

Case Report

Orthopaedic Cast and Splint Immobilization: Complications

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Abstract

Orthopedic casts are used in the management of fractures and to support and correct deformities. The application and removal of plaster casts is a skill requiring knowledge, judgement and sensitivity. Orthopedic technicians/technologists need to have a good working knowledge of the main principles of plaster casting to ensure safety and provide patients with appropriate advice and information about how to care for casts and how to recognize possible complications.

Introduction

During the past three decades, internal fixation has become increasingly popular for fracture management and limb reconstruction. As a result, during their training, orthopedic surgeons receive less formal instruction in the art of extremity immobilization and cast application and removal. Casting is not without risks and complications (eg, stiffness, pressure sores, compartment syndrome); the risk of morbidity is higher when casts are applied by less experienced practitioners. Certain materials and methods of ideal cast and splint application are recommended to prevent morbidity in the patient who is at high risk for complications with casting and splinting. Those at high risk include the obtunded or comatose multi-trauma patient, the patient under anesthesia, the very young patient, the developmentally delayed patient, and the patient with spasticity.

With the advent of the rigid internal plate and intramedullary rod fixation, the technique of cast immobilization has become a lost art for many young orthopedists. Newer treatment options and surgical techniques are stressed during residency training, while the nuances of conservative treatment by closed reduction and cast immobilization are often overlooked. The risks and morbidity of cast immobilization are often unknown or ignored.

Today, casts are routinely applied by midlevel orthopedic providers (ie, cast room technicians, physician assistants), thus further decreasing the amount of training orthopedic residents to receive in casting. Despite these limitations in training and exposure, cast immobilization remains a mainstay of treatment for many orthopedic conditions.

In the current medicolegal climate, knowledge of the potential problems associated with casting and insight into preventing them is beneficial to both patient and surgeon. The true incidence of cast complications is unknown. It is difficult to determine the significance of cast problems based on the incidence of medicolegal action. Over 10 years, insurers paid upwards of \$100,000 per claim on approximately 33% of medical malpractice claims for problems related to a closed reduction of fractures. (1) In the same period, insurers paid out a similar amount per claim on approximately 25% for problems related to immobilization and traction. More than 10% of all claims had an associated issue, including failure of consent. This implies that many physicians, caregivers, and patients expect cast immobilization to be without risk.

There are risks associated with cast immobilization, and it is important to inform patients and their caregivers of them.

The surgeon should identify patients at risk for cast complications. In addition, the problems inherent with different casting materials must be recognized, and care should be taken during application of these materials. The surgeon must be vigilant about watching for problems throughout the period of cast immobilization and must know the risks of prolonged immobilization as well as the potential complications with cast removal.



Figure 1: Severe soft-tissue necrosis as a result of compartment syndrome in a 5-year-old boy who was immobilized in a spica cast for a femur fracture. The patient had a baseline peripheral neuropathy that made post reduction neuro circulatory evaluation difficult.

The High-risk Patient

The mantra, “There are no hypochondriacs in casts” is important to remember. Every effort should be taken to resolve the source of complaint in any patient treated with cast immobilization. Certain groups of patients are at higher risk for cast-related complications. These include patients with an inability to effectively communicate in particular, the obtunded or comatose multi-trauma patient. Also, in this group are patients under general or limb block anesthesia (eg, axillary nerve, Bier) who are unable to feel and respond to noxious stimuli such as heat and pressure during cast application. Likewise, the very young or developmentally delayed patient may have difficulty clearly expressing pain. Almost any intervention can cause these patients to become irritable. Thus, discerning a problem may be difficult.

The patient with impaired sensation is at high risk for injury related to excessive heat and pressure (Figure 1). Individuals in this group present with spinal cord injury,^{2,3} meningomyelocele,⁴ and systemic disorders (eg, diabetes mellitus).⁵ Prolonged immobilization in many of these marginally ambulatory patients will potentiate existing osteopenia, thus increasing the risk of insufficiency fracture, which requires further immobilization, propagating a vicious cycle.

The patient with spasticity also is at increased risk for complications. This patient often has multiple risk factors in addition to spasticity, including communication difficulties and poor nutrition. These factors place the patient at particular risk for developing pressure sores, which result from increased tone after cast is applied. Pressure sores have been noticed in children with cerebral palsy treated with surgery and casting for knee flexion contracture and hip instability. In one series, 5 of 79 such patients had decubitus ulcers on cast removal. (6)

Cast Strategies

The physician treating a high-risk patient must first determine the purpose of immobilization and whether the patient requires rigid circumferential immobilization. When immobilization is necessary to maintain fracture reduction in a patient who is unable to communicate due to injury or who is non-ambulatory and insensate, it may be wise to temporarily place the injured limb in a support splint. These splints can be removed, allowing the body part to be inspected periodically, permitting relief of compression or areas of localized pressure. Splint use may be more appropriate than casting to accommodate unrecognized constriction of limbs in the patient who is at risk for swelling due to fluid shifts or bleeding.

To combat the cycle of immobilization-induced osteopenia in the neuropathic patient, the clinician must limit the length of immobilization. The patient may begin weight-bearing while immobilized or be placed in a flexible synthetic cast material that maintains semirigid reduction. The latter method prevents stress shielding of the bone.

The casting of a spastic limb should be done by an experienced physician or cast technician who is well-versed in the application of padding over pressure points and who is familiar with the strategic placement of cast windows to detect and prevent pressure sores. Cast windows are of value for the evaluation of increased pain or symptoms in high-risk patients. They also are useful for examining open wounds (to enable inspection and care) and relieving pressure over prominent

Kirschner wires and external fixation devices. Self-adhesive foam padding, such as Reston self-adhering foam (3M, St. Paul, MN), applied directly to the skin over pressure-sensitive areas can be helpful in these patients. With a spastic patient who needs a hip spica cast, the feet should be included in the cast to prevent the worsening of equinus contracture and to prevent fracture at the end of the cast. Special considerations should be made for the patient with cerebral palsy who is immobilized after contracture release. Often, a cast is used to hold the limb in a more functional position after surgical release. These patients are at increased risk of tension injury to the neurovascular structures, which may be compounded by their impaired ability to communicate.

Casting Material

The most common types of casting material available today are plaster and synthetically based fiberglass. Each of these has benefits and drawbacks that help direct optimal indications regarding their use.

The plaster-impregnated cloth is the time-tested form of immobilization. It was first described in 1852 and has been the benchmark for cast immobilization for many years. This material is generally less expensive and is more moldable than its synthetic counterparts. The major advantages of plaster over synthetic materials in the prevention of cast sores and limb compression are its increased pliability and its ability to effectively spread after the cast is univalved. In-conveniences associated with plaster include its poor resistance to water and its relatively low strength-to-weight ratio, resulting in heavier (thicker) casts.

In the process of setting up, the conversion of the plaster of Paris to gypsum is an exothermic reaction, with thermal energy generated as a byproduct. In general, the amount of heat produced varies between each of the manufactured plasters. However, within each product line, faster-setting plasters can be expected to produce more heat. As the speed of the reaction, amount of re-actants, and temperature of the system (dip water and/or ambient temperature) increase, the amount of heat given off can cause significant thermal injury. (7,8) The low strength-to-weight ratio leads to thicker casts and may increase the risk of thermal injury. Those who are unfamiliar with the amount (ply) of plaster to use may inadvertently use too much, resulting in a burn.

Synthetic fiberglass materials are lightweight, yet strong. These materials may be combined with water-proof liners to allow the patient to bathe and swim in the cast. Often, fiberglass is more

radiolucent than plaster, allowing better imaging within the cast. Because of their strength (requiring less material) and the very low amount of thermal energy released during the curing process, the risk of thermal injury is much lower, a major advantage over plaster. (9) However, because of their increased stiffness, fiberglass casts are felt to be more difficult than plaster casts to mold. To prevent increased areas of pressure on and constriction of the limb, special precautions are recommended when applying fiberglass rolls. (10) Fiberglass is at least twice as expensive as plaster. There may be a small long-term risk to those who apply and remove these materials. Studies have disputed the carcinogenic risks in the manufacturing and use of fiberglass materials. (11,12)

Simple cotton and synthetic materials, as well as newer waterproof liners and padding, such as Gore-Tex liners (W.L. Gore, Newark, DE), may be used to pad the extremity between the cast material and the skin. Cotton is the cheapest and the most commonly used cast padding. It can be applied under both plaster and fiberglass cast material. These casts cannot be made waterproof, however, because the cotton padding retains water.

Newer synthetic padding materials have variable water resistance; when paired with fiberglass, the patient can bathe and swim. Convenience has a cost, however, as synthetic padding is considerably more expensive than cotton. Some insurance companies will not reimburse for the expensive waterproof liners. Water-permeable liners (eg, Gore-Tex) have been a significant improvement in the care of children who require a spica cast application (Figure 2). These liners may be used with either fiberglass or plaster cast material.

In addition to being more convenient for the patient, newer synthetic materials have been shown to prevent skin irritation. (13-15) It is important that closed-cell foam padding not be applied directly adjacent to these materials because accumulated moisture and urine will not be effectively wicked away from the liner and thus, the skin. Special attention should be given when applying a cast over a traumatic or surgical wound. These wounds should not be dressed with circumferential cotton fiber gauze. Cotton fibers absorb blood, which hardens and may become constrictive around the limb as edema increases. In such cases, it is preferable to use sterile cast padding, which stretches with swelling.

Selecting the Appropriate Casting Material

When selecting the appropriate casting material, the physician must determine the goals and anticipated duration of immobilization, taking into account both patient and financial factors. When a well-molded cast is crucial to maintain reduction, plaster immobilization is the first choice. Plaster could be used in an acute pediatric forearm fracture that requires closed reduction and immobilization. In this young, healthy population, the plaster might remain in place for only 2 to 3 weeks, after which early fracture callus would safely permit conversion to a splint or a lighter, stronger, and possibly waterproof fiberglass cast.

A similar rationale is used in choosing plaster casts to manage clubfoot when the immobilized limb is small, maintaining position is essential, and the life span of each cast need be only 1 to 2 weeks. In the busy nonsurgical fracture clinic, where many casts are regularly applied, plaster might be chosen for both its increased pliability and its lower cost.

However, when cast immobilization is used simply to offer support and hold a limb in an anatomic position, as in the case of a stable minimally displaced fracture, a fiberglass cast or splint may be the treatment of choice. Depending on the fit of the cast, it may remain in place throughout treatment. Similarly, after the initial postoperative edema has abated, fiberglass is the material of choice for postoperative casting. Its high strength-to-weight ratio allows for easier mobilization postoperatively, and its durability is ideal for walking casts.



Figure 2: A, Gore-Tex pantaloons are a major advancement in preventing skin irritation from spica cast application.

B, An abdominal spacer is placed underneath the pantaloon before wrapping the padding and the rest of the cast material.

C, D, and E, Using the stretch-relaxation method, the clinician first unrolls the fiberglass material, then lays it over the surface to be casted.

F and G, After the cast has hardened, the abdominal spacer is removed, and the cast is finished by rolling the edges of the padding.

H, Fecal and urine soiling is minimized by placing an absorbent pad under the edges of the cast and next to the perineum.

Cast Application

Although the risk of thermal injury is greatest with plaster casts and splints, a few simple technical pearls can keep the patient safe. Dip water temperature and thickness of cast material are the two factors most strongly associated with plaster cast related burns. Several studies have shown that the risk of thermal injury is significant when the dip water temperature is too hot (>50°C) or the cast is too thick (>24-ply). (7,8) Each plaster manufacturer has recommended dip water temperatures that should not be exceeded. An impatient clinician may be tempted to use warmer temperatures to speed up the setting time. This is strongly discouraged because the risk of thermal injury increases with the temperature.

Casts over 24-ply are rarely required. To avoid material overlap, the clinician should be mindful of an inadvertent increase in the amount of casting material placed in the concavities of extremities (eg, antecubital fossa, dorsum of the ankle). This can be minimized by incorporating splints on the convexity, thus decreasing overlap in the concavity. Similarly, the clinician placing 10 to 15-ply plaster splints on an extremity may breach safe thick-nesses when the splint is too long and the edges are folded over, thus creating a focal area of 20- to 30-ply, a thickness at which temperatures become a risk.

Studies have shown that temperatures high enough to cause significant thermal injury can be reached when the clinician places a curing cast on a pillow. (7) Likewise, the practice of reinforcing a curing plaster cast with fiberglass may place the limb at significant risk because the synthetic overlap prevents heat from effectively dissipating. The clinician must wait for the plaster to cure before either setting the casted limb on a support frame or pillow or applying fiberglass reinforcement. Failure to wait may place the insulated portion of the limb at significant thermal risk.

Fiberglass tapes are inherently safer than plaster from a thermal standpoint, (9) but they do have risks associated with their increased stiffness and the tightness at which they are applied. (16) These materials have an inherent tackiness that requires increased tension to unroll. This places significant tension on the applied casting tape, resulting in constriction of the casted tissues, which may lead to decreased perfusion and compartment syndrome. The stretch-relaxation technique has been shown to improve the safety at which fiber-glass tape is applied. (10) The fiberglass material is unrolled and laid over the casted limb (Figure 2, C through E). The increased stiffness of this material may cause increased pressure and irritation, especially at the cast edges. Rough edges from fiberglass material are common. Great care should be taken to ensure that these edges are well padded (Figure 2, F and G).

These simple recommendations should help decrease thermal and pressure-related complications, regardless of casting material. The development of newer materials may further help in preventing these complications. (13-15,17)

Casting Technique

Application of a well-molded cast is the key to preventing soft-tissue irritation and loss of fracture reduction. Classic works by Charnley, (18) Sarmiento and Latta, (19) and Wenger et al (20) discuss the fine points of molding and three-point immobilization. Each cast should closely mimic the limb it is immobilizing. A cast that is wrapped too tightly acts like a rigid tourniquet to the extremity.

Areas of increased pressure lead to foci of decreased perfusion, resulting in pressure sores. Every assistant should be well trained to hold the limb without producing divots or dimples in the cast. The neophyte cast technician may rationalize that the best way to avoid pressure sores is to increase the amount of padding under the cast. However, injudicious application of excessive padding can lead to a cast that is too loose and that paradoxically increases the risk of skin irritation from shear stress at the skin/padding interface. The loose-fitting cast can be further associated with fracture malunion due to loss of fracture reduction (Figure 3, A). In such cases, the distal fingers or toes often migrate proximally, which should alert the clinician that there is a problem. Thus, bony prominences and cast edges should be well padded and the cast molded to fit snugly without undue pressure.

The cross-section of an appropriate forearm plaster should resemble an oval, not a circle. The importance of cast molding has been demonstrated in two independent studies of distal forearm fractures treated with casting. (21,22) Both found a significant risk of fracture displacement when casts fit poorly; well-molded plasters-maintained reductions. These well-fitting plasters were found to have an optimal sagittal-to-coronal ratio of 0.7 (Figure 3, B through D). Well-fitting plasters are important with any immobilized limb.

In addition to cast molding, great care should be taken in preventing a change in limb position once the casting material is applied. This is especially true in the cast applied to hold a limb in a flexed position or to stretch soft tissues. Examples include a lower extremity cast holding the foot in a neutral position, an above-elbow cast holding the elbow in 90° of flexion, and serial casting of a contracture. Changing the position of the limb during the curing process will weaken the cast, which likely will result in increased bunching of casting material and, thus, increased pressure in the flexion crease.

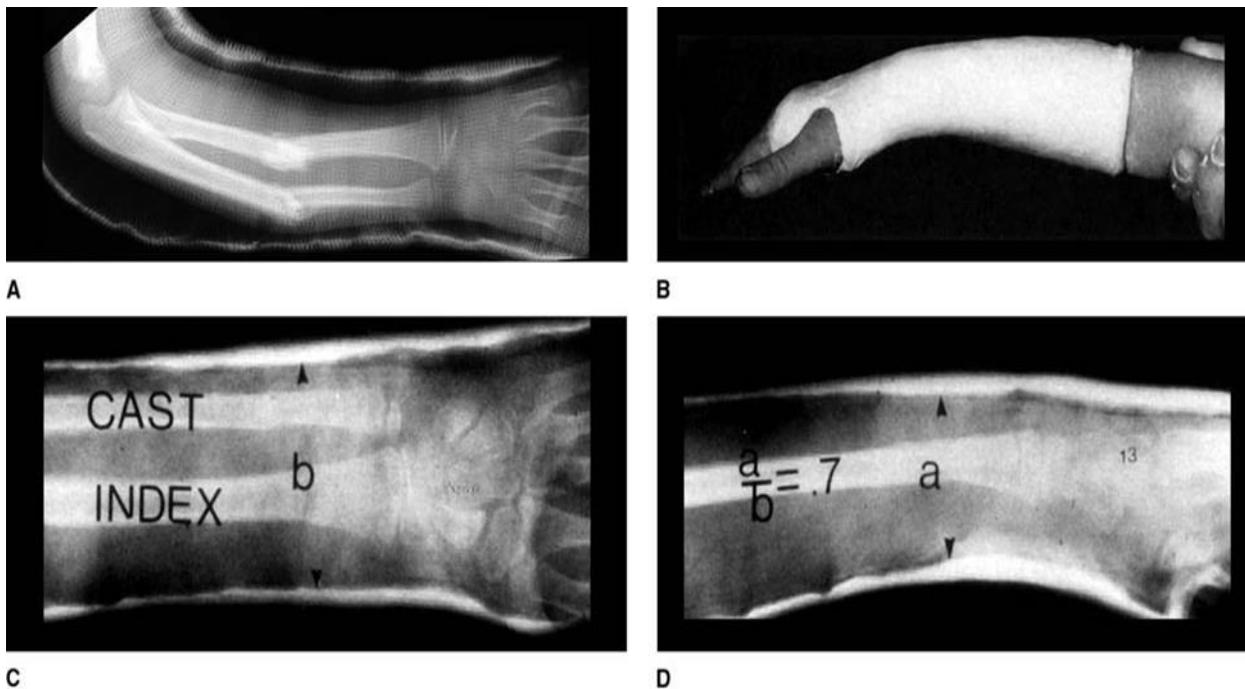


Figure 3: (A), Anteroposterior (AP) radiograph of a poor-fitting long arm cast, noted by the large spaces between the cast and the skin surfaces. The forearm settled into significant ulnar bowing. A better fitting cast with improved molding and proper positioning of the first (thumb) metacarpal in line with the radial shaft may have prevented this complication.

(B), Photograph of a well-fitting forearm cast. AP

(C) and lateral

(D) radiographs demonstrating the ideal sagittal-to-coronal ratio of 0.7.

(Panel A, Case contributed by Charles Price, MD, Orlando, FL. Panels B, C, and D reproduced with permission from Chess DG, Hyndman JC, Leahey JL, Brown DC, Sinclair AM: Short arm plaster cast for distal pediatric forearm fractures. *J Pediatr Orthop* 1994;14:211-213.)

Cast Wedging:

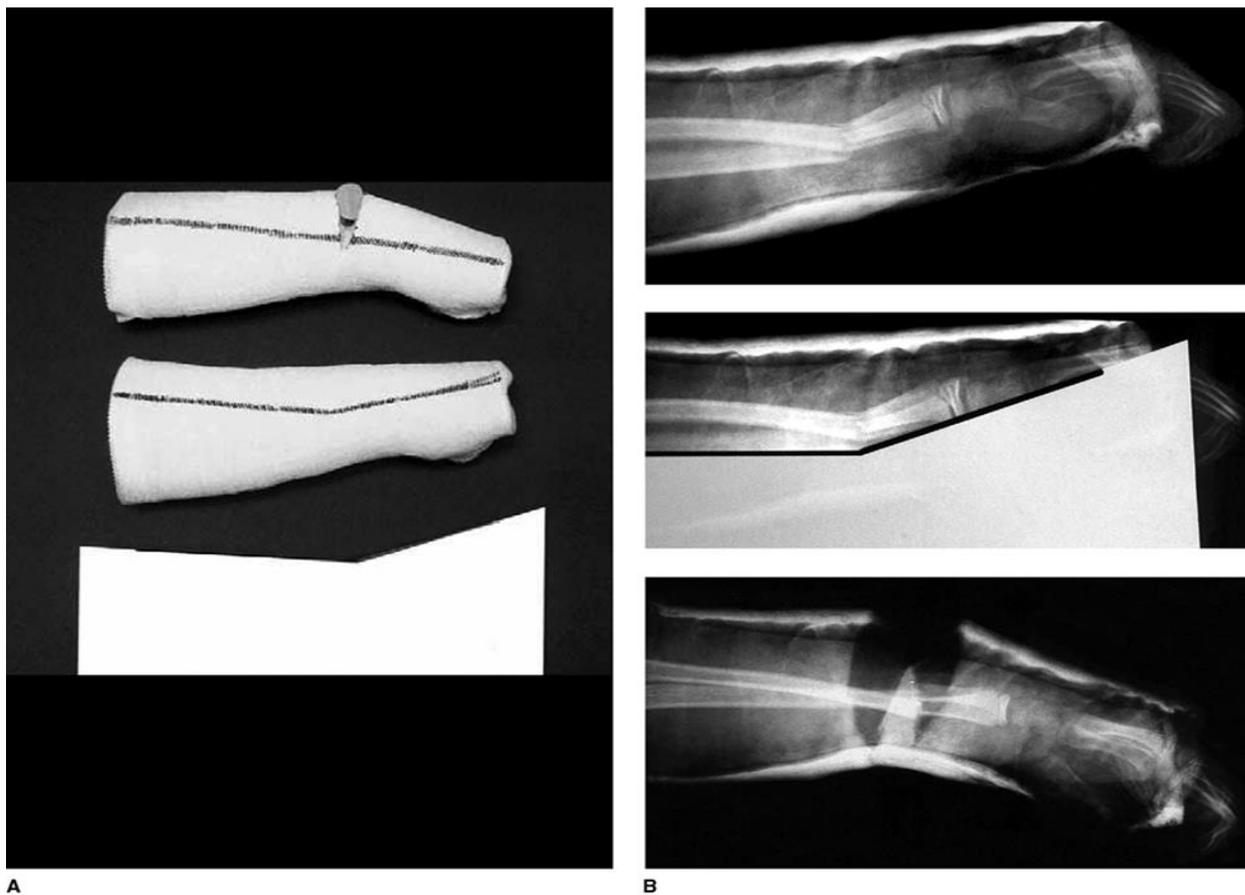


Figure 4: Cast wedging technique.

A, From bottom to top, the deformity is traced onto paper, which is transferred onto the cast.

The cast is then wedged until the deformity is straightened.

B, Lateral radiographs (from top to bottom) demonstrating the improved alignment of the fracture as the result of wedging. (Reproduced with permission from Bebbington A, Lewis P, Savage R: Cast wedging for orthopaedic surgeons! *Injury* 2005;36:71)

Salvaging a Loss of Reduction

When a fresh fracture (one in which significant callus formation has not yet occurred) is found to have an unacceptable loss of reduction within the plaster and the cast appears to be well-fitting, cast wedging may be attempted to regain correction. Many techniques for cast wedging have been described. The most recent description, by Bebbington et al, (23) appears easy to apply clinically for simple angular deformities. A radiograph of the injured area is used to trace the long axis of the mal aligned bone onto a sheet of paper. The piece of paper is cut along this line, and the cut edge is traced onto the cast. The position of the apex of the deformity is determined from the radiographs. Next, the plaster is cut nearly circumferentially at this level, leaving a bridge of intact plaster only at the apex. Corks or cast wedges are applied opposite this bridge until the line transferred onto the cast is straight (Figure 4). If this fails, the cast may need to be removed and the fracture manipulated or treated in some other manner.

Complications

Certain risks may be minimized with the correct casting technique. For instance, upper extremity casts extending beyond the metacarpal heads should be avoided because they inhibit finger motion, resulting in stiffness. When distal immobilization is needed, the fingers should be placed in the safety position (70° metacarpophalangeal flexion and interphalangeal extension) to prevent metacarpophalangeal stiffness. Below-knee casts ending at the fibular neck place pressure over this area and are notorious for causing peroneal nerve palsy. Thus, such casting should be avoided. (24)

Mubarak et al (25) recently demonstrated the importance of proper casting technique when using hip spica casting to treat children with a femur fracture. The author's presented several cases

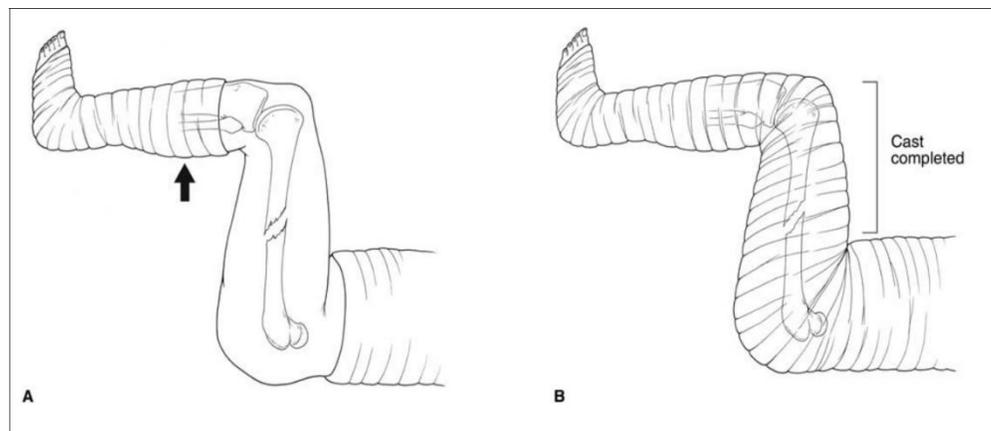
in which the limbs were likely placed in traction during cast application, which led to neurovascular embarrassment and compartment syndrome (Figure 5).

During the spica application for a femur fracture, the clinician must take care not to apply the below-knee cast first and then use it to pull traction through the fracture until the cast is completed with the body of the cast. Doing so may result in increased pressure in the popliteal fossa, thus placing the limb at risk for compartment syndrome and pressure sores. (25-29)

Cast Wear

Pressure and Compartment Syndrome

Barring immediate problems resulting from cast application, the clinician must be vigilant for problems that may arise throughout the immobilization process. Every patient complaint regarding the cast should be evaluated on time by a member of the medical team. Most limbs are more comfortable after immediate immobilization. Therefore, increased pain and neurovascular change should be fully evaluated. Soft-tissue swelling, which may or may not have been present during cast application, may lead to the compartment syndrome.



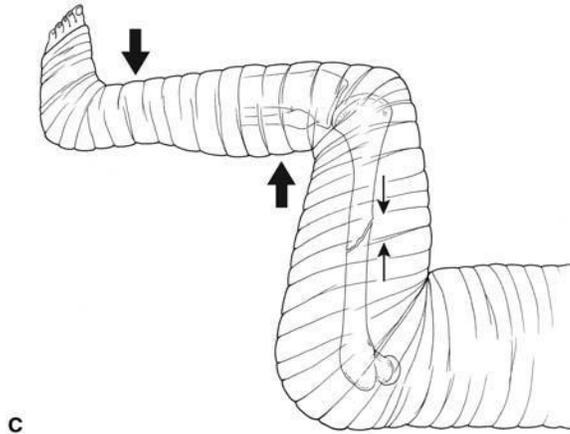


Figure 5: Application of the 90/90 hip spica cast and pathogenesis of the resulting problems.

A, Below-knee cast applied with the patient on the spica frame. Traction (arrow) is applied to the below-knee cast to produce distraction at the fracture site.

B The remainder of the cast is applied, fixing the relative distance between the leg and the torso.

C, After the child awakens from general anesthesia, there is a shortening of the femur from muscular contraction, which causes the thigh and leg to slip somewhat back into the spica.

This causes pressure at the corners of the cast (arrows at the proximal posterior calf and anterior ankle). (Adapted with permission from Mubarak SJ, Frick S, Sink E, Rathjen K, Noonan KJ: Volkmann contracture and compartment syndromes after femur fractures in children treated with 90/90 spica casts. *J Pediatr Orthop* 2006;26:567-572.)

The first intervention should be to relieve circumferential pressure by splitting the cast. Several authors have studied the amount of pressure relieved with cutting and spreading casts as well as after releasing the underlying padding. (10,16) The effect of cast splitting depends on the material used, how it was applied, and whether the associated padding was split. Plaster cast cutting and spreading (univalving) can be expected to reduce pressure by 40% to 60%; re-release of padding may reduce pressure an additional 10% to 20%. Fiberglass casts applied without

stretch-relaxation are known to be two times tighter than those applied with plaster.⁽¹⁰⁾ In these cases, bivalving the fiberglass cast would be required to see similar decreases in pressure.

Casts that are applied with the stretch-relaxation method are among the least constrictive of fiber-glass casts; therefore, univalving may be sufficient as long as the cast can be spread and held open. However, many of these synthetic casts spring back to their original position after simply cutting one side of the cast. Thus, it may be wise to use commercially available plastic cast wedges to help hold open these split casts.

Wet and Soiled Cast

Wet casts that are not made with synthetic material and waterproof liners should be changed. Failure to do so may result in skin irritation, skin breakdown, and infection. Light moisture or spotting may be dried with a hairdryer on cool or low heat, with instructions to the patient to check the temperature of the dryer with his or her hand to ensure that it is not too warm. Increased wetness requires inspection of the skin and cast change. A foul-smelling cast may be a sign of wound infection. The cast should be removed or windowed to inspect the source of the odor. Hip spica casts are often applied in the operating room; their removal and exchange likely will require a general anesthetic. Anesthetic risks must be weighed against the perceived risk of damage to skin and soft tissue.

Parents should be instructed on positioning (to avoid soiling), frequent diaper changes, and inspecting the child for skin irritation. Problems from foreign bodies placed down casts have been reported in numerous case studies. Patients must be counseled against placing objects (eg, coat hangers) downcasts in attempts to scratch pruritic areas because this can lead to skin complications.

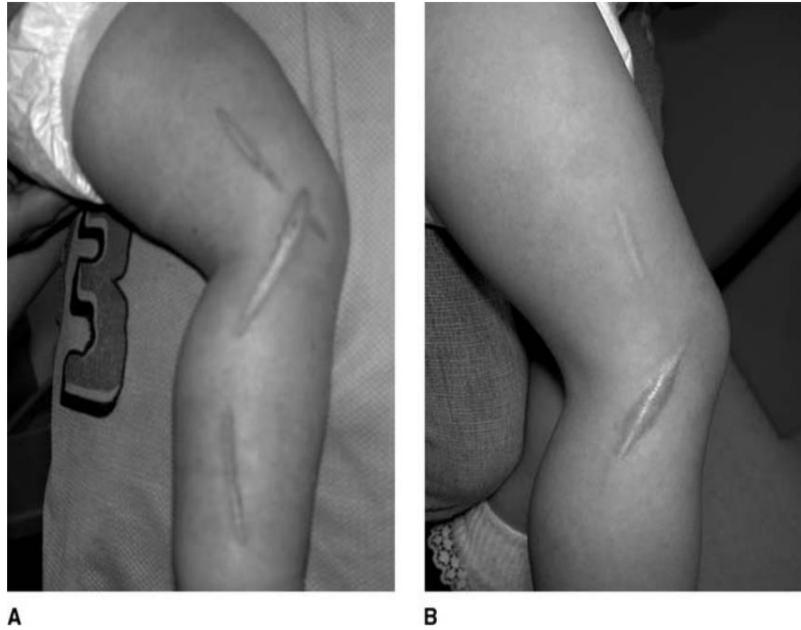


Figure 6: A, Cast saw burns. Children treated with clubfoot casts are particularly at risk for this injury.

B, Hypertrophic keloid formation 5 months after injury.

Immobilization

Several factors must be considered when determining the duration of cast immobilization. The clinician must recognize that unwanted physiologic changes will occur. Excessive length of immobilization may lead to problems such as joint stiffness, muscle atrophy, cartilage degradation, ligament weakening, and osteoporosis. This must be weighed against the bony healing gained in prolonged immobilization. Alternatives such as the Pavlik harness (bracing for infants with femur fracture), patellar tendon-bearing casts versus long leg casts for tibial fractures, and other functional braces may minimize some of the risks of cast immobilization or decrease the duration of cast treatment.

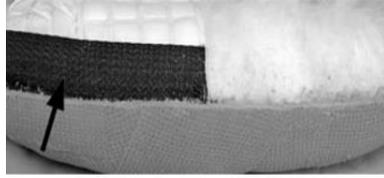


Figure 7: A cut fiberglass cast. A blue protective strip (arrow) is needed over the friable Gore-Tex liner to protect the skin surface. The cotton padding is more resistant than Gore-Tex to the saw blade.

The patient with a paralytic condition of cerebral palsy and the patient taking anticonvulsants may experience further disuse osteopenia with immobilization. (2,3) These patients are at significantly higher risk of pathologic fracture while cast and on cast removal. Strategies to prevent this complication include early mobilization, weight-bearing maybe a sign of wound infection. The cast should be removed or win-dowed to inspect the source of the odor. Hip spica casts are often applied in the operating room; their removal and exchange likely will require a general anesthetic. Anesthetic risks must be weighed against the perceived risk of damage to the skin and soft tissue.

In the adult population, deep venous thrombosis (DVT) is a significant problem after lower extremity immobilization. Two independent studies found that adults treated with a lower extremity cast for an average of 3 weeks had an incidence of DVT between 15% and 36%. Daily use of low-molecular-weight heparin did not significantly reduce this risk. No pulmonary emboli or deaths were noted in these studies. However, the clinician must have a high index of suspicion of DVT and its potentially fatal sequelae, and the patient should be counseled regarding this risk. casts, and the use of Soft Cast (3M) and less rigid immobilization (splints and braces).

Cast Removal Cast Saws

Typically, casts are removed with an oscillating cast saw. These saws are designed to cut the hard cast material and not to cut soft material, such as padding and skin. Ansari et al⁴⁴ reported a 0.72% incidence of the cast saw burns resulting from the removal of casting material. Several precautions are needed to avoid morbidity related to casting removal (Figure 6). With a waterproof cast, the orthopaedic tech must remember to cut over the incorporated safety strips (material between the skin and padding designed to prevent saw injury) before removing the fiberglass

cast (Figure 7). These safety strips are required to prevent injury from the saw because this type of padding is less heat-resistant than cotton padding.

Studies have shown that increased cast thickness and increased blade use result in higher blade temperatures. Thus, blades should be inspected and changed frequently; dull blades can increase the heat generated and subsequently increase the potential for morbidity. Most importantly, the orthopaedic technician or technologist who removes the cast must be well-trained in the use of the saws. One common pitfall is sliding the oscillating saw along with the cast; doing so increases the chance of a cut or a burn. Proper technique dictates alternating firm pressure with relaxation into the material, followed by withdrawal before placing the blade at a different location. The technician should intermittently feel the blade and pause when necessary to allow the blade to cool. This is essential when cutting long casts (ie, long leg plaster). Plaster shears are one alternative to the cast saw.

Clubfoot Cast

Clubfoot casts removed with a saw may be at an exceptionally high risk of injury. These casts are typically applied with minimal padding, which increases the risk of skin injury. Soaking off the clubfoot cast may be a safer method of removal.

Summary

Complications resulting from cast immobilization range from minor skin irritation to serious iatrogenic nerve palsy, compartment syndrome, skin loss, and contracture. A cast may be too tight or too loose, and the patient must be counselled to report either of these conditions to effect a cast change. Casting complications should be recorded and reported and should not be dismissed by the clinician. Acknowledgment of these problems is essential in their prevention.

Casting is often referred to as a conservative treatment, but the clinician and clinician-in-training must remember that this treatment option is not without risk. Furthermore, the patient and family or caregiver must be educated regarding the risks of cast immobilization. Such communication will reduce the assumptions that these methods are without risk and will enable the patient and family/caregiver to recognize the warning signs of complications. With a thoughtful selection of casting material, careful application, and awareness of potential problems, patients can be safely managed with casting for a variety of orthopaedic pathologies.

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