

Unit 6: Thumb Spica Cast

The thumb spica cast is a versatile immobilization technique primarily used to stabilize fractures and soft tissue injuries involving the thumb and adjacent structures. This type of cast extends from the proximal forearm to the distal interphalangeal joint of the thumb, ensuring adequate immobilization while preserving circulation and minimizing functional limitations post-healing. Below are detailed descriptions of common fractures managed using a thumb spica cast.





Scaphoid Fracture

Fracture Type(s) for Thumb Spica Cast

Scaphoid Fractures

- ✓ **Clinical Relevant Anatomy:** The scaphoid is a small carpal bone situated on the radial side of the wrist, bridging the distal and proximal carpal rows. It plays a critical role in wrist stability and motion. The blood supply to the scaphoid, primarily from the radial artery, is retrograde, increasing the risk of avascular necrosis, particularly in proximal pole fractures.
- ✓ **Epidemiology / Etiology / Mechanism of Injury:** Scaphoid fractures account for approximately 60%-70% of carpal bone fractures (Adams et al., 2020). They often result from a fall on an outstretched hand (FOOSH), with the wrist hyperextended and radially deviated.
- ✓ **Clinical Characteristics / Presentation:** Patients typically present with pain and tenderness in the anatomical snuffbox, swelling, and reduced wrist range of motion. Pain exacerbates with axial loading of the thumb or wrist extension.
- ✓ **Fracture Diagnosis Process:** Diagnosis is made through clinical examination and imaging. Radiographs (posteroanterior, lateral, and scaphoid views) are the first step. If initial imaging is inconclusive, advanced modalities such as MRI or CT scan can confirm the diagnosis and assess displacement.
- ✓ **Differential Diagnosis / Associated Injuries:** Distal radius fracture; Triangular fibrocartilage complex (TFCC) injury; Lunate dislocation
- ✓ **Treatment / Management Considerations:** Non-displaced scaphoid fractures are treated with a thumb spica cast for 6-12 weeks, depending on the location of the fracture. Displaced or proximal pole fractures often require surgical fixation.

Fracture Type(s) for Thumb Spica Cast

First Metacarpal Fractures (Bennett's and Rolando's Fractures)

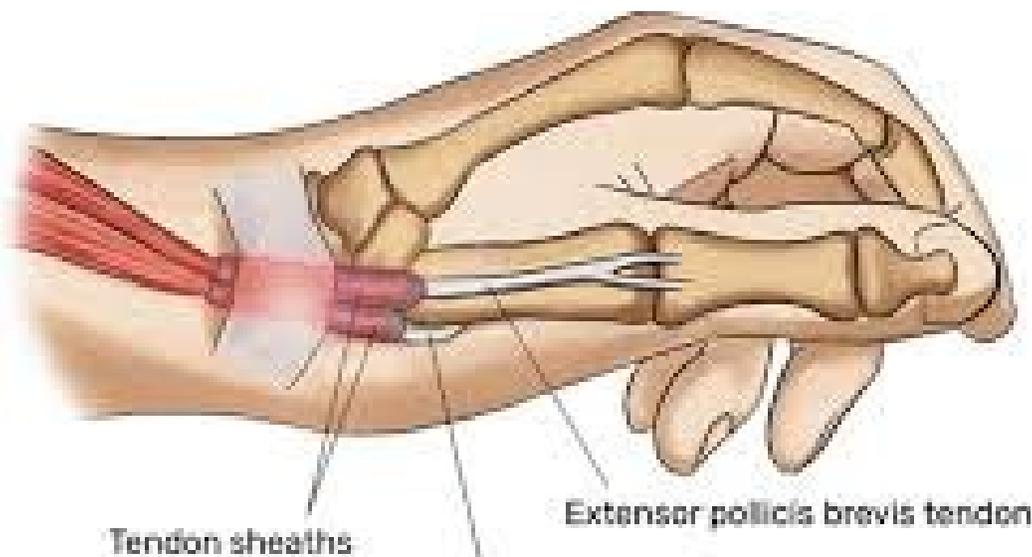
- ✓ Clinical Relevant Anatomy: the first metacarpal forms the thumb's base and articulates with the trapezium, allowing for a wide range of thumb movements. Stability is provided by the ulnar collateral ligament, volar plate, and dorsal capsule.
- ✓ Epidemiology / Etiology / Mechanism of Injury:
 - ✓ Bennett's fracture (a single intra-articular fracture-dislocation) and Rolando's fracture (a comminuted intra-articular fracture) are common in younger, active populations. These injuries typically result from axial loading or direct trauma during sports or falls.
- ✓ Clinical Characteristics / Presentation: Patients report pain, swelling, and deformity at the thumb base. Movement, particularly pinching and grasping, is markedly painful. Visible shortening or angulation may be present.
- ✓ Fracture Diagnosis Process: Radiographs confirm the fracture pattern, with Bennett's fractures showing a triangular fragment attached to the trapezium and Rolando's fractures displaying a Y- or T-shaped comminuted pattern.
- ✓ Differential Diagnosis / Associated Injuries: Gamekeeper's or skier's thumb (ulnar collateral ligament tear); Carpometacarpal joint dislocations
- ✓ Treatment / Management Considerations: Non-displaced fractures may be immobilized in a thumb spica cast for 4-6 weeks. Displaced or unstable fractures usually require open reduction and internal fixation.



Fracture Type(s) for Thumb Spica Cast

DeQuervain's Tenosynovitis (Soft Tissue Injury)

- ✓ Clinical Relevant Anatomy: This condition involves inflammation of the tendons in the first dorsal compartment (abductor pollicis longus and extensor pollicis brevis) and their synovial sheath.
- ✓ Epidemiology / Etiology / Mechanism of Injury: De Quervain's tenosynovitis is common in repetitive strain injuries due to overuse or direct trauma. It often affects individuals performing repetitive wrist and thumb motions.
- ✓ Clinical Characteristics / Presentation: Patients present with pain and swelling over the radial styloid, worsened by thumb movements or ulnar deviation of the wrist. The Finkelstein test reproduces symptoms.
- ✓ Fracture Diagnosis Process: This condition is primarily diagnosed clinically. Imaging may be used to exclude underlying fractures or arthritis.
- ✓ Differential Diagnosis / Associated Injuries:
 - ✓ Intersection syndrome
 - ✓ Scaphoid fracture
 - ✓ Radial styloid fracture
- ✓ Treatment / Management Considerations: A thumb spica splint or cast may be used for immobilization to reduce inflammation. Conservative treatment includes NSAIDs, physical therapy, and corticosteroid injections. Surgical intervention is considered in refractory cases.



Fracture Type(s) for Thumb Spica Cast

Ulnar Collateral Ligament (UCL) Injuries of the Thumb

- ✓ Clinical Relevant Anatomy: The UCL stabilizes the thumb's metacarpophalangeal joint, preventing excessive valgus stress. Injury to this ligament is commonly referred to as "skier's thumb."
- ✓ Epidemiology / Etiology / Mechanism of Injury: UCL injuries are often caused by forceful thumb abduction, such as during a fall while holding a ski pole. Chronic cases are termed "gamekeeper's thumb" due to repetitive stress.
- ✓ Clinical Characteristics / Presentation: Patients present with pain, swelling, and ecchymosis at the thumb's base. Valgus stress testing reveals joint laxity.
- ✓ Fracture Diagnosis Process: Diagnosis is clinical, with stress radiographs used to assess associated avulsion fractures.
- ✓ Differential Diagnosis / Associated Injuries: Stener lesion (displaced ligament entrapment); First metacarpal fracture
- ✓ Treatment / Management Considerations: Partial tears are treated conservatively with a thumb spica cast for 4-6 weeks. Complete tears or Stener lesions require surgical repair.



Thumb Spica Cast: Overview

Patient Preparation

Preparing a patient's skin prior to the application of an orthopedic fracture cast is crucial to ensure proper hygiene, reduce the risk of infection, and provide a comfortable fit. Here are the general steps to prepare the skin before applying a cast:

- **Removing jewelry from the affected limb prior to the application of a fiberglass cast for the upper extremity helps to ensure patient comfort, proper cast fitting, and effective healing while reducing the risk of complications during the treatment and recovery process.**
- **Clean the skin: Gently clean the area around the fracture site using mild soap and water or an antiseptic solution. This step helps to remove dirt, debris, and bacteria from the skin, reducing the risk of infection.**
- **Dry the skin: Pat the skin dry with a clean towel or gauze. Make sure the skin is completely dry before proceeding, as moisture can interfere with the adhesion of the cast materials and promote the growth of bacteria.**
- **Assess the skin: Examine the skin for any signs of infection, open wounds, or skin irritation. If there are any concerns, consult with the healthcare professional responsible for the patient's care.**
- **Apply a skin barrier (if necessary): In some cases, a skin barrier may be used to protect the skin from irritation or maceration. This could be a moisture barrier cream or spray, which can help prevent skin breakdown caused by prolonged exposure to moisture.**
- **Trim or shave hair (if necessary): Excessive hair in the cast area can cause discomfort, itching, and difficulty removing the cast later. If the patient has a lot of hair in the area, it may be necessary to trim or shave it before applying the cast. Be sure to get the patient's consent before doing so.**
- **Position the limb: Properly position the patient's limb in the desired position for casting. This may involve supporting the limb with pillows, bolsters, or other positioning aids to ensure that it remains stable and comfortable during the casting process.**
- **Once the patient's skin is clean, dry, and properly assessed, you can proceed with applying the stockinette, padding, and casting material according to the healthcare professional's instructions.**

Remember, it's essential to consult with a healthcare professional to ensure proper technique and care for the patient's specific needs.

Thumb Spica Cast: Application

Stockinette Application

- **Measure the stockinette:** Measure the length required for the stockinette, which should cover the patient's arm from the upper arm to the base of the thumb. Make sure you have enough material to fold back at the edges to create a neat finish.
- **Cut the stockinette:** Cut the stockinette to the measured length, ensuring it's wide enough to fit comfortably around the patient's arm without excessive stretching.
- **Position the patient:** Have the patient sit or lie down in a comfortable position with their arm well-supported and elevated. The fingers should be slightly flexed, and the thumb should be in a functional position (slightly abducted and extended).
- **Apply the stockinette:** Slide the stockinette over the patient's hand and up their arm, ensuring it covers the entire area where the cast will be applied. Smooth out any wrinkles or folds.
- **Create a thumb hole:** Locate the base of the thumb and carefully cut a small hole in the stockinette for the thumb to fit through. Make sure the hole is snug but not too tight, to avoid constriction or discomfort.
- **Fit the thumb:** Gently guide the patient's thumb through the hole, ensuring the stockinette covers the base of the thumb and the thumb-forefinger web space without any wrinkles or folds. The stockinette should provide a smooth, comfortable layer between the skin and the cast padding. Refer to video for detailed instructions.

Padding Application

- **Apply padding to the thumb:** Begin applying the cast padding (cotton or synthetic) around the patient's thumb, starting at the tip and working your way towards the base. Ensure adequate padding to prevent pressure sores, especially at the thumb's base and the thumb-forefinger web space.
- **Apply padding to the wrist and forearm:** Start wrapping the padding around the wrist, overlapping each layer by 50% for uniform thickness. Continue up the forearm, ensuring the padding lies smoothly without wrinkles or folds. Apply extra padding around bony prominences as needed.

Thumb Spica Cast cont ...

Fiberglass Cast Tape Application

- **Preparation:** Put on gloves to protect your hands from the fiberglass resin. Gather all necessary materials, including fiberglass casting tape, a bucket of lukewarm water, and scissors.
- **Dip the fiberglass tape:** Fully submerge a roll of fiberglass tape in the lukewarm water for a few seconds to activate the resin. Squeeze the roll gently to remove excess water.
- **Apply fiberglass tape to the thumb:** Start wrapping the fiberglass tape around the base of the thumb, working your way up towards the tip. Overlap each layer by 50% for uniform thickness. Ensure the tape lies smoothly without any wrinkles or air pockets. This is similar to the padding technique previously described.
- **Apply fiberglass tape to the hand:** Once the thumb is covered, begin wrapping the tape around the patient's hand, making sure to cover the thumb-forefinger web space. Continue overlapping each layer by 50% to maintain uniform thickness.
- **Apply fiberglass tape to the wrist and forearm - similar to the short arm cast previous demonstrated:** Start wrapping the tape around the wrist and work your way up the forearm. Overlap each layer by 50% for even thickness. Make sure the tape lies smoothly without any wrinkles or air pockets.
- **Mold the cast:** As you apply the fiberglass tape, use your hands to mold and shape the cast around the thumb, hand, wrist, and forearm. Apply gentle pressure to ensure a snug fit without causing discomfort. Ensure the thumb is immobilized in a functional position (slightly abducted and extended).
- **Apply additional layers:** Apply additional layers of fiberglass tape to reinforce the cast and ensure adequate immobilization. Keep dipping, wrapping, and molding the cast tape as needed.
- **Final molding:** Once you have reached the desired thickness, smooth the outer surface of the cast using your hands or a gloved palm. This will help set the cast and make it more comfortable for the patient.
- **Cast setting:** Allow the fiberglass cast to harden, which usually takes around 10-15 minutes. The cast will feel warm as it hardens, which is normal.
- **Inspect the cast:** Once the cast is set, check for any sharp edges, pressure points, or skin irritation. Trim or smooth any rough edges as necessary. Ensure proper circulation by checking the patient's capillary refill time and ensuring they can move their fingers without difficulty.
- **Provide aftercare instructions:** Explain to the patient how to care for their cast, including keeping it dry, avoiding direct pressure on the cast, and reporting any signs of infection or discomfort.

Remember to monitor the patient's condition and follow up as needed to ensure proper healing and prevent complications.

Thumb Spica Cast - Removal

Thumb Spica Cast Removal

Removing a thumb spica fiberglass cast requires careful handling to prevent injury to the patient. Here's a step-by-step guide on how to remove the cast using a cast saw, scissors, and a cast spreader, along with skin considerations after the cast is removed:

- **Explain the process:** Inform the patient about the cast removal process, emphasizing that the cast saw will make noise and may feel warm but will not cut their skin.
- **Position the patient:** Have the patient sit or lie down in a comfortable position, ensuring their arm, wrist, and thumb are well-supported throughout the process.
- **Cast saw safety:** Put on protective eyewear and ensure the cast saw is in good working condition before using it. Double-check that the blade is sharp and properly attached.
- **Cutting the cast:** Begin by cutting the cast longitudinally along the sides of the thumb, hand, wrist, and forearm. Take care to avoid direct contact with the patient's skin. Apply gentle pressure and use a steady, back-and-forth motion. Do not force the blade or attempt to cut through the padding in one pass. The cast saw is designed to cut through the rigid outer layer without cutting the padding underneath.
- **Scissor insertion:** Once the cast is cut on both sides, gently insert the blunt-nosed cast scissors or a spreader between the padding and the patient's skin, keeping the blade parallel to the skin. This will protect the patient's skin while you cut through the padding.
- **Cut the padding:** Carefully cut the padding along the same lines you cut the outer layer of the cast. Be cautious not to nick or cut the patient's skin.
- **Cast spreading:** Using a cast spreader, gently pry apart the two halves of the cast. If necessary, use additional cutting or spreading to ensure the cast can be removed without causing discomfort to the patient.
- **Remove the cast:** Carefully lift the two halves of the cast away from the patient's arm, taking care not to cause any sudden movements or excessive pressure on the healing injury.
- **Remove the padding and stockinet:** Gently peel back the padding and stockinet, being cautious of any sensitive or tender areas on the patient's skin.
- **Skin inspection:** Examine the patient's skin for any signs of infection, pressure sores, or other issues that may require medical attention. Look for redness, swelling, discharge, or foul odor. Additionally, assess the patient's range of motion and strength in their arm, wrist, and fingers.
- **Clean the area:** Gently cleanse the patient's skin with warm water and mild soap, and pat dry. Apply moisturizing lotion if the skin is dry or irritated.
- **Follow-up care:** Based on the patient's recovery progress and physician's instructions, provide appropriate follow-up care, such as range of motion exercises, physical therapy, or the application of a new cast or brace.