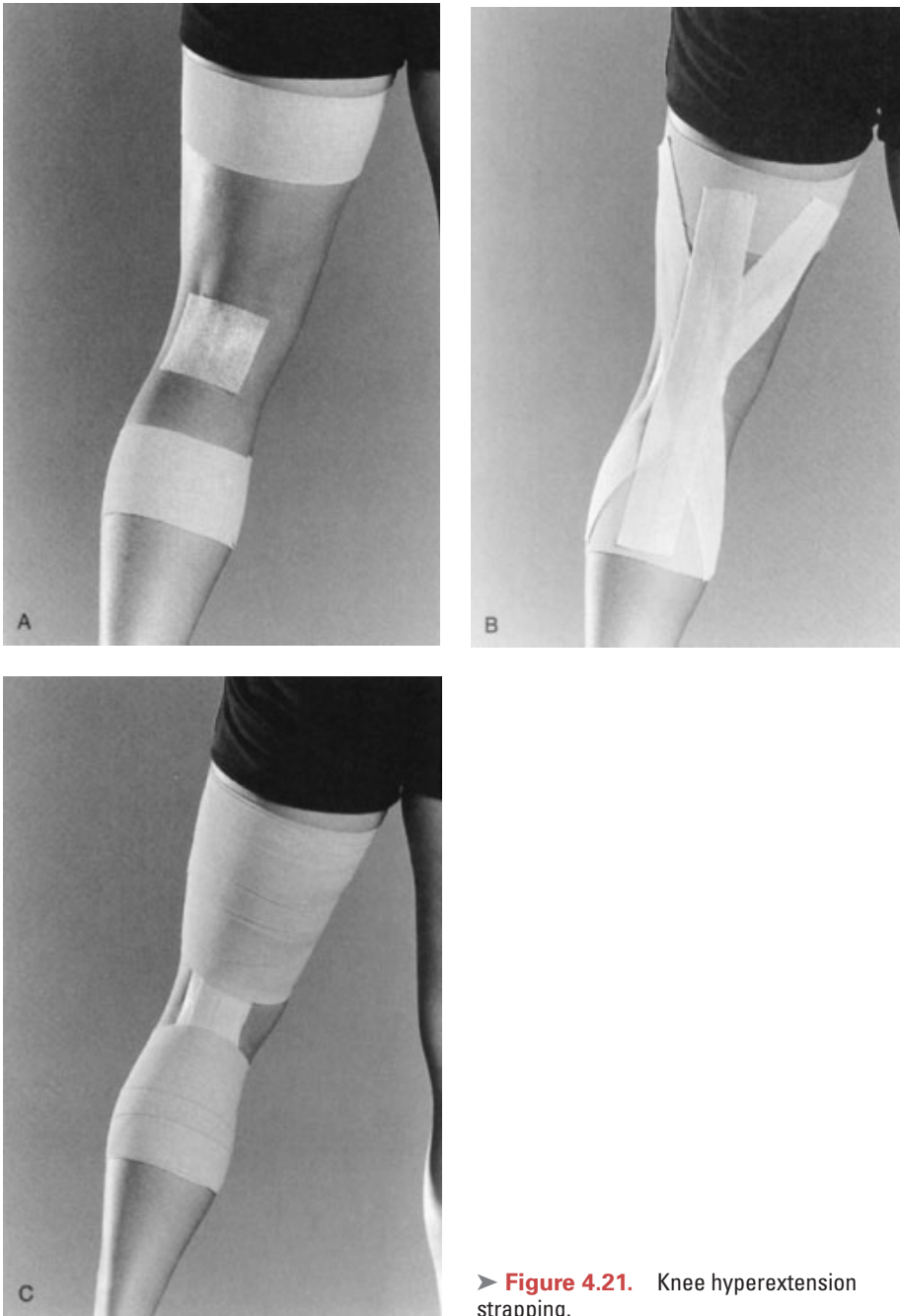


► **Figure 4.20.** Rotary knee instability strapping.

The area should be shaved and clean, and tape adherent applied. The patient is positioned with the knee in full extension. The two tapes used for this technique are specialty tapes, Fixomull and Leuko Sportape (Biresdorf Australia, Ltd.). The initial step is the application of base strips, covering the patellar, applied with the Fixomull tape. This is performed by placing strips on the lateral condyle and extending them across the anterior aspect of the knee to the medial femoral condyle of the knee. For the remainder of the technique, the Leuko Sportape is used.

In correcting a lateral glide, the tape begins on the lateral border of the patella and is pulled medially. The

soft tissue should be lifted over the medial femoral condyle toward the patella to provide for a more secure fixation. A lateral tilt correction is performed by placing the tape on the middle of the patella. The next step is to pull the tape medially to lift the lateral border. The soft tissue over the medial femoral condyle should be lifted toward the patella for a more secure fixation. Correction of external rotation is completed by applying the tape to the middle of the inferior border of the patella. Rotating the inferior pole internally and superior pole externally, the tape is pulled upward and medially. In correcting the anterior-posterior component,



► **Figure 4.21.** Knee hyperextension strapping.

the middle of tape is placed on the superior half of the patella. The tape is attached equally on both sides, lifting the inferior pole.

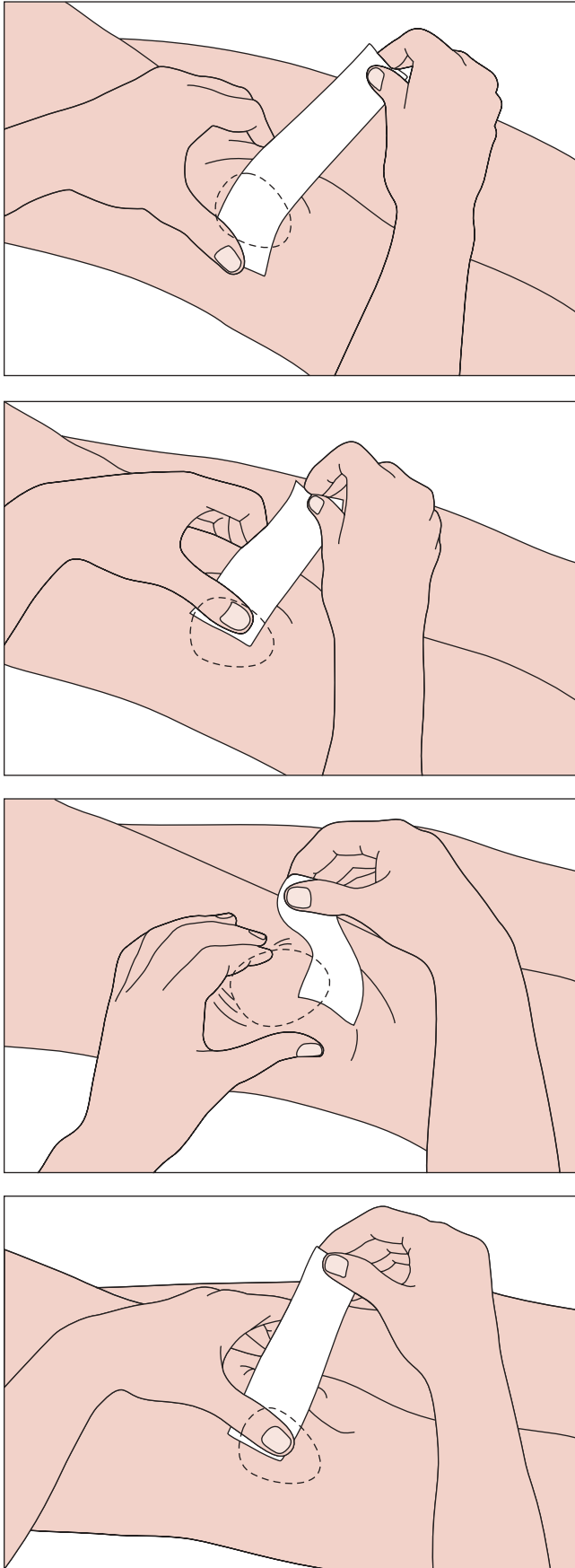
The tape is worn by the patient throughout the day. Because the tape is likely to loosen, the patient should be instructed to tighten the strips as necessary.

► *Quadriceps and Hamstrings Wrap*

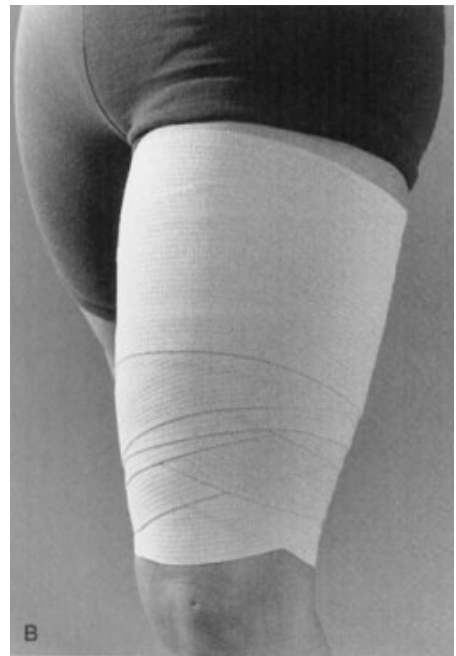
A thigh strain may involve either the quadriceps or hamstrings muscle group. This technique can be used to provide compression and/or support for either muscle group.

If the quadriceps muscles are involved, the heel of the injured leg should be elevated 2 to 3 inches on a taping block. With the thigh in a neutral position, an elastic wrap is placed on the anterior aspect of the midthigh distal to the painful site. The wrap is applied in an upward and lateral direction, encircling the thigh (**Figure 4.23**). Elastic tape is then applied over the wrap to provide additional support.

Two techniques may be used if the injury is a hamstring strain. The first technique is appropriate when the strain is to the distal portion of the muscle group. The wrap is applied in a manner similar to the quadriceps

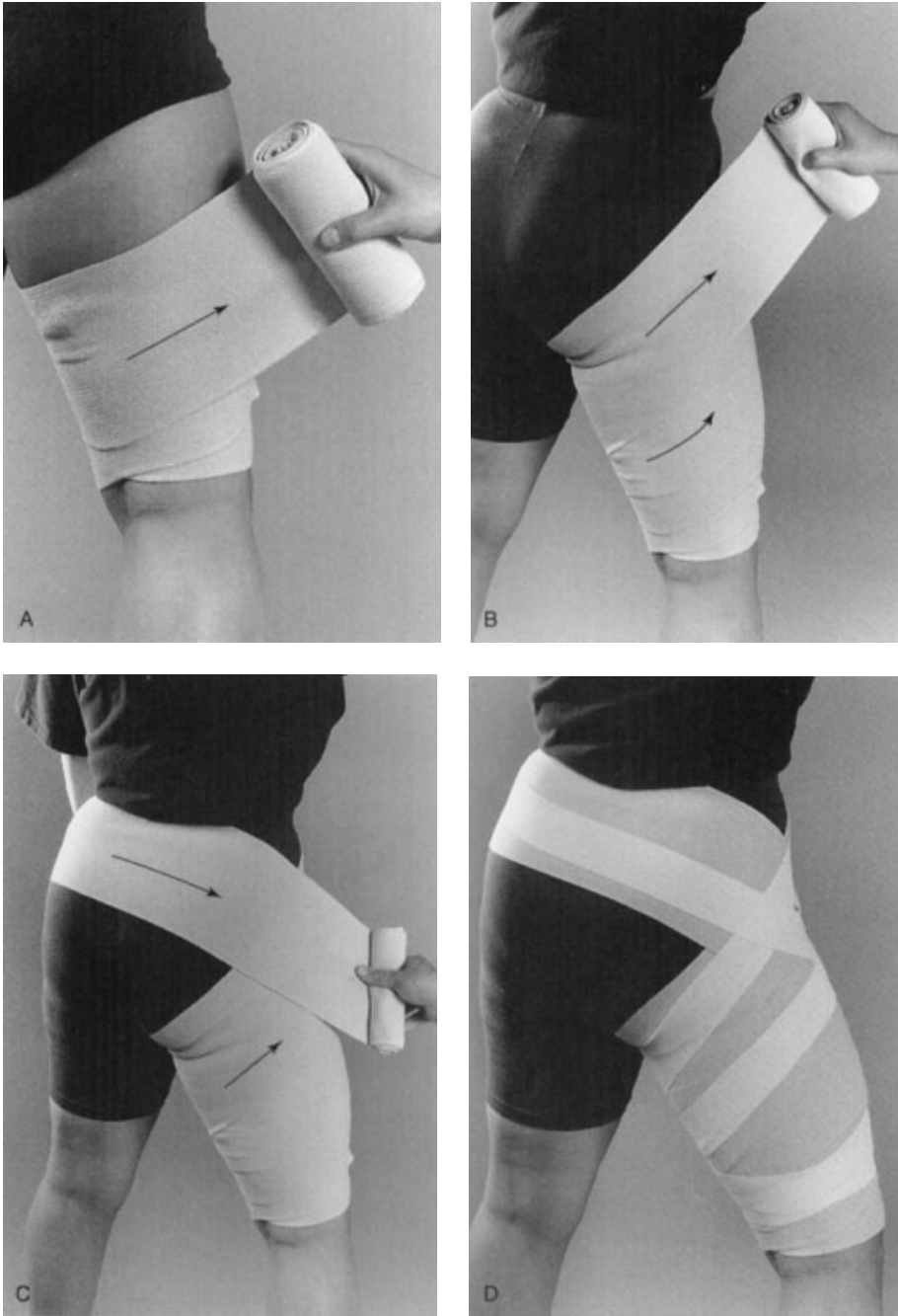


► **Figure 4.22.** Patellofemoral taping using the McConnell technique.



► **Figure 4.23.** Quadriceps wrap.

wrap. The wrap is directed in an upward and lateral manner, 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, brought around the opposite iliac crest over the waist and gluteals, then crosses the greater trochanter, ending back on the anterior thigh. The thigh is encircled again, moving



► **Figure 4.24.** Although the hamstrings strain may be wrapped in a similar manner as the quadriceps wrap, the technique shown is used when the strain is located in the proximal portion of the muscle belly.

in a medial to lateral direction (**Figure 4.24**). Repeating the same pattern, the wrap is then reinforced with elastic tape.

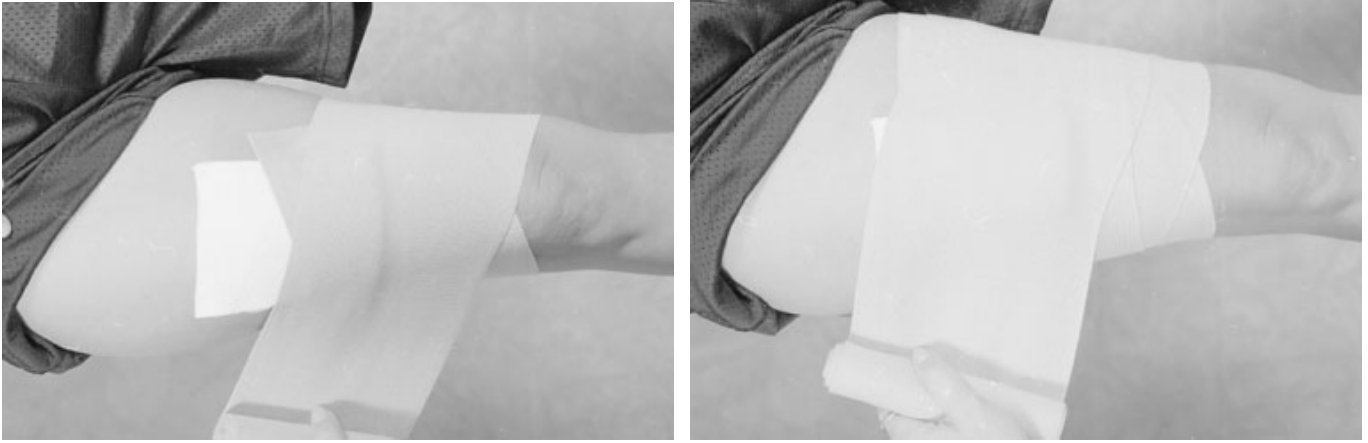
► *Quadriceps Contusion Wrap*

This technique can be used to provide compression or protection for a quadriceps contusion. In the management of a contusion, in which compression is desired, a felt pad of 1/2-inch thickness should be placed over the injured site. The pad is secured by an elastic wrap (**Figure 4.25**). Beginning at a point distal to injury, the wrap is applied in an upward and lateral direction encircling the thigh. If the desired outcome is to protect the area during activity, a foam pad should be placed over

the involved area. Following application of the elastic wrap, the wrap should be covered with elastic tape to provide additional support to the area.

► *Groin Wrap*

Although groin strains may refer to damage to the hip flexors, hip adductors, or hip abductors, this explanation focuses on preventing 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 (**Figure 4.26**). The wrap continues around the thigh, crossing over the greater



▶ **Figure 4.25.** Quadriceps contusion wrap.



▶ **Figure 4.26.** Hip spicas are often used for groin strains.

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. Following the same pattern, the wrap is then reinforced with elastic tape.

► Hip Contusion Wrap

This technique is designed to provide protection and support to a contused iliac crest. A protective pad should be placed over the iliac crest. The pad is secured applying an elastic wrap in a spica pattern (**Figure 4.27**). The wrap starts at the distal aspect of the anterior thigh, moves over the top of the pad, around the waist, diagonally down toward the lateral thigh, and behind the thigh to the starting point. This pattern is repeated for the length of the wrap. Application of elastic tape over the wrap provides additional support.



► **Figure 4.27.** Hip contusion wrap.

Taping and Wrapping Techniques for the Upper Extremity

► Acromioclavicular Taping

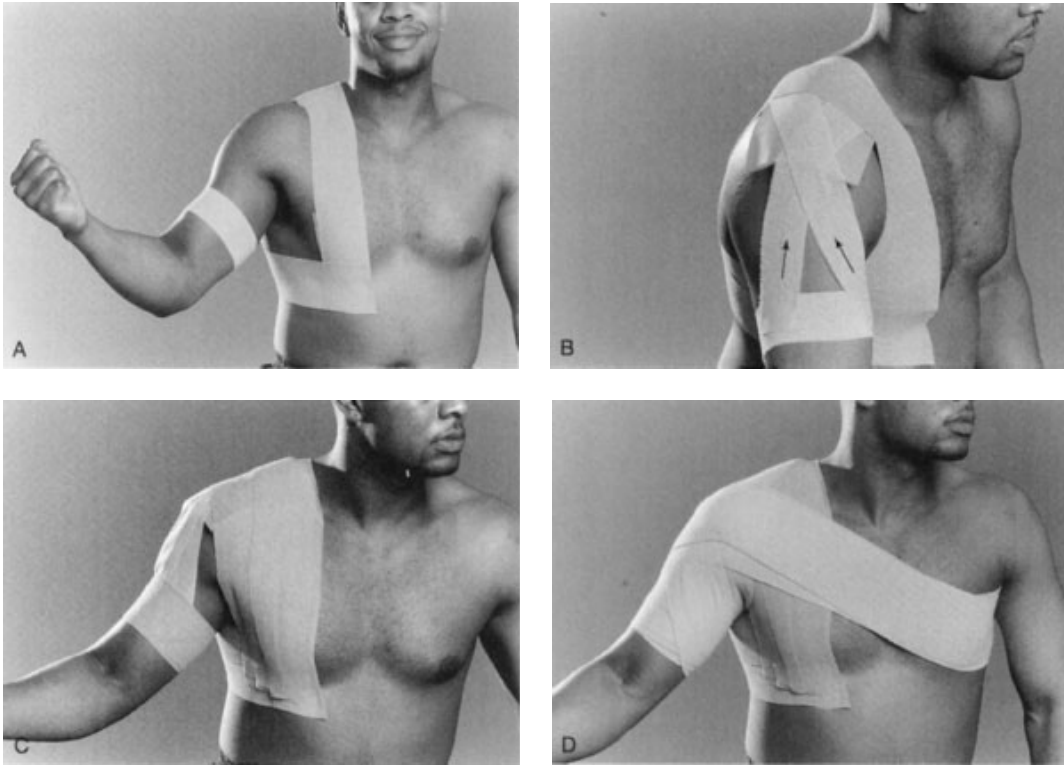
The purpose of this taping is to provide support to the AC joint. The patient is positioned with the arm placed in a relaxed position and supported at the elbow. The nipple should be protected with a gauze pad and lubricant to prevent chaffing. Using elastic tape, an anchor is placed at the midbiceps 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 (**Figure 4.28**). 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. 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.

► Shoulder Spica Wrap

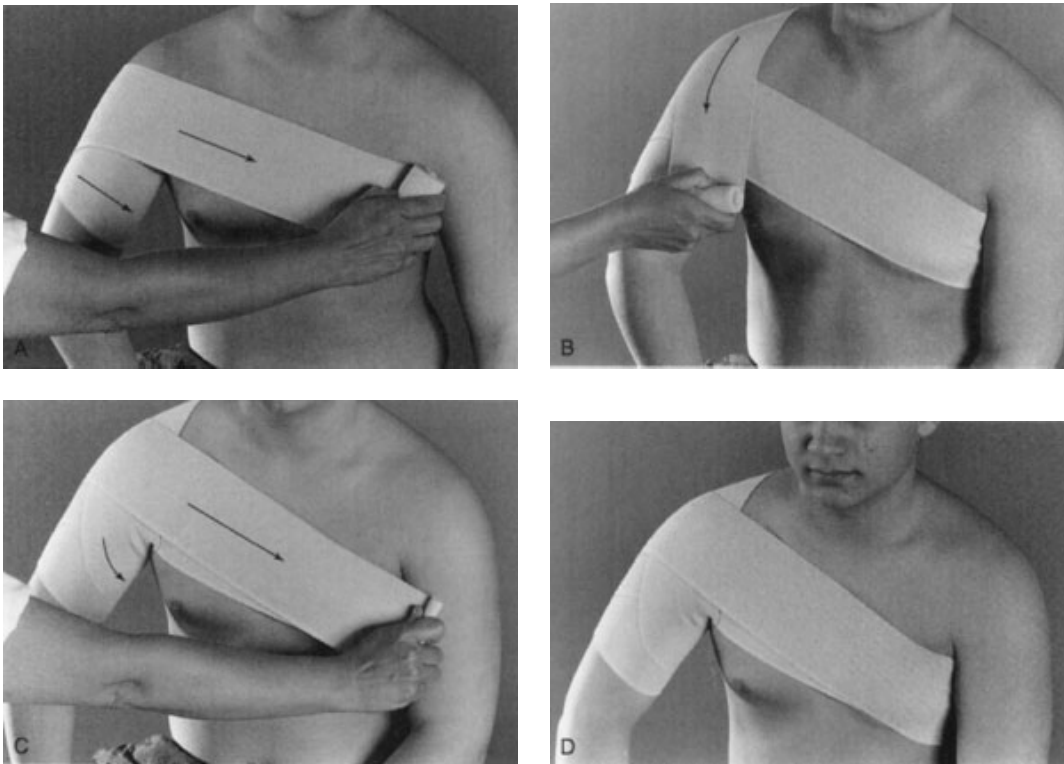
This technique can be used to provide support and stabilization for the glenohumeral joint. The patient should hold the injured arm in internal rotation. The technique begins by encircling the arm in a posterior to anterior direction at the midbiceps. Next, the anterior chest is crossed in the region of the pectoralis major (**Figure 4.29**). 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 brought under the opposite axilla, across the back, over the acromion process in an anterior direction. The wrap is then continued through the axilla, around the arm, and again across the anterior chest. Then the wrap is secured with nonelastic tape.

► Elbow Hyperextension

This technique is designed to restrict painful motion, while permitting functional movement. The patient should be instructed to clench the fist and hold the elbow in slight flexion with the palm facing up. To determine



▶ **Figure 4.28.** Acromioclavicular taping.



▶ **Figure 4.29.** Shoulder spica.

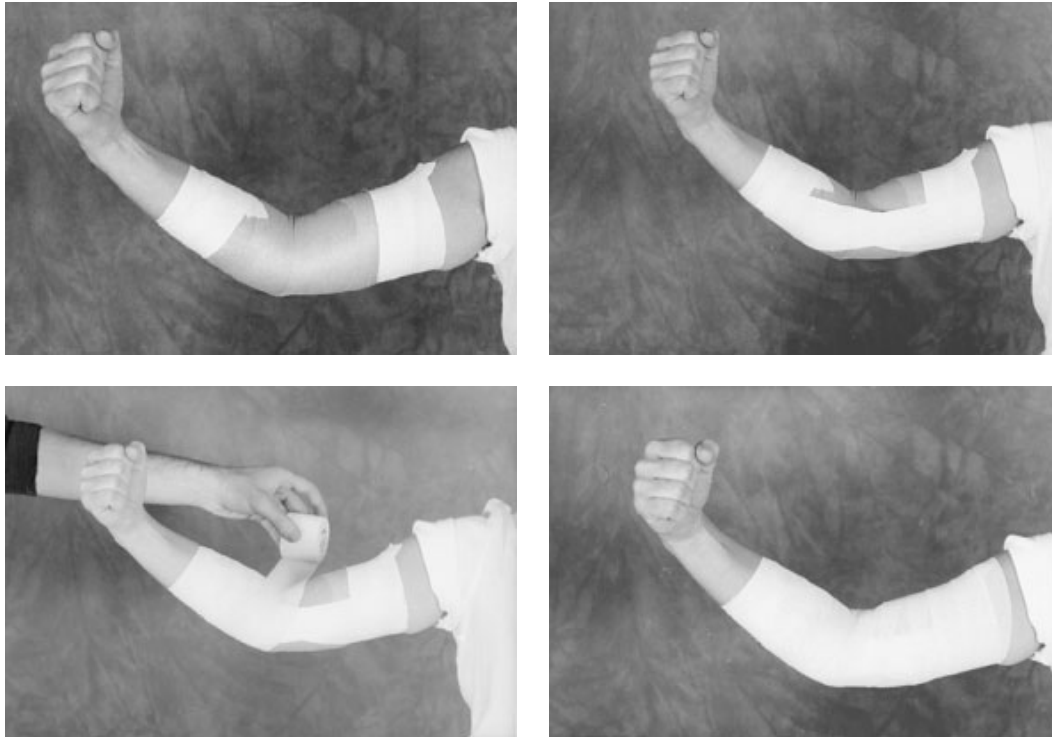
► **Figure 4.30.** Elbow hyperextension.

the degree of flexion, the elbow should be extended to the point of discomfort and then slightly flexed from that point. Using either nonelastic tape or elastic tape, anchors are applied to the midregion of the forearm and upper arm. After approximating the distance between the two anchors, two strips of tape the same length as the distance between the anchors are torn from the roll. A check rein 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 (**Figure 4.30**). The check rein is then attached to the anchors by applying three to four additional anchors. The anchors should overlap each other by one-half to two-thirds. Using an

elastic wrap, a figure-eight then may be applied to further secure the taping and prevent slipping during activity. The radial pulse should be checked and monitored to determine if the tape is applied too tight.

► *Elbow Sprain Taping*

The purpose of this taping is to provide support for the collateral ligaments of the elbow. The patient's arm is placed in a position of slight flexion. Anchors are applied to the midregion of the forearm and upper arm. If the injury is to the medial collateral ligament, using nonelastic tape, three to four strips of tape are placed over the



► **Figure 4.31.** Elbow sprain taping.

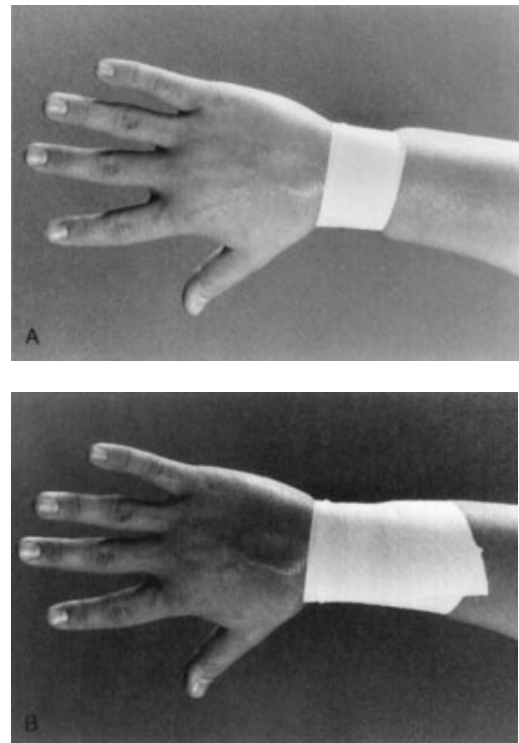
ligament in an X pattern (**Figure 4.31**). The strips are secured above and below the joint with elastic tape. The cubital fossa should remain open. The same technique can be modified for injury to the lateral collateral ligaments by changing the location of the strips.

► *Wrist Taping*

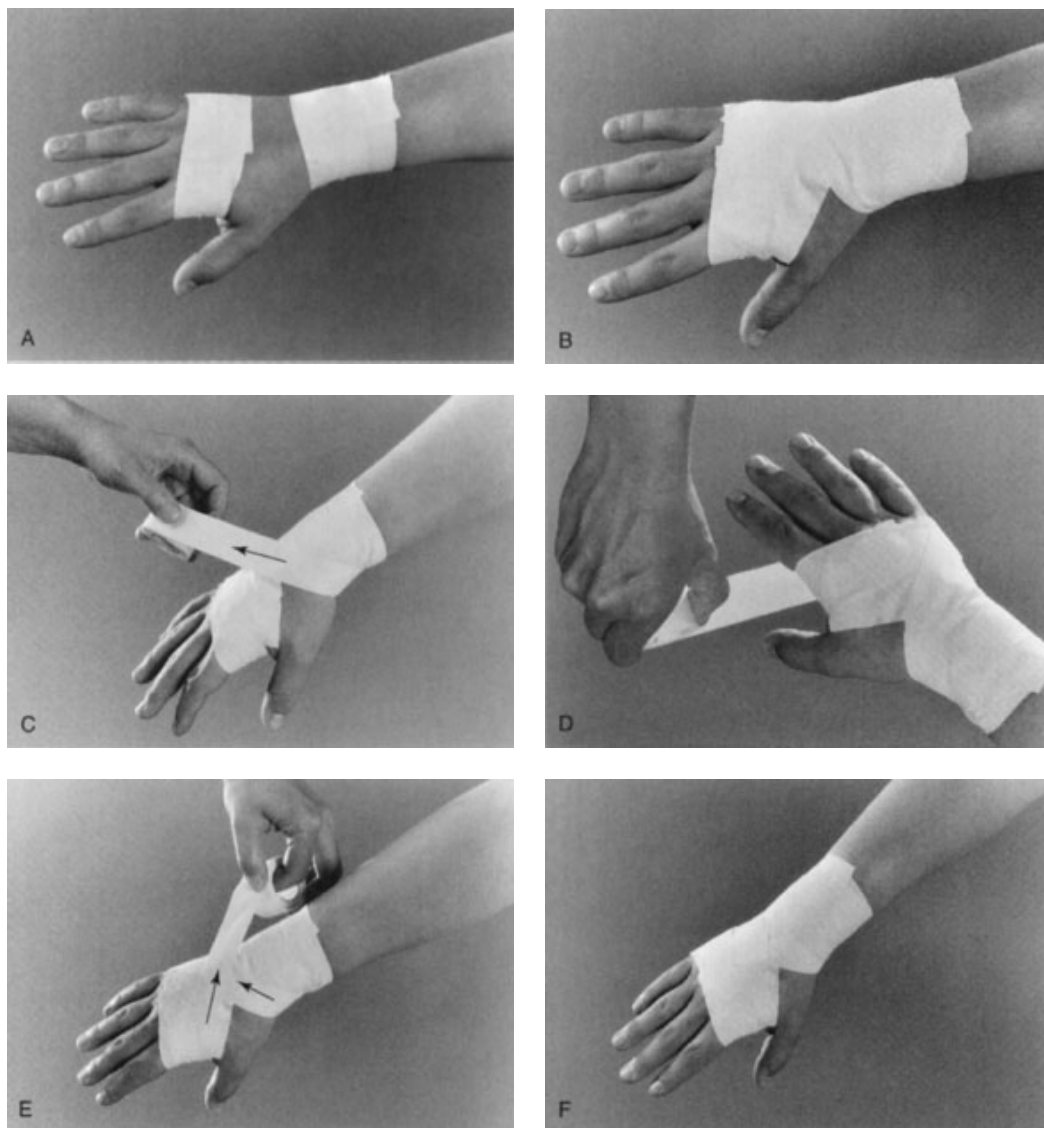
Hyperextension or hyperflexion of the wrist may damage the ligaments of the wrist. Application of a taping technique can provide support and stability for the wrist.

Wrist Taping: Technique 1. For a mild sprain, three or four circular strips of tape may be applied to the wrist. The strips should be positioned from distal to proximal and overlap the previous strip by one-half to two-thirds the width of the tape (**Figure 4.32**).

Wrist Taping: Technique 2. This technique can help to limit painful wrist motion. The patient should be instructed to spread his or her fingers. The wrist is positioned in slight flexion or extension, depending on the injury. Anchor strips are placed around the wrist and at the heads of the metacarpals (**Figure 4.33**). If the intent is to limit hyperextension, three to four strips of tape are placed in an X pattern over the palmar aspect of the hand. To limit hyperflexion, the X pattern is positioned over the dorsum of the hand; to limit hyperextension, the X pattern is positioned over the palmar aspect of the hand. Next, using either elastic or nonelastic tape, a figure-eight is



► **Figure 4.32.** For a mild wrist sprain, three or four circular strips of tape may be applied to the wrist.



► **Figure 4.33.** For a moderate wrist sprain, a more extensive strapping is necessary to limit painful motion.

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, across the palm of the hand, and end on the ulnar side of the proximal anchor. As the tape is brought through the web space of the thumb and index finger, the tape should be crimped to prevent irritation of the skin.

► *Thumb Taping*

Most thumb injuries occur when the thumb is hyperextended. Thumb taping is designed to provide support and limit extension of the 1st metacarpal-phalangeal joint. The thumb is placed in a position of slight flexion and adduction. An anchor is placed on the wrist (**Figure 4.34**). Next, a strip of tape is applied beginning on the ulnar aspect of the proximal anchor and continuing upward over the palmar aspect of the thenar

eminence on the thumb, crossing over the metacarpophalangeal joint, and encircling the thumb. The strip is then reanchored on the dorsal aspect of the anchor. This line of pull makes an X pattern. Three to four Xs should be applied before finishing the taping with additional anchors.

► *Finger Taping Technique*

Sprains of interphalangeal joints occur frequently. Taping can assist in providing support for an unstable interphalangeal joint. “Buddy” taping for the fingers involves using an adjacent finger for support. Strips of narrow tape are applied around the proximal phalanx and distal phalanx of the two fingers, leaving the joints uncovered to permit limited flexion and extension of the fingers (**Figure 4.35**).

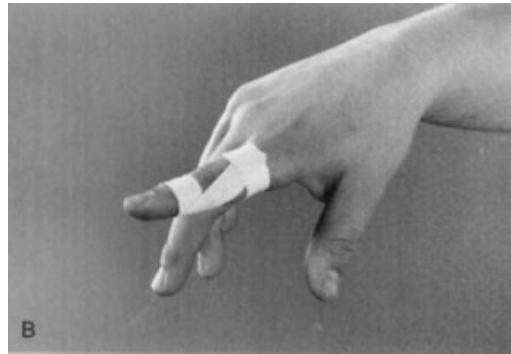
If additional support for the medial and lateral collateral ligaments is needed, anchors can be placed just



▶ **Figure 4.34.** Thumb spica.



▶ **Figure 4.35.** Buddy taping for the fingers.



▶ **Figure 4.36.** Added support for the collateral ligaments of the fingers can be provided by this strapping.

proximal and distal to the injured joint (**Figure 4.36**). Working from distal to proximal, two narrow strips of tape are applied 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, because the blood supply is very superficial and easily compressed.

A The football lineman separated his right shoulder at the AC 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 technique.

SUMMARY

1. 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.
2. Used in conjunction with a comprehensive rehabilitation program, tape or wraps can allow early resumption of activity without the threat of reinjury.
3. 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.

4. 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.

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