 Department of Health Government of Nunavut		NURSING POLICY, PROCEDURE AND PROTOCOLS	
		Community Health Nursing	
TITLE:		SECTION:	POLICY NUMBER:
Splinting		Clinical Procedures	11-017-00
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APPLIES TO:			
Community Health Nurses			

POLICY 1:

Registered nurses, who are employed in the expanded role and who have completed additional training with the Nurse Educator or delegate, may apply a plaster splint for traumatic injuries. Generally, a physician's order is not required; however, a physician shall be consulted for all fractures and suspected fractures.

Plaster splinting will not be performed under the following conditions without prior consultation of a physician:

1. Signs of infection
2. Impending compartment syndrome
3. Diabetic or other neuropathy
4. Compound fracture
5. Significant displacement or misalignment
6. Fracture involving the growth plate
7. Fractures involving the long bones of the extremities.

POLICY 2:

The Registered Nurse is expected to be proficient in the application of short arm and short leg splints. The nurse is permitted to apply other types of splints upon direction of the physician. These splints include:

1. Long Arm Splint
2. Long Leg Splint
3. Thumb Spica Splint
4. Sugar Tong Splint
5. Ulnar Gutter Splint

DEFINITION:

Compartment syndrome is a condition that can develop in injured tissue in which swelling occurs within an anatomic area that does not allow expansion (e.g., within fascial planes).

PRINCIPLE:

- Splints are not circumferential and are able to accommodate swelling. Splints are helpful for immobilizing acute injuries in which inflammation is expected and protecting wounds and repairs.
- Splints are not as rigid as a cast and offer less immobilization; therefore casts are more appropriate for long-term immobilization that requires rigid stability.
- The injuries which require immobilization beyond the short arm and leg splints tend to involve additional considerations and therefore must have physician consultation prior to splinting.

RELATED POLICIES, GUIDELINES AND LEGISLATION:

Policy 08-005-00	Acknowledgement of Diagnostic Test Results
Policy 08-006-00	Follow-up of Abnormal Diagnostic Test Results
Policy 08-007-00	X-Rays
Policy 08-008-00	Types of Sanctioned X-Rays
Procedure 11-017-01	General Plaster Splinting
Procedure 11-017-02	Short Arm Splint
Procedure 11-017-03	Short Leg Splint

REFERENCES:

- Chudnofsky, CR, Byers, S. (2004). Splinting Techniques. *Clinical Procedures in Emergency Medicine*, 4th ed. WB Saunders: Philadelphia.
- Fromy B, Abraham P, Bouvet C, et al. (2002). Early Decrease of Skin Blood Flow in Response to Locally Applied Pressure in Diabetic Subjects. *Diabetes*; 51: 1214-1217.
- Kumar S, O'Connor A, Despois M, Galloway H (2005). Use of Early Magnetic Resonance Imaging in the Diagnosis of Occult Scaphoid Fractures: The CAST study. *New Zealand Medical Journal*; 118: 1296.
- Thomsen, TW., and Setnik, GS. (2008). *General Splinting Techniques*.
- Woolfrey KGH, Eisenhauer MA (2006). Wrist and Forearm. *Rosen's Emergency Medicine: Concepts and Clinical Practice*, 6th ed. Elsevier: Philadelphia.



PROCEDURE 11-017-01

NURSING CONSIDERATIONS:

1. Appropriate radiographic studies must be performed prior splinting to fully assess the extent of the injury with x-rays interpreted by the appropriate physician and radiologist.
 2. Examine the extremity carefully before splinting for:
 - a. Signs of Infection: Covering an infected area can aggravate the infection as well as interfere with monitoring and examining the area. Do not apply a splint if signs of infection are present and a physician must be consulted.
 - b. Openings in the skin: Openings may indicate a compound fracture, which requires a medivac to a designated facility for specialist evaluation. A physician must be consulted immediately.
 - c. Significant displacement or misalignment: A reduction manoeuvre may be necessary before application of a splint. A physician must be consulted.
 - d. Swelling within the anatomical area: Compartment syndrome causes pressure on compressible tissues, leading to vascular compromise and potentially necrosis. Fasciotomy (surgical incision to relieve the pressure) may be required to maintain adequate perfusion to tissues within and distal to the affected anatomic area. Physician must be consulted immediately.
 3. A detailed neurovascular examination must be completed prior to splinting.
 - a. Assess for any vascular insufficiency by palpating distal pulses, testing for capillary refill time, and assessing the color and warmth of the extremity.
 - b. Assess for any sign of nerve compression, such as numbness and/or tingling of the distal extremity.
 - c.
 - d. Applying a splint to a limb with neuropathy can lead to pressure ulceration, particularly over bone prominences.
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1. In people with diabetes, the integrity of the skin can be further compromised due to microvascular changes associated with the disease.
 2. It is important that any abnormalities be corrected if possible and documented before placement of the splint.
 3. Thicker splints are stronger but are heavier and more uncomfortable for the client. Additionally, thicker splints are more likely to cause plaster burns than thinner ones. Thinner splints are lightweight and more comfortable but may not provide adequate strength. The decision on the thickness of the splint to be used will depend upon patient and fracture characteristics.



Plaster Burn

- The severity of the burns is related to the plaster temperature and the contact time.
- Burns can be avoided by using room temperature water to soak plaster bandages.

Pressure Sores

- Pressure sores can be caused by anything that applies point pressure to the skin under the splint.
- Most commonly, pressure sores are attributable to folds or wrinkles that were left during application of the initial Cast padding layer, or when insufficient padding was given to areas with bony prominences such as the ankle fibular head, the malleoli, or the metatarsal heads.
- Pressure sores can also arise from indentations made on the plaster by finger pressure before the plaster is fully hardened.
- Pressure sores can be prevented by providing adequate cast padding to bony prominences; careful placement of the Cast padding to avoid wrinkles; and avoiding direct pressure from the fingertips while forming the unhardened plaster.

Nerve Palsy

- Nerve palsy most commonly occurs from direct compression of a relatively superficial nerve.
- Nerve injury can be avoided by providing adequate padding in places where nerves are typically superficial and making sure that once the splint has hardened there is enough free space to not compress the nerves.

Vascular Compromise

- Vascular compromise occurs from direct compression. It can be avoided by providing adequate padding and ensuring there is enough free space after the splint has hardened.
- Conducting a vascular examination and assessing capillary refill time are helpful in identifying vascular compromise caused by compression.

Splint Dermatitis

- Splint dermatitis can arise from inadequate ventilation and hygiene of the skin directly below the splint. In some occasions, this dermatitis can also be due to an allergic reaction to the plaster chemicals.
- Dermatitis can be avoided by providing adequate ventilation to the skin under the splint as well as instructing the client to keep the cast clean and dry. Allergic dermatitis can be avoided by ensuring there is no direct contact of plaster to skin.

Permanent joint stiffness

- Stiffness around the joints inevitably occurs when joints are immobilized for an extended time. Capsular tissue, ligaments, and tendons tend to retract during immobilization.
- Stiffness can be diminished by splinting in positions where tendons and ligaments are at extended positions, such as the flexion of metacarpophalangeal (MP) and extension of proximal interphalangeal (PIP) in metacarpal fractures

APPROPRIATE SPLINTS FOR UPPER AND LOWER EXTREMITY FRACTURES	
Upper Extremity Fractures	Appropriate Splints
Proximal Humerus	Coaptation Splint Technique
Midshaft Humerus	Sugar Tong Splint Coaptation Splint Technique
Distal Humerus	Long Arm Splint
Olecranon / Radial Head	Long Arm Splint
Forearm	Long Arm Splint
Distal Radius	Sugar Tong Splint
Scaphoid	Thumb Spica Splint
Other Carpus	Short Arm Splint
Thumb, metacarpal, phalanges	Thumb Spica Splint
Lower Extremity Fractures	Appropriate Splints
Midshaft Femur Fracture	Long Leg Splint
Distal Femur / Proximal Tibia	Long Leg Splint
Patella Fracture / Ligament Injury of Knee	Long Leg Splint
Midshaft Tibia Fracture	Long Leg Splint
Distal Tibia / Ankle Fracture	Short Leg Splint

PROCEDURE:

EQUIPMENT (PLASTER SPLINTS)
<ul style="list-style-type: none"> ✓ Slightly warm (not over 24°C) water and bowl ✓ Stockinette (optional) ✓ Soft cotton bandage/undersplint material (e.g., Cast padding or Kendall), available in 2-, 3-, 4-, and 6-inch width sizes ✓ Plaster bandages, available in 2-, 3-, 4-, and 6-inch width sizes ✓ Elastic Ace bandages ✓ Adhesive tape

Plaster splints are typically made up of 4 layers of material. They are generally arranged in the following order: Cast padding – Plaster – Cast padding – Elastic bandage. An optional fifth under layer (stockinette) may be used for added comfort. The purpose of this technique is to protect the skin, pad and protect any bony prominences, and immobilize the limb.



1. Apply stockinette to the extremity (recommended).
 - a. The stockinette should extend beyond the anticipated ends of the splint by several inches.
 - b. A 3-inch stockinette is generally used for the upper extremity, and 4-inch stockinette is used for the lower.
 - c. Be careful to avoid wrinkles in the stockinette, which may cause pressure injury.
2. Measure the required length of splinting material.
 - a. Unroll a single layer of Cast padding along the anticipated course of the splint.
 - b. Tear off this segment and place it on the bedside table.

Figure 1: Measuring Padding



3. Prepare the layer of Cast padding.
 - a. Place an additional 3 layers of Cast padding onto the layer that was used to measure splint length.
 - b. Make the top layer out of 2 strips of Cast padding, each offset from the middle of the other layers by half their width.
 - c. The overhanging edges of this top layer of Cast padding will be used to fold over the plaster bandages.

Figure 2: Preparing Cast Padding



Note: When splinting, it is crucial to understand the compromise between padding and stability. The closer the plaster is to the skin, the more effective the immobilization becomes. It is critical to strike a balance in the amount of padding, such that the wound and bony prominences are protected while adequate immobilization is provided.

4. Place layers of dry plaster bandages onto the Cast padding.

Figure 3: Preparing Plaster



- a. Roll out layers of plaster bandages on top of the Cast padding.
- b. The width of plaster bandage used will vary depending on the extremity being splinted and the size of the client.
- c. In general, the width of the splint should be slightly wider than the extremity.
- d. The number of layers of plaster required will depend on the individual splint.
- e. In general, upper extremity splints require 8-10 layers of plaster, whereas lower extremity splints will require 10-15 layers.

5. Soak the plaster bandages.

- a. Using a bowl, soak the layers of plaster bandages in **room temperature water** until no more bubbles arise from the material.
- b. Warm water (up to 24° C) reduces setting time, which may be helpful when casting freshly reduced fractures.

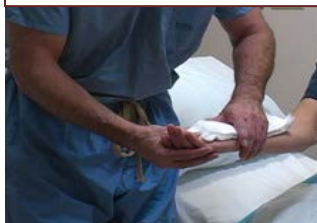
Note: Heat is released when plaster bandages are exposed to water. Hot water must not be used, because this may cause burns from the plaster.

Figure 4: Removing Excess Water



6. Once soaked, raise the layers vertically over the bowl, firmly holding each end of the roll in your hands.
7. Remove excess water by allowing the plaster to fold upon itself and then gently squeeze the layers.
8. Place the wet plaster onto the cast padding, and smooth the surface by running your hands over it. This causes the layers to form a single mass of plaster.
9. Fold the overhanging edges of cast padding over the plaster. This single layer of padding is used to prevent the plaster from adhering to the elastic bandage.
10. Finally, fold any excess padding over the ends of the splint, to provide additional cushioning.
11. Carefully place the splint in the desired location. Be sure to place the padded side of the splint (i.e., the side with the 4 layers of Cast padding) next to the skin.

Figure 5: Moulding Splint



12. Gently mould the plaster to the area, using the palms of your hands.
 - a. Avoid using your finger tips, which may create indentations in the plaster that may lead to pressure sores.
 - b. During the moulding process, ensure that the extremity remains in the desired anatomic position.

13. Roll an elastic bandage over the splint, from distal to proximal with an overlap of approximately 50%

Figure 6: Applying Bandage



- a. **Modest tension** should be placed on the bandage, because this is the only compressive component of the splint.
 - b. Adequate compression is important to reduce local edema.
 - c. If this compressive layer is applied too tightly, it can be corrected very easily by removing the elastic bandage and reapplying it with less tension.
14. Use adhesive tape to secure the elastic bandage. Do NOT place the tape circumferentially because it may cause constriction and ischemia if subsequent edema develops.
 15. Gently mould the splint again to the extremity using your hands.
 - a. This must be done before the plaster has begun to set, which usually occurs within 10 minutes.
 - b. Manipulation of the splint after this time period must be avoided to maintain the structural integrity of the splint.

POST-PROCEDURE CARE

Post-Splinting Radiography

If a reduction maneuver was performed, obtain a second set of radiographs, showing two views, to confirm that anatomical reduction was not lost during the splinting process.

Neurovascular Examination

1. Repeat a thorough neurovascular examination of the splinted limb
2. If there are signs of neurovascular compromise, remove the elastic bandage first and replace it with more with gentle compression.
3. If the neurovascular deficit persists, the splint should be removed, the limb should be inspected, and another splint should be placed. Persistent neurovascular deficits will require immediate orthopedic consultation.

Client Education

1. Instruct the client to keep the splint clean and dry.
2. The extremity should remain elevated for the first 2-3 days to decrease swelling.
 - a. Lower extremity injuries should be elevated above the level of the heart when lying down.
 - b. Upper extremity injuries should be elevated over the head when lying down.
4. Educate the client about the signs and symptoms of neurovascular compromise and about how to loosen the bandages if neurovascular symptoms arise.
5. Instruct clients to contact the nurse on call if there is increased pain or paraesthesia. It is possible for pressure ulcers and infection to develop underneath the splint.
6. Clients should be advised to avoid scratching inside the splint with any objects as small lacerations can occur and secondary infections develop.

DOCUMENTATION

Document the following in the client's health record:

- ❖ Client history, including mechanism of injury
- ❖ Pre-splint assessments, including initial x-ray interpretation
- ❖ Post-splint assessment, including neurovascular assessment and repeat x-ray findings (if applicable)
- ❖ Client education and follow-up appointment
- ❖ Complete WSCC forms (as required)



PROCEDURE 11-017-02

SHORT ARM SPLINT

Splinting coupled with anatomic reduction allows healing to take place by keeping the fractured bones opposed in an anatomic position for a period of time.

This procedure is an addendum to the Procedure 11-017-01 *General Plaster Splinting*. For detailed instructions and considerations, refer to Procedure 11-017-01.

Nursing Considerations

1. Short arm splinting is indicated for temporary immobilization for:
 - a. Fractures of the carpal bones
 - b. Small non-displaced fractures of the distal radius or ulna
2. The short arm splint does not prevent supination and pronation of the forearm, and thus a sugar tong splint is better suited for displaced and/or complex fractures of the distal radius and ulna. The physician shall be consulted for such circumstances.
3. The short arm splint does not provide adequate immobilization of the first metacarpal and scaphoid bone, and thus a thumb spica splint should be used for scaphoid fractures. The physician shall be consulted for such circumstances.
4. The short arm splint is contraindicated for:
 - a. Infections: all wounds must be assessed for signs of infection before splinting. The physician must be consulted if signs of infection are noted.
 - b. Impending compartment Syndrome
 - c. Diabetic or other neuropathy
 - d. Open fracture

EQUIPMENT
<ul style="list-style-type: none">✓ Slightly warm (not over 24°C) water and bowl✓ Stockinette (optional)✓ Soft cotton bandage/cast padding material (e.g., Webril; Kendall), 3- or 4-inch width✓ Plaster bandages, available in 3- or 4-inch width✓ Elastic bandages (E.g. Ace bandage)✓ Adhesive tape



Procedure

1. Examine the extremity carefully for signs of an open fracture.
2. Perform a detailed neurovascular examination before splinting.
 - a. Assess for any vascular insufficiency by palpating distal pulses at the ulnar and radial arteries, testing for capillary refill time, and assessing the color and warmth of the extremity.
 - b. Assess for any sign of nerve compression, such as numbness and/or tingling of the distal extremity.
 - c. Numbness in the proximal thumb and/or dorsal hand suggests radial nerve compromise.
 - d. Numbness in the medial dorsal or palmar hand/fifth digit (small finger area) suggests ulnar injury.
 - e. Numbness in the lateral palmar region and the tips of the second and third digits (forefinger and middle finger) suggests median nerve injury.
 - f. It is important that any abnormalities be corrected if possible and documented before placement of the splint.
3. Obtain appropriate radiographic studies. Two views of the fractured bone should be obtained, making sure to image the joints directly proximal and distal to the fracture.
4. If the fracture has significant displacement or misalignment, a reduction maneuver may be necessary before splint application and the physician must be consulted.
5. Position the client in a sitting position with the arm in 90° abduction, external rotation, and 90° elbow flexion.
6. Apply stockinette to the extremity (recommended).
 - a. Stockinette is placed from distal palm crease in the hand to approximately 5 cm distal to the elbow.
 - b. This stockinette (usually 3-inch) should extend beyond the anticipated ends of the splint by several inches.
 - c. Ensure all wrinkles in the stockinette have been removed to avoid pressure injury.
7. Measure the required length of splinting material by unrolling a single layer of Cast padding along the anticipated course of the splint - from the distal palmar crease to a point 5-10 cm proximal to the elbow.

Figure 1: Measuring Splint



8. Lay this piece of Cast padding on a bedside table, and then roll out an additional 3 layers on top of it to form the cast padding. Make the top layer out of two strips of Cast padding, each offset from the middle of the other layers by half their width.

9. Roll out 8-10 layers of plaster bandages on top of the Cast padding. The plaster may be folded back and forth upon itself during this process.
10. Soak the layers of plaster bandages in room temperature water in a bucket. Do not use hot water, because it increases the risk for burns from the exothermic plaster.
11. Once soaked, raise the layers vertically over the bowl, firmly holding each end of the roll in your hands.
12. Remove excess water by allowing the plaster to fold upon itself and then gently squeeze the layers.
13. Place the wet plaster onto the cast padding, and smooth the surface by running your hands over it. This causes the layers to form a single mass of plaster.
14. Fold the overhanging edges of cast padding over the plaster. This single layer of padding is used to prevent the plaster from adhering to the elastic bandage.
15. Finally, fold any excess padding over the ends of the splint, to provide additional cushioning.
16. Carefully place the splint in the desired location. Be sure to place the padded side of the splint (i.e., the side with the 4 layers of Cast padding) next to the skin.
17. Apply the splint along the volar surface of the forearm and wrist. Gently mould the plaster to the area, using the palms of your hands (do not use fingertips to mould plaster)

Figure 2: Measuring Plaster



Figure 3: The “position of function:



18. Roll 3-inch elastic bandage over the splint, in a distal to proximal direction.
19. Once again, gently mould the splint to the extremity using your hands. For most indications, the wrist and hand should be immobilized in the “position of function,” with the wrist extended to approximately 30°.

Post-Splinting Radiography

If a reduction maneuver was performed, obtain a second set of radiographs, showing two views, to confirm that anatomical reduction was not lost during the splinting process.

Neurovascular Examination

1. Repeat a thorough neurovascular examination of the splinted limb
2. If there are signs of neurovascular compromise, remove the elastic bandage first and replace it with more with gentle compression.
3. If the neurovascular deficit persists, the splint should be removed, the limb should be inspected, and another splint should be placed. Persistent neurovascular deficits will require immediate orthopedic consultation.

Client Education

1. Instruct the client to keep the splint clean and dry.
2. The extremity should remain elevated for the first 2-3 days to decrease swelling.
3. Educate the client about the signs and symptoms of neurovascular compromise and about how to loosen the bandages if neurovascular symptoms arise.
4. Instruct clients to contact the nurse on call if there are is increased pain or paraesthesia. It is possible for pressure ulcers and infection to develop underneath the splint.
5. Clients should be advised to avoid scratching inside the splint with any objects as small lacerations can occur and secondary infections develop.

DOCUMENTATION

Document the following in the client's health record:

- ❖ Client history, including mechanism of injury
- ❖ Pre-splint assessments, including initial x-ray interpretation
- ❖ Post-splint assessment, including neurovascular assessment and repeat x-ray findings (if applicable)
- ❖ Client education and follow-up appointment
- ❖ Complete WSCC forms (as required)



PROCEDURE 11-017-03

LONG ARM SPLINTING

Splinting coupled with anatomic reduction allows healing to take place by keeping the fractured bones opposed in an anatomic position for a period of time. The long arm splint is used to immobilize a variety of injuries to the upper extremity.

This procedure is an addendum to the Procedure 11-017-01 *General Plaster Splinting*. For detailed instructions and considerations, refer to Procedure 11-017-01.

Nursing Considerations

1. The long arm splint can be used for temporary immobilization for
 - a. Elbow joint dislocation
 - b. Olecranon fracture
 - c. Distal humerus fracture
2. Due to the conditions which require a long arm splint, physician services should be consulted prior to splinting.
3. The long arm splint is contraindicated for:
 - a. Infections: all wounds must be assessed for signs of infection before splinting. The physician must be consulted if signs of infection are noted.
 - b. Impending compartment Syndrome
 - c. Diabetic or other neuropathy
 - d. Open fracture

EQUIPMENT
<ul style="list-style-type: none">✓ Slightly warm (not over 24°C) water and bowl✓ Stockinette (optional)✓ Soft cotton bandage/cast padding material (e.g., Webril; Kendall), 4- or 6-inch width✓ Plaster bandages, available in 4- or 6-inch width✓ Elastic bandages (E.g. Ace bandage)✓ Adhesive tape



Procedure

1. Examine the extremity carefully for signs of a compound fracture.
2. Obtain appropriate radiographic studies. Two views of the fractured bone should be obtained, making sure to image the joints directly proximal and distal to the fracture
3. Perform a detailed neurovascular examination before splinting.
 - a. Assess for vascular insufficiency by palpating distal pulses at the ulnar and radial arteries, testing for capillary refill time, and assessing the color and warmth of the extremity.
 - b. Assess for signs of nerve compression, such as numbness and/or tingling of the distal extremity.
 - Numbness in the proximal thumb and/or dorsal hand suggests radial nerve compromise.
 - Numbness in the medial dorsal or palmar hand/fifth digit (small finger area) suggests ulnar injury.
 - Numbness in the lateral palmar region and the tips of the second and third digits (forefinger and middle finger) suggests median nerve injury.
 - c. It is important that any abnormality is reported to the physician and corrected if possible prior to splinting. Document such findings and interventions.
4. If the fracture has significant displacement or misalignment, a reduction maneuver may be necessary before splint application and thus the physician must be consulted.
5. Position the client in a sitting position with the affected arm in neutral abduction with 90° of elbow flexion
6. Apply stockinette to the extremity (recommended).
 - a. Stockinette may be placed from distal palm crease in the hand to approximately 5 cm below the axillary fold.
 - b. This stockinette (usually 3-inch) should extend beyond the anticipated ends of the splint by several inches.
 - c. Ensure all wrinkles in the stockinette have been removed to avoid pressure injury.
7. Measure the required length of splinting material by unrolling a single layer of Cast padding along the anticipated course of the splint - posteriorly from the inferior border of the deltoid muscle, along the triceps proximally, along the ulnar border distally, to the head of the fifth metacarpal.

Figure 1: Measuring Splint



8. Lay this piece of Cast padding on a bedside table, and then roll out an additional 3 layers on top of it to form the cast padding. Make the top layer out of two strips of Cast padding, each offset from the middle of the other layers by half their width.

9. Roll out 10-12 layers of plaster bandages on top of the Cast padding. The plaster may be folded back and forth upon itself during this process.

10. Soak the layers of plaster bandages in room temperature water in a bucket. Do not use hot water, because it increases the risk for burns from the exothermic plaster.

11. Once soaked, raise the layers vertically over the bowl, firmly holding each end of the roll in your hands.

12. Remove excess water by allowing the plaster to fold upon itself and then gently squeeze the layers.

13. Place the wet plaster onto the cast padding, and smooth the surface by running your hands over it. This causes the layers to form a single mass of plaster.

14. Fold the overhanging edges of cast padding over the plaster. This single layer of padding is used to prevent the plaster from adhering to the elastic bandage.

15. Finally, fold any excess padding over the ends of the splint, to provide additional cushioning.

16. Carefully place the splint in the desired location. Be sure to place the padded side of the splint (i.e., the side with the 4 layers of Cast padding) next to the skin.

17. Apply the splint to the posterior aspect of the arm, from the deltoid muscle to the hand. Gently mould the plaster to the area, using the palms of your hands.

Figure 2: Measuring Plaster



Figure 3: Applying Splint



18. Roll 4-inch elastic bandage over the splint.

- a. Use 1 to 2 Ace bandages to wrap the arm from the fifth metacarpal to the axillary fold
- b. Providing adequate compression while moving proximally.

19. Once again, gently mould the splint to the extremity using your hands and not your fingertips.

Post-Splinting Radiography

If a reduction maneuver was performed, obtain a second set of radiographs, showing two views, to confirm that anatomical reduction was not lost during the splinting process.

Neurovascular Examination

1. Repeat a thorough neurovascular examination of the splinted limb
2. If there are signs of neurovascular compromise, remove the elastic bandage first and replace it with more with gentle compression.
3. If the neurovascular deficit persists, the splint should be removed, the limb should be inspected, and another splint should be placed. Persistent neurovascular deficits will require immediate orthopedic consultation.

Client Education

3. Instruct the client to keep the splint clean and dry.
4. The extremity should remain elevated for the first 2-3 days to decrease swelling.
6. Educate the client about the signs and symptoms of neurovascular compromise and about how to loosen the bandages if neurovascular symptoms arise.
7. Instruct clients to contact the nurse on call if there are is increased pain or paraesthesia. It is possible for pressure ulcers and infection to develop underneath the splint.
8. Clients should be advised to avoid scratching inside the splint with any objects as small lacerations can occur and secondary infections develop.

DOCUMENTATION

Document the following in the client's health record:

- ❖ Client history, including mechanism of injury
- ❖ Pre-splint assessments, including initial x-ray interpretation
- ❖ Post-splint assessment, including neurovascular assessment and repeat x-ray findings (if applicable)
- ❖ Client education and follow-up appointment
- ❖ Complete WSCC forms (as required)



PROCEDURE 11-017-04

SHORT LEG SPLINT

Splinting coupled with anatomic reduction allows healing to take place by keeping the fractured bones opposed in an anatomic position for a period of time.

This procedure is an addendum to the Procedure 11-017-01 *General Plaster Splinting*. For detailed instructions and considerations, refer to Procedure 11-017-01.

Nursing Considerations

1. The short leg splint is useful for the temporary immobilization of:
 - a. Fractures of the distal tibia and fibula
 - b. Fractures of the talus, calcaneus, cuboid, navicular, cuneiform, and metatarsal bones of the foot
 - c. Ankle dislocations
2. The short leg splint is contraindicated for:
 - a. Infections: all wounds must be assessed for signs of infection before splinting. The physician must be consulted if signs of infection are noted.
 - b. Impending compartment Syndrome
 - c. Diabetic or other neuropathy
 - d. Open fracture

EQUIPMENT
<ul style="list-style-type: none">✓ Slightly warm (not over 24°C) water and bowl✓ Stockinette (optional)✓ Soft cotton bandage/cast padding material (e.g., Webril; Kendall), 4- or 6-inch width✓ Plaster bandages, available in 4- or 6-inch width✓ Elastic bandages (E.g. Ace bandage)✓ Adhesive tape



Procedure

1. Examine the extremity carefully for signs of an open fracture.
2. Perform a detailed neurovascular examination before splinting.
 - a. Assess for any vascular insufficiency by palpating distal pulses at the popliteal, posterior tibial, and dorsalis pedis arteries, testing for capillary refill time, and assessing the color and warmth of the extremity.
 - b. Assess for any sign of nerve compression, such as numbness and/or tingling of the distal extremity.
 - Numbness in the anterior leg and/or dorsal foot suggests peroneal nerve damage.
 - Numbness in the webspace between the great and second toe suggests deep peroneal nerve damage.
 - c. It is important that any abnormalities be corrected if possible and documented before placement of the splint.
3. Obtain appropriate radiographic studies. At least two views of the fractured bone should be obtained, making sure to image the joints directly proximal and distal to the fracture.
4. If the fracture has significant displacement or misalignment, a reduction maneuver may be necessary before splint application and the physician must be consulted.
5. Position the client prone on the bed with the knee flexed at 90°. This position allows the client to relax the gastrocnemius muscles, making it easier to place the foot in the neutral position.
6. Apply stockinette to the extremity (recommend
 - a. Stockinette is placed from the foot to the proximal lower leg.
 - b. This stockinette (usually 4 or 5-inch) should extend beyond the anticipated ends of the splint by several inches.
 - c. Ensure all wrinkles in the stockinette have been removed to avoid pressure injury.
7. Measure the required length of splinting material by unrolling a single layer of Cast padding along the anticipated course of the splint - from the proximal posterior leg, down around the ankle, and then to the level of the metatarsal heads.
8. Lay this piece of Cast padding on a bedside table, and then roll out an additional 3 layers on top of it to form the cast padding. Make the top layer out of two strips of Cast padding, each offset from the middle of the other layers by half their width.
9. Roll out 12-15 layers of plaster bandages on top of the Cast padding. The plaster may be folded back and forth upon itself during this process.

Figure 1: Correct Client Positioning



Figure 2: Measuring Cast Padding



10. Soak the layers of plaster bandages in room temperature water in a bucket. Do not use hot water, because it increases the risk for burns from the exothermic plaster.
11. Once soaked, raise the layers vertically over the bowl, firmly holding each end of the roll in your hands.
12. Remove excess water by allowing the plaster to fold upon itself and then gently squeeze the layers.
13. Place the wet plaster onto the cast padding, and smooth the surface by running your hands over it. This causes the layers to form a single mass of plaster.
14. Fold the overhanging edges of cast padding over the plaster. This single layer of padding is used to prevent the plaster from adhering to the elastic bandage.
15. Finally, fold any excess padding over the ends of the splint, to provide additional cushioning.
16. Carefully place the splint in the desired location. Be sure to place the padded side of the splint (i.e., the side with the 4 layers of Cast padding) next to the skin.
17. Apply the splint along the posterior surface of the leg. Gently mould the plaster to the area, using the palms of your hands.
18. Roll 4- or 6-inch elastic bandages over the splint, in a distal to proximal direction.
19. Once again, gently mould the splint to the extremity using your hands. The ankle should be flexed to 90°.

Figure 3: Apply Splint



NOTE: If additional support is required, such as in the case of a displaced ankle fracture that has been reduced in a closed fashion, a lower-leg sugar tong splint may be applied in addition to the short leg splint.

To apply the sugar tong splint, refer to Procedure 11-017-06.

POST-PROCEDURE CARE

Post-Splinting Radiography

If a reduction maneuver was performed, obtain a second set of radiographs, showing two views, to confirm that anatomical reduction was not lost during the splinting process.

Neurovascular Examination

1. Repeat a thorough neurovascular examination of the splinted limb
2. If there are signs of neurovascular compromise, remove the elastic bandage first and replace it with more with gentle compression.
3. If the neurovascular deficit persists, the splint should be removed, the limb should be inspected, and another splint should be placed. Persistent neurovascular deficits will require immediate orthopedic consultation.

Client Education

5. Instruct the client to keep the splint clean and dry.
6. The extremity should remain elevated for the first 2-3 days to decrease swelling.
9. Educate the client about the signs and symptoms of neurovascular compromise and about how to loosen the bandages if neurovascular symptoms arise.
10. Instruct clients to contact the nurse on call if there are is increased pain or paraesthesia. It is possible for pressure ulcers and infection to develop underneath the splint.
11. Clients should be advised to avoid scratching inside the splint with any objects as small lacerations can occur and secondary infections develop.

DOCUMENTATION

Document the following in the client's health record:

- ❖ Client history, including mechanism of injury
- ❖ Pre-splint assessments, including initial x-ray interpretation
- ❖ Post-splint assessment, including neurovascular assessment and repeat x-ray findings (if applicable)
- ❖ Client education and follow-up appointment
- ❖ Complete WSCC forms (as required)



PROCEDURE 11-017-05

LONG LEG SPLINT

This procedure is an addendum to the Procedure 11-017-01 *General Plaster Splinting*. For detailed instructions and considerations, refer to Procedure 11-017-01.

Nursing Considerations

1. The long leg splint is useful for the temporary immobilization of:
 - a. Fractures of the tibia
 - b. Fractures of the fibula
 - c. Fractures of the distal femur
 - d. Dislocations of the knee
2. For many indications, a prefabricated knee immobilizer provides an equivalent degree of immobilization and may be used instead of a plaster long-leg splint, consult the physician.
3. The long leg splint is contraindicated for:
 - a. Infections: all wounds must be assessed for signs of infection before splinting. The physician must be consulted if signs of infection are noted.
 - b. Impending compartment Syndrome
 - c. Diabetic or other neuropathy
 - d. Open fracture

EQUIPMENT
<ul style="list-style-type: none">✓ Slightly warm (not over 24°C) water and bowl✓ Stockinette (optional)✓ Soft cotton bandage/cast padding material (e.g., Webril; Kendall), 6-inch width✓ Plaster bandages, available in 6-inch width✓ Elastic bandages (E.g. Ace bandage)✓ Adhesive tape



Procedure

1. Examine the extremity carefully for signs of an open fracture.
2. Perform a detailed neurovascular examination before splinting.
3. Assess for any vascular insufficiency by palpating distal pulses at the popliteal, posterior tibial, and dorsalis pedis arteries, testing for capillary refill time, and assessing the color and warmth of the extremity.
4. Assess for any sign of nerve compression, such as numbness and/or tingling of the distal extremity.
 - Numbness in the anterior leg and/or dorsal foot suggests peroneal nerve damage.
 - Numbness in the webspace between the great and second toe suggests deep peroneal nerve damage.
 - Numbness in the thigh suggests femoral nerve injury.
 - Numbness in the lateral thigh suggests lateral femoral cutaneous nerve injury.
 - Numbness in the posterior thigh suggests injury to the posterior femoral cutaneous nerve.
5. It is important that any abnormalities be corrected if possible and documented before placement of the splint.
6. Obtain appropriate radiographic studies. At least two views of the fractured bone should be obtained, making sure to image the joints directly proximal and distal to the fracture.
7. If the fracture has significant displacement or misalignment, a reduction maneuver may be necessary before splint application and the physician must be consulted.
8. Position the client in a supine position, with the knee joint bent at 20° and ankle bent at 90°.

Figure 1: Correct Client Positioning



9. Apply stockinette to the extremity (recommended).
 - a. Stockinette is placed from the foot to proximal thigh
 - b. This stockinette (usually 4 or 5-inch) should extend beyond the anticipated ends of the splint by several inches.
 - c. Ensure all wrinkles in the stockinette have been removed to avoid pressure injury.
10. Measure the required length of splinting material by unrolling a single layer of Cast padding along the anticipated course of the splint, from the proximal thigh, past the knee, to a level 5 cm proximal to the malleoli.
11. The splint may be extended to the metatarsal heads if immobilization of the ankle joint is required.
12. Lay this piece of Cast padding on a bedside table, and then roll out an additional 3 layers on top of it to form the cast padding. Make the top layer out of two strips of Cast padding, each offset from the middle of the other layers by half their width.
13. Roll out 12-15 layers of plaster bandages on top of the Cast padding. The plaster may be folded back and forth upon itself during this process.
17. Soak the layers of plaster bandages in room temperature water in a bucket. Do not use hot water, because it increases the risk for burns from the exothermic plaster.
18. Once soaked, raise the layers vertically over the bowl, firmly holding each end of the roll in your hands.
19. Remove excess water by allowing the plaster to fold upon itself and then gently squeeze the layers.
20. Place the wet plaster onto the cast padding, and smooth the surface by running your hands over it. This causes the layers to form a single mass of plaster.
21. Fold the overhanging edges of cast padding over the plaster. This single layer of padding is used to prevent the plaster from adhering to the elastic bandage.
22. Finally, fold any excess padding over the ends of the splint, to provide additional cushioning.
23. Carefully place the splint in the desired location. Be sure to place the padded side of the splint (i.e., the side with the 4 layers of Cast padding) next to the skin.

Figure 2: Measuring Cast Padding



20. Apply the splint along the posterior surface of the leg. Gently mould the plaster to the area, using the palms of your hands.
21. Roll 6-inch elastic bandages over the splint, in a distal to proximal direction.
22. Once again, gently mould the splint to the extremity using your hands. The knee should be flexed 10° to 20°. If the splint extends to the foot, the ankle should be flexed to 90°.

Figure 3: Apply Splint



POST-PROCEDURE CARE

Post-Splinting Radiography

If a reduction maneuver was performed, obtain a second set of radiographs, showing two views, to confirm that anatomical reduction was not lost during the splinting process.

Neurovascular Examination

1. Repeat a thorough neurovascular examination of the splinted limb
2. If there are signs of neurovascular compromise, remove the elastic bandage first and replace it with more with gentle compression.
3. If the neurovascular deficit persists, the splint should be removed, the limb should be inspected, and another splint should be placed. Persistent neurovascular deficits will require immediate orthopedic consultation.

Client Education

7. Instruct the client to keep the splint clean and dry.
8. The extremity should remain elevated for the first 2-3 days to decrease swelling.
12. Educate the client about the signs and symptoms of neurovascular compromise and about how to loosen the bandages if neurovascular symptoms arise.
13. Instruct clients to contact the nurse on call if there are is increased pain or paraesthesia. It is possible for pressure ulcers and infection to develop underneath the splint.
14. Clients should be advised to avoid scratching inside the splint with any objects as small lacerations can occur and secondary infections develop.

DOCUMENTATION

Document the following in the client's health record:

- ❖ Client history, including mechanism of injury
- ❖ Pre-splint assessments, including initial x-ray interpretation
- ❖ Post-splint assessment, including neurovascular assessment and repeat x-ray findings (if applicable)
- ❖ Client education and follow-up appointment
- ❖ Complete WSCC forms (as required)



PROCEDURE 11-017-06

SUGAR TONG SPLINT

Splinting coupled with anatomic reduction allows healing to take place by keeping the fractured bones opposed in an anatomic position for a period of time. The sugar tong splint is used to immobilize a variety of distal forearm fractures.

This procedure is an addendum to the Procedure 11-017-01 *General Plaster Splinting*. For detailed instructions and considerations, refer to Procedure 11-017-01.

Nursing Considerations

1. The sugar tong splint is useful for the temporary immobilization of distal fractures of the radius, such as:
 - a. Colles' or Smith's fracture
 - b. Radial styloid (chauffeur's) fracture
 - c. Comminuted intraarticular fracture of the distal radius
2. The sugar tong splint is contraindicated for:
 - e. Infections: all wounds must be assessed for signs of infection before splinting. The physician must be consulted if signs of infection are noted.
 - f. Impending compartment Syndrome
 - g. Diabetic or other neuropathy
 - h. Open fracture

EQUIPMENT
<ul style="list-style-type: none">✓ Slightly warm (not over 24°C) water and bowl✓ Stockinette (optional)✓ Soft cotton bandage/cast padding material (e.g., Webril; Kendall), 3 or 4-inch width✓ Plaster bandages, available in 3 or 4-inch width✓ Elastic bandages (E.g. Ace bandage)✓ Adhesive tape

Procedure

1. Examine the extremity carefully for signs of an open fracture.
2. Perform a detailed neurovascular examination before splinting.
3. Assess for any vascular insufficiency by palpating distal pulses at the ulnar and radial arteries, testing for capillary refill time, and assessing the color and warmth of the extremity.
4. Assess for any sign of nerve compression, such as numbness and/or tingling of the distal extremity.
 - a. Numbness in the proximal thumb and/or dorsal hand suggests radial nerve compromise.
 - b. Numbness in the medial dorsal or palmar hand/fifth digit (small finger area) suggests ulnar injury.
 - c. Numbness in the lateral palmar region and the tips of the second and third digits (forefinger and middle finger) suggests median nerve injury.
5. It is important that any abnormalities be corrected if possible and documented before placement of the splint.
6. Obtain appropriate radiographic studies. At least two views of the fractured bone should be obtained, making sure to image the joints directly proximal and distal to the fracture.
7. If the fracture has significant displacement or misalignment, a reduction maneuver may be necessary before splint application and the physician must be consulted.
8. Position the client in a sitting position, with the elbow in 90° abduction, external rotation, and 90° elbow flexion.
9. Apply stockinette to the extremity (recommended).
 - a. Stockinette may be placed from the distal palmar crease of the hand to the level of the midshaft humerus.
 - b. Excess stockinette around the elbow joint should be cut off as to prevent wrinkles.
 - c. This stockinette (usually 3" width) should extend beyond the anticipated ends of the splint by several inches.
 - d. Ensure all wrinkles in the stockinette have been removed to avoid pressure injury.
10. Measure the required length of splinting material by unrolling a single layer of Cast padding along the anticipated course of the splint, from the dorsal metacarpal heads, proximally along the dorsal aspect of the forearm, around the elbow, distally along the volar forearm, up to the distal palmar crease.
11. Lay this piece of Cast padding on a bedside table, and then roll out an additional 3 layers on top of it to form the cast padding. Make the top layer out of two strips of Cast padding, each offset from the middle of the other layers by half their width.



12. Roll out 8-10 layers of plaster bandages on top of the Cast padding. Fold plaster back and forth upon itself during this process.
13. Soak the layers of plaster bandages in room temperature water in a bucket. Do not use hot water, because it increases the risk for burns from the exothermic plaster.
14. Once soaked, raise the layers vertically over the bowl, firmly holding each end of the roll in your hands.
15. Remove excess water by allowing the plaster to fold upon itself and then gently squeeze the layers.
16. Place the wet plaster onto the cast padding, and smooth the surface by running your hands over it. This causes the layers to form a single mass of plaster.
17. Fold the overhanging edges of cast padding over the plaster. This single layer of padding is used to prevent the plaster from adhering to the elastic bandage.
18. Finally, fold any excess padding over the ends of the splint, to provide additional cushioning.
19. Carefully place the splint in the desired location. Be sure to place the padded side of the splint (i.e., the side with the 4 layers of Cast padding) next to the skin.
20. Apply the splint to the arm, starting from the volar distal palmar crease, around the elbow, and up to the dorsal metacarpals. Gently mould the plaster to the area, using the palms of your hands.
21. Roll 4-inch elastic bandages over the splint, in a distal to proximal direction.

Figure 2: Apply Splint



Avoid immobilizing the volar metacarpophalangeal (MCP) joints of the hand

22. Once again, gently mould the splint to the extremity using your hands. Stabilize the distal third of the forearm by placing the arm in a protective shoulder sling.

Post-Splinting Radiography

If a reduction maneuver was performed, obtain a second set of radiographs, showing two views, to confirm that anatomical reduction was not lost during the splinting process.

Neurovascular Examination

1. Repeat a thorough neurovascular examination of the splinted limb
2. If there are signs of neurovascular compromise, remove the elastic bandage first and replace it with more with gentle compression.
3. If the neurovascular deficit persists, the splint should be removed, the limb should be inspected, and another splint should be placed. Persistent neurovascular deficits will require immediate orthopedic consultation.

Client Education

1. Instruct the client to keep the splint clean and dry.
2. The extremity should remain elevated for the first 2-3 days to decrease swelling.
3. Educate the client about the signs and symptoms of neurovascular compromise and about how to loosen the bandages if neurovascular symptoms arise.
4. Instruct clients to contact the nurse on call if there are is increased pain or paraesthesia. It is possible for pressure ulcers and infection to develop underneath the splint.
5. Clients should be advised to avoid scratching inside the splint with any objects as small lacerations can occur and secondary infections develop.

DOCUMENTATION

Document the following in the client's health record:

- ❖ Client history, including mechanism of injury
- ❖ Pre-splint assessments, including initial x-ray interpretation
- ❖ Post-splint assessment, including neurovascular assessment and repeat x-ray findings (if applicable)
- ❖ Client education and follow-up appointment
- ❖ Complete WSCC forms (as required)



PROCEDURE 11-017-07

THUMB SPICA SPLINT

Splinting coupled with anatomic reduction allows healing to take place by keeping the fractured bones opposed in an anatomic position for a period of time.

This procedure is an addendum to the Procedure 11-017-01 *General Plaster Splinting*. For detailed instructions and considerations, refer to Procedure 11-017-01.

Nursing Considerations

1. The thumb spica splint is useful for the temporary immobilization of scaphoid fractures of the wrist.
2. Up to 25% of scaphoid fractures may not be visible on the initial radiograph. Clients with wrist, hand, or thumb injuries who have tenderness in the “anatomical snuffbox” should be placed in a thumb spica splint, regardless of radiographic findings, until further evaluated by the physician / orthopedist. A physician must be consulted.
3. The thumb spica splint is contraindicated for:
 - a. Infections: all wounds must be assessed for signs of infection before splinting. The physician must be consulted if signs of infection are noted.
 - b. Impending compartment Syndrome
 - c. Diabetic or other neuropathy
 - d. Open fracture

EQUIPMENT
<ul style="list-style-type: none">✓ Slightly warm (not over 24°C) water and bowl✓ Soft cotton bandage/cast padding material (e.g., Webril; Kendall), 3 or 4-inch width✓ Plaster bandages, available in 3 inch width✓ Elastic bandages (E.g. Ace bandage)✓ Adhesive tape

Procedure

1. Examine the extremity carefully for signs of an open fracture.
2. Perform a detailed neurovascular examination before splinting.
3. Assess for vascular insufficiency by palpating distal pulses at the ulnar and radial arteries, testing for capillary refill time, and assessing the color and warmth of the extremity.
 - a. Assess for signs of nerve compression, such as numbness and/or tingling of the distal extremity.
 - b. Numbness in the proximal thumb and/or dorsal hand suggests radial nerve compromise.
 - c. Numbness in the medial dorsal or palmar hand/fifth digit (small finger area) suggests ulnar injury.
 - d. Numbness in the lateral palmar region and the tips of the second and third digits (forefinger and middle finger) suggests median nerve injury.
4. It is important that any abnormalities be corrected if possible and documented before placement of the splint.
5. Obtain appropriate radiographic studies. At least two views of the fractured bone should be obtained, making sure to image the joints directly proximal and distal to the fracture. **Special scaphoid views should be obtained** if there is high clinical suspicion despite normal AP and lateral views of the wrist.
6. If the fracture has significant displacement or misalignment, a reduction maneuver may be necessary before splint application and the physician must be consulted
7. Position the client in a sitting position, with the elbow resting on the table and flexed at 90°.
8. Measure the required length of splinting material by unrolling a single layer of Cast padding along the anticipated course of the splint - along the radial aspect of the forearm, from the tip of thumb to the proximal third of the radius.
9. Lay this piece of Cast padding on a bedside table, and then roll out an additional 3 layers on top of it to form the cast padding. Make the top layer out of two strips of Cast padding, each offset from the middle of the other layers by half their width.
10. Roll out 6-8 layers of plaster bandages on top of the Cast padding. The plaster may be folded back and forth upon itself during this process.
11. Soak the layers of plaster bandages in room temperature water in a bucket. Do not use hot water, because it increases the risk for burns from the exothermic plaster.
12. Once soaked, raise the layers vertically over the bowl, firmly holding each end of the roll in your hands.
13. Remove excess water by allowing the plaster to fold upon itself and then gently squeeze the layers.
14. Place the wet plaster onto the cast padding, and smooth the surface by running your hands over it. This causes the layers to form a single mass of plaster.
15. Fold the overhanging edges of cast padding over the plaster. This single layer of padding is used to prevent the plaster from adhering to the elastic bandage.

Figure 1: Measuring Cast Padding



16. Finally, fold any excess padding over the ends of the splint, to provide additional cushioning.
17. Carefully place the splint in the desired location. Be sure to place the padded side of the splint next to the skin.
18. Apply the splint along the thumb and radial aspect of the forearm starting. Gently mould the plaster to the area, using the palms of your hands.
19. Roll 2 to 3-inch elastic bandages over the splint, in a distal to proximal direction.
20. Once again, gently mould the splint to the extremity using your hands. The wrist should be splinted in approximately 20° extension, and the thumb should be flexed at both the metacarpophalangeal (MCP) and interphalangeal (IP) joint.

Figure 2: Apply Splint



Figure 3: Neurovascular Exam



POST-PROCEDURE CARE

Post-Splinting Radiography

If a reduction maneuver was performed, obtain a second set of radiographs, showing two views, to confirm that anatomical reduction was not lost during the splinting process.

Neurovascular Examination

4. Repeat a thorough neurovascular examination of the splinted limb
5. If there are signs of neurovascular compromise, remove the elastic bandage first and replace it with more with gentle compression.
6. If the neurovascular deficit persists, the splint should be removed, the limb should be inspected, and another splint should be placed. Persistent neurovascular deficits will require immediate orthopedic consultation.

Client Education

1. Instruct the client to keep the splint clean and dry.
2. The extremity should remain elevated for the first 2-3 days to decrease swelling.
3. Educate the client about the signs and symptoms of neurovascular compromise and about how to loosen the bandages if neurovascular symptoms arise.
4. Instruct clients to contact the nurse on call if there are is increased pain or paraesthesia. It is possible for pressure ulcers and infection to develop underneath the splint.
5. Clients should be advised to avoid scratching inside the splint with any objects as small lacerations can occur and secondary infections develop.

COMPLICATIONS

In addition to the complications identified in Procedure 11-017-01 *General Plaster Splinting*, the nurse must assess for: **Avascular necrosis and nonunion of the scaphoid bone**

Because of its unique anatomy and tenuous blood supply, the scaphoid bone is at high risk of avascular necrosis and nonunion. All scaphoid injuries, known or suspected, require timely follow-up with an orthopedist.



DOCUMENTATION

Document the following in the client's health record:

- ❖ Client history, including mechanism of injury
- ❖ Pre-splint assessments, including initial x-ray interpretation
- ❖ Post-splint assessment, including neurovascular assessment and repeat x-ray findings (if applicable)
- ❖ Client education and follow-up appointment
- ❖ Complete WSCC forms (as required)



PROCEDURE 11-017-08

ULNAR GUTTER SPLINT

Splinting coupled with anatomic reduction allows healing to take place by keeping the fractured bones opposed in an anatomic position for a period of time.

This procedure is an addendum to the Procedure 11-017-01 *General Plaster Splinting*. For detailed instructions and considerations, refer to Procedure 11-017-01.

Nursing Considerations

1. Splinting is indicated for temporary immobilization for:
 - a. Fractures of the fourth or fifth metacarpals or phalanges.
 - b. The boxer's fracture, which is a fracture of the diaphysis of the fifth metacarpal, is a common injury.
2. The ulnar gutter splint is contraindicated for:
 - a. Infections: all wounds must be assessed for signs of infection before splinting. The physician must be consulted if signs of infection are noted.
 - b. Impending compartment Syndrome
 - c. Diabetic or other neuropathy
 - d. Open fracture: Wounds adjacent to metacarpal head fractures should be considered open fractures and emergent consultation should be obtained.
3. Lacerations overlying the metacarpophalangeal (MCP) joints may be seen in conjunction with metacarpal head fractures. These are often referred to as "fight bites" or clenched-fist injuries, if sustained during an altercation. These wounds should be assumed to be open fractures, and the physician must be consulted as soon as possible.

EQUIPMENT
<ul style="list-style-type: none">✓ Slightly warm (not over 24°C) water and bowl✓ Stockinette (optional)✓ Soft cotton bandage/cast padding material (e.g., Webril; Kendall), 2, 3, 4 or 6-inch width✓ Plaster bandages, available in 2, 3, 4 or 6- inch width✓ Elastic bandages (E.g. Ace bandage)✓ Adhesive tape



Procedure

1. Examine the extremity carefully for signs of an open fracture.
2. Perform a detailed neurovascular examination before splinting.
3. Assess for any vascular insufficiency by palpating distal pulses at the ulnar and radial arteries, testing for capillary refill time, and assessing the color and warmth of the extremity.
4. Assess for any sign of nerve compression, such as numbness and/or tingling of the distal extremity.
5. It is important that any abnormalities be corrected if possible and documented before placement of the splint.
6. Obtain appropriate radiographic studies. At least two views of the fractured bone should be obtained, making sure to image the joints directly proximal and distal to the fracture.
7. The physician must be notified if any displacement or angulation is visible on the radiograph, as a hand specialist will need to be consulted.
8. Position the client in a sitting position, with the arm held in 90° abduction, and external rotation, and 90° elbow flexion.
9. Apply stockinette to the extremity (optional).
 - a. The stockinette should extend beyond the anticipated ends of the splint by several inches.
 - b. Ensure all wrinkles in the stockinette have been removed to avoid pressure injury.
10. Measure the required length of splinting material by unrolling a single layer of Cast padding along the anticipated course of the splint - from the tip of the little finger to a point 5-10 cm proximal to the elbow, along the ulnar portion of the forearm.
11. Lay this piece of Cast padding on a bedside table, and then roll out an additional 3 layers on top of it to form the cast padding. Make the top layer out of two strips of Cast padding, each offset from the middle of the other layers by half their width.
12. Roll out 6-8 layers of plaster bandages on top of the Cast padding. The plaster may be folded back and forth upon itself during this process.

Figure 1: Measuring Cast Padding



13. Soak the layers of plaster bandages in room temperature water in a bucket. Do not use hot water, because it increases the risk for burns from the exothermic plaster.
14. Once soaked, raise the layers vertically over the bowl, firmly holding each end of the roll in your hands.
15. Remove excess water by allowing the plaster to fold upon itself and then gently squeeze the layers.
16. Place the wet plaster onto the cast padding, and smooth the surface by running your hands over it. This causes the layers to form a single mass of plaster.
17. Fold the overhanging edges of cast padding over the plaster. This single layer of padding is used to prevent the plaster from adhering to the elastic bandage.
18. Finally, fold any excess padding over the ends of the splint, to provide additional cushioning.
19. Before applying the splint, place a small piece of folded Cast padding between the ring and little fingers. This serves as a padding and will prevent maceration of the digits after the splint has been applied
20. Carefully place the splint in the desired location. Be sure to place the padded side of the splint next to the skin.
21. Apply the splint along the ulnar aspect of the forearm. The splint should extend to the tip of the little finger and wrap around the ring and little finger.

Figure 2: Padding between fingers



Figure 3: Applying Splint



22. Gently mould the plaster to the area, using the palms of your hands.
23. Roll 2 to 3-inch elastic bandages over the splint, in a distal to proximal direction. Both the ring and little fingers should be included in the elastic bandage
24. Once again, gently mould the splint to the extremity using your hands. For fractures involving the distal metacarpal or the metacarpal-phalangeal joint, the MCP joint should be placed in 90° flexion, and the interphalangeal (IP) joints should be extended.

Post-Splinting Radiography

If a reduction maneuver was performed, obtain a second set of radiographs, showing two views, to confirm that anatomical reduction was not lost during the splinting process.

Neurovascular Examination

7. Repeat a thorough neurovascular examination of the splinted limb
8. If there are signs of neurovascular compromise, remove the elastic bandage first and replace it with more with gentle compression.
9. If the neurovascular deficit persists, the splint should be removed, the limb should be inspected, and another splint should be placed. Persistent neurovascular deficits will require immediate orthopedic consultation.

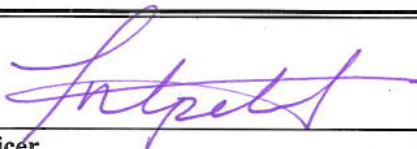

Client Education

6. Instruct the client to keep the splint clean and dry.
7. The extremity should remain elevated for the first 2-3 days to decrease swelling.
8. Educate the client about the signs and symptoms of neurovascular compromise and about how to loosen the bandages if neurovascular symptoms arise.
9. Instruct clients to contact the nurse on call if there are is increased pain or paraesthesia. It is possible for pressure ulcers and infection to develop underneath the splint.
10. Clients should be advised to avoid scratching inside the splint with any objects as small lacerations can occur and secondary infections develop.

DOCUMENTATION

Document the following in the client's health record:

- ❖ Client history, including mechanism of injury
- ❖ Pre-splint assessments, including initial x-ray interpretation
- ❖ Post-splint assessment, including neurovascular assessment and repeat x-ray findings (if applicable)
- ❖ Client education and follow-up appointment
- ❖ Complete WSCC forms (as required)

Approved by:		Effective Date:
Chief Nursing Officer	11 FEB 2011 Date	April 1, 2011
	February 11, 2011 Date	
Deputy Minister of Health and Social Services		

