

Orthopedic Training Partner Program



A comprehensive course providing a foundational understanding of orthopedic principles and essential fracture casting methods for effective musculoskeletal injury management.

Overview: Foundations of Casting

1. Introduction to Casting in Orthopedic Practice

- 1.1. History and evolution of casting
- 1.2. Role of the orthotech in casting
- 1.3. Indications and contraindications for casting

2. Principles of Casting Materials and Tools

- 2.1. Types of casting materials (plaster, fiberglass, etc.)
- 2.2. Essential tools and equipment
- 2.3. Safety considerations and handling techniques

3. Casting Techniques Overview

- 3.1. Functional goals of casting
- 3.2. General Guidelines for Extremity Casting
 - 3.2.1. Patient Preparation
 - 3.2.2. Fiberglass Application
 - 3.2.3. Cast Removal

4. Physiological Considerations – Bone Injury

- 4.1. Cardinal Signs of Inflammation
- 4.2. Bones Healing following injury
- 4.3. Factors Affecting Bone Injury

5. Orthopedic Terminology

- 5.1. Fracture Classification
- 5.2. General Terminology

UNIT 1A:

01 History and evolution of casting

02 Role of the Orthotech in casting

03 Indications and contraindications for casting

Introduction to Casting in Orthopedic Practice

Welcome to the Orthopedic Fracture Casting Techniques course.

This comprehensive course is designed to provide students with a solid foundation in the principles of orthopedics and a thorough understanding of the various fracture casting techniques employed in the management of musculoskeletal injuries. As a medical professional, it is essential to have a strong grasp of orthopedic principles, casting techniques, and the appropriate management of fractures to ensure optimal patient outcomes.

Throughout this course, students will investigate the anatomy and biomechanics of the musculoskeletal system, explore the diagnosis and classification of fractures, and develop practical skills in casting and immobilization techniques. The course will also address essential aspects of patient care, including cast maintenance, complication management, and the role of rehabilitation in achieving functional recovery. With a combination of theoretical knowledge and hands-on practice, students will become proficient in the assessment and management of various orthopedic conditions, enabling them to provide the highest standard of care to their patients.

Upon successful completion of these orthopedic modules, students will be able to:

- ✓ Demonstrate a comprehensive understanding of the anatomy and biomechanics of the musculoskeletal system.
- ✓ Identify and classify various types of fractures and orthopedic injuries based on their location, morphology, and etiology.
- ✓ Develop proficiency in the application of appropriate casting techniques for specific fractures and musculoskeletal injuries, including those involving the upper and lower extremities.
- ✓ Implement fundamental principles of orthopedic casting, including anatomic reduction, immobilization, and patient comfort, to ensure optimal healing and functional recovery.
- ✓ Recognize and manage common complications associated with orthopedic casting, such as pressure sores, compartment syndrome, and cast-related skin problems.
- ✓ Provide patients with clear instructions on cast care, including maintenance, hygiene, and strategies to prevent complications.
- ✓ Evaluate the role of rehabilitation and in the recovery process following fracture management with casting techniques.
- ✓ Apply effective communication skills when interacting with patients, their families, and the interdisciplinary healthcare team to ensure coordinated and patient-centered care.
- ✓ Stay current with evolving best practices and advancements in orthopedic casting techniques to continuously improve patient care.
- ✓ Demonstrate professionalism, ethical behavior, and cultural competence in the management of patients with orthopedic injuries.

1.1 History and Evolution of Casting

Casting has evolved significantly from its origins in ancient civilizations to its current advanced forms used in orthopedic practice. Understanding this progression provides valuable context for modern casting techniques and the role of the orthotech in managing injuries.

Orthopedics, derived from the Greek words "orthos" meaning "straight" or "correct" and "paidion" (meaning "child"), is a medical specialty that focuses on the diagnosis, treatment, and prevention of musculoskeletal disorders. Although orthopedic medicine has evolved significantly over time, its historical roots can be traced back to ancient civilizations.

- **Ancient Methods**

- Casting can be traced back to ancient Egypt, where linen bandages and natural resins were used to immobilize fractures. Edwin Smith Papyrus, a surgical document from around 1600 BCE, describes the use of splints to stabilize fractures (Anderson, 2015). Similarly, Hippocrates of ancient Greece, often regarded as the "Father of Medicine," documented methods for fracture reduction and splinting (Galloway et al., 2021).

- **Medieval and Renaissance Developments**

- During the Middle Ages, fracture care involved rudimentary splints made from wood or leather. The Renaissance era brought a deeper understanding of human anatomy through pioneers like Andreas Vesalius, who influenced the treatment of fractures with more anatomically accurate methods (Brown & Parker, 2018).

- **19th Century: The Advent of Modern Casting**

- The term "orthopedics" was first coined by French physician Nicholas Andry in his 1741 book "Orthopaedia, or the Art of Correcting and Preventing Deformities in Children." Andry's work laid the foundation for the modern discipline, emphasizing the importance of correcting musculoskeletal deformities in children to promote healthy development. The introduction of plaster of Paris in the 1800s marked a turning point in fracture care. Invented by Mathijsen, a Dutch military surgeon, plaster casts were lightweight, moldable, and provided rigid immobilization (Robinson, 2020).

- **20th Century to Present: Advanced Materials and Techniques**

- The development of fiberglass casting materials in the mid-20th century further improved the process by offering lightweight, durable, and water-resistant options. Modern innovations, such as breathable cast liners and waterproof materials, continue to enhance patient comfort and outcomes (Smith et al., 2022).

- **1600 BC**
ancient Egyptians were among the first to use splints made from materials like linen and natural resins to immobilize fractures
- **Middle Ages**
Advancements in human anatomy studies enabled fracture management to more anatomically precise
- **19th Century**
Introduction of Plaster of Paris for cast application created lightweight, moldable, and rigid casts
- **20th Century**
Fiberglass offered an immobilization option that was lighter, more durable and water-resistant

The field of orthopedics has a rich history that spans thousands of years, from ancient civilizations to modern surgical advancements. Through the collective efforts of physicians and researchers, the discipline has evolved to provide effective treatments for a wide range of musculoskeletal conditions, significantly improving the quality of life for patients worldwide.

1.2 Role of the Orthotech in Casting

Orthotechs serve a vital function in casting within orthopedic care, especially in sports medicine and clinical practice settings. They are not only responsible for casting

application but also play a vital role in patient education, follow-up care, and interdisciplinary collaboration.

- **Casting Application and Maintenance**

- Orthotechs frequently assist in the management of acute injuries and, under a physician's guidance, apply casts to immobilize fractures or severe sprains. They ensure proper alignment and monitor for complications like pressure sores or circulatory issues (NATA, 2021).

- **Post-Casting Care**

- Monitoring patients for potential complications is a key responsibility. Orthotechs are trained to recognize signs of neurovascular compromise, compartment syndrome, or cast breakage and report such to their supervising physician. They also coordinate with physical therapists to facilitate rehabilitation once the cast is removed (Johnson et al., 2019).

- **Patient Education**

- Educating patients about cast care is essential. Topics include maintaining hygiene, avoiding water exposure for non-waterproof casts, and recognizing warning signs such as increased pain, swelling, or numbness (Smith et al., 2022).

- **Interdisciplinary Collaboration**

- Orthotechs work closely with orthopedic surgeons, primary care physicians, and rehabilitation specialists to develop and implement comprehensive treatment plans, ensuring optimal patient outcomes (NATA, 2021).

1.3 Indications and Contraindications for Casting

Casting is a primary treatment modality for various orthopedic conditions, but its appropriateness depends on the injury type, patient condition, and potential complications.

- **Indications for Casting**

- **Fractures:** Stable fractures, such as those involving the radius, ulna, tibia, or fibula, are commonly treated with casting. Closed, non-displaced fractures respond particularly well to immobilization (Galloway et al., 2021).
- **Soft Tissue Injuries:** Severe ligament sprains or tendon injuries may benefit from immobilization to facilitate healing (Smith et al., 2022).
- **Post-Surgical Immobilization:** Casting protects surgical repairs, such as tendon or ligament reconstructions, during the initial healing phase.
- **Joint Dislocations:** Following reduction, a cast may be applied to stabilize the joint and prevent re-dislocation.

- **Contraindications for Casting**

- **Open Fractures:** Due to the risk of infection, open fractures are typically managed with external fixation or surgical intervention rather than casting (Robinson, 2020).
- **Severe Swelling:** Casting in the presence of significant swelling can lead to complications like compartment syndrome. Initial treatment with splinting is preferred until swelling subsides (Johnson et al., 2019).
- **Infections:** Skin infections or wounds at the site of casting increase the risk of complications and should be resolved before applying a cast.
- **Circumferential Injuries:** Injuries with extensive swelling or circumferential involvement may require splinting for easier monitoring and adjustments.
- **Chronic Conditions:** Patients with diabetes or vascular disease require special consideration due to an increased risk of delayed healing and skin complications (Smith et al., 2022).

References

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