



A Comprehensive Guide to
**Surgical Screws for
Different Body Fractures**

Introduction

Surgical screws are used for internal fixation in treating fractures more often than any other type of orthopedic implant. Although surgical screws are simple devices, they are designed differently based on the type of fracture, how the screw will be used, and other factors, making selecting the appropriate screw essential for proper fracture fixation and optimal patient outcomes.

This three-part guide will provide a comprehensive overview of surgical screws, including a list of surgical screws by body fracture, an explanation of the surgical screw manufacturing process, and selection criteria to help you choose the best surgical screw for a specific fracture.

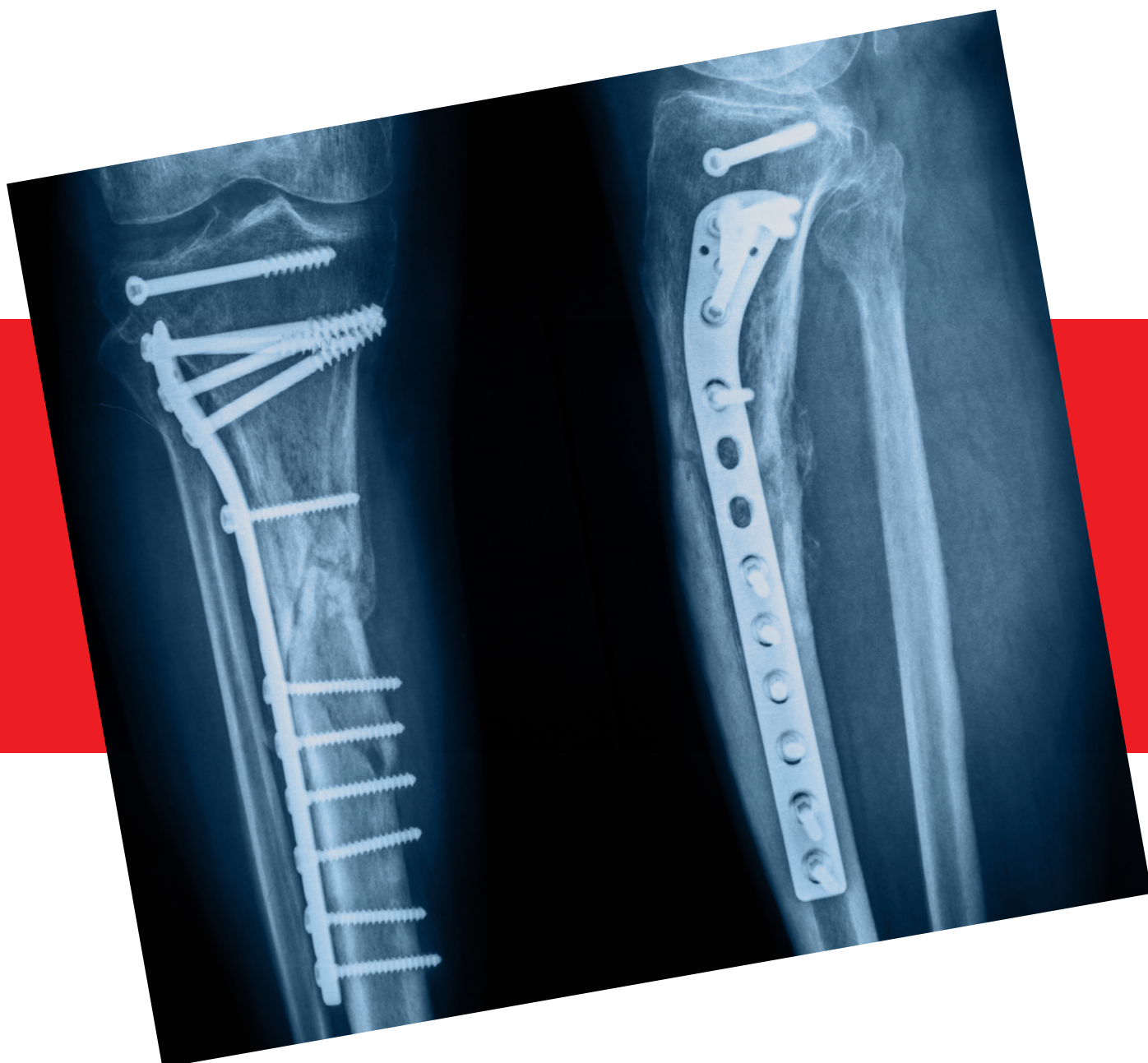
- **Part 1:** Overview of surgical screws by body fracture
- **Part 2:** The surgical screw manufacturing process
- **Part 3:** How to select the right surgical screw for the proper fixation of fractures

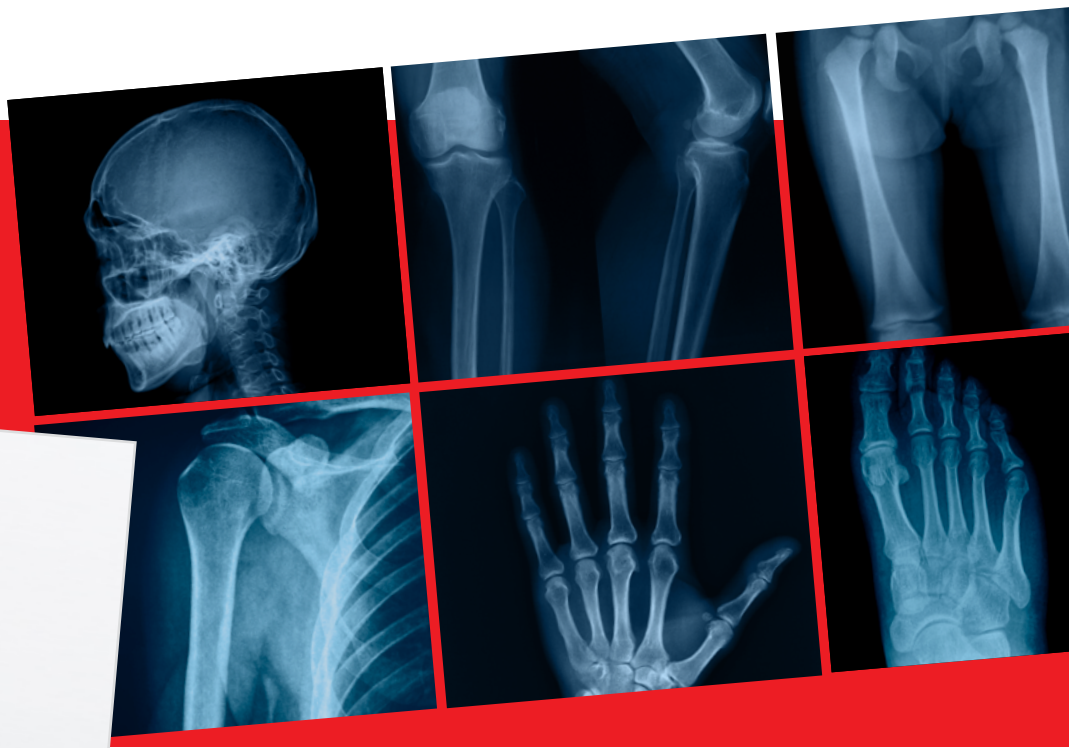
We hope you'll use this guide to better understand the different types of surgical screws available for various body fractures, gain insight into the manufacturing process of surgical screws, and ultimately make informed decisions about selecting the appropriate screw for your patient's specific fracture. By providing a comprehensive overview of surgical screws, we aim to help you navigate the complexities of fracture fixation.

Part 1: Surgical Screws by Body Fracture

Surgical screws are implants used in orthopedic surgery to stabilize bones and joints. They are typically made of metal, such as stainless steel, titanium, or cobalt-chromium alloy, and come in various sizes and shapes.

Common types of surgical screws include cortical, cancellous, cannulated, locking, lag, and self-tapping screws. In the following section, we will explain these screw types and their specific applications in the fixation of body fractures.





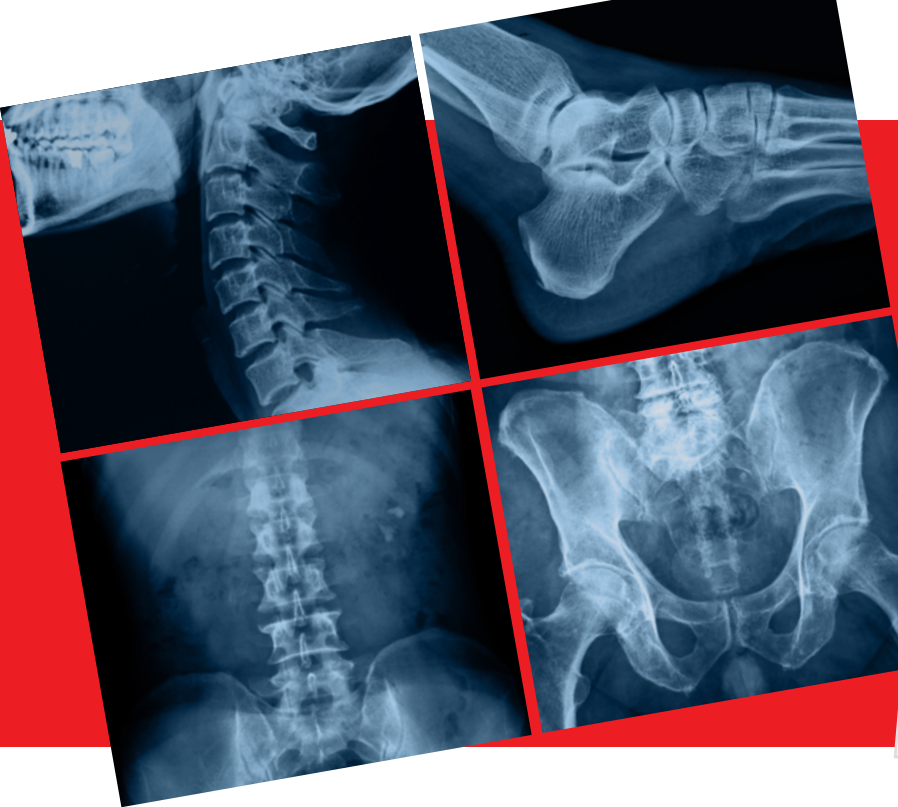
Cortical Screws | Body fracture examples: Skull, femur, tibia, humerus, hand, foot

Cortical screws repair fractures in the hard outer layer of bones, such as the skull. They are designed to fix cortical bone, the hard outer layer surrounding the softer, spongy cancellous bone. Cortical screws have a tapered shank and a flat head, which allows surgeons to countersink them into the bone to avoid causing irritation or impinging on surrounding soft tissue.

Cortical screws are typically used for stable fractures that do not require compression, such as simple fractures, oblique fractures, and transverse fractures.

Some specific fractures that may be treated with cortical screws include:

- **Fractures of the femur or tibia:** Cortical screws may be used to fix fractures that occur in the shaft of the femur or tibia, mainly when the fracture is stable and does not require compression.
- **Fractures of the humerus:** Cortical screws may be used to fix fractures that occur in the shaft of the humerus, mainly when the fracture is stable and does not require compression.
- **Fractures of the hand or foot:** Cortical screws may be used to fix fractures that occur in the small bones of the hand or foot, mainly when the fracture is stable and does not require compression.



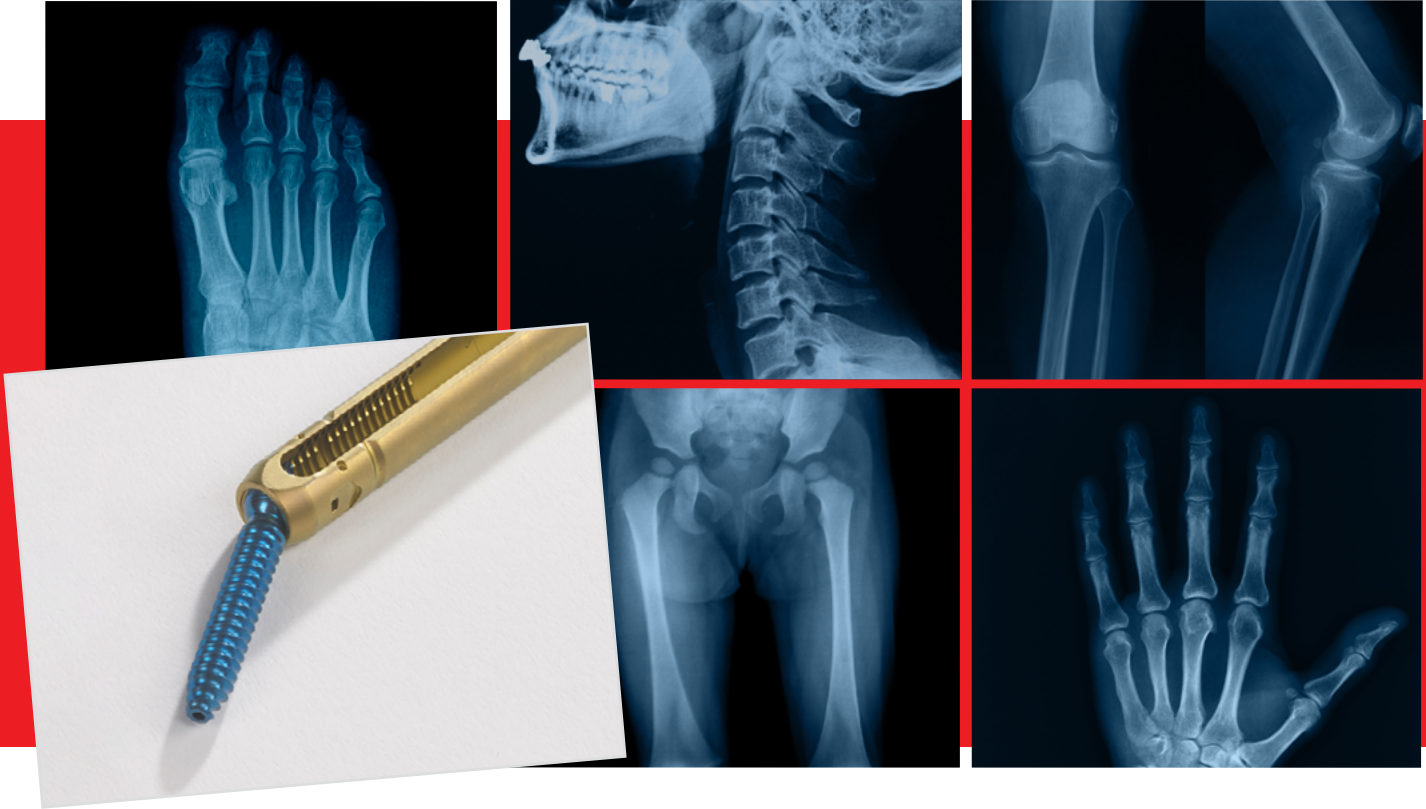
Cancellous Screws | Body fracture examples: Femoral neck, ankle, vertebral body, pelvis

Cancellous screws are used in fractures of the spongy bone, such as the spine and pelvis. Cancellous screws are designed to fix the cancellous bone, the spongy, porous bone found in the inner part of bones. Cancellous screws have a coarser thread than cortical screws, which makes them more suitable for engaging with and anchoring into the softer cancellous bone.

Cancellous screws are typically used for less stable fractures, such as those requiring compression, or in bones with a higher proportion of cancellous bone, such as in the vertebral bodies of the spine or the femoral neck of the hip. They may also be combined with other fixation devices, such as plates or rods, to provide additional stability to the fracture site.

Some specific types of fractures that may be treated with cancellous screws include:

- **Fractures of the femoral neck:** Cancellous screws may be used to fix fractures that occur in the neck of the femur, particularly in situations where the fracture is displaced and requires compression.
- **Fractures of the ankle:** Cancellous screws may be used to fix fractures in the ankle joint, particularly when the fracture is displaced and requires compression.
- **Fractures of the vertebral body:** Cancellous screws may be used to fix fractures that occur in the vertebral body, particularly when the fracture is unstable and requires additional support.



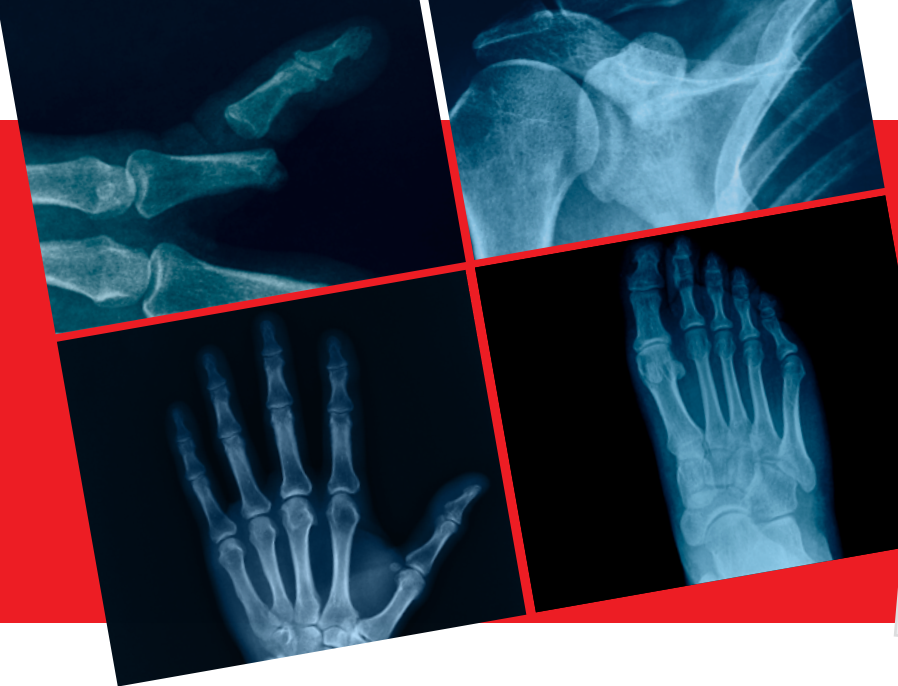
Cannulated Screws | Body fracture examples: Neck, tibia, fibula, hand, foot

Cannulated screws are hollow screws that are used with a guide wire for accurate placement in the bone. The guide wire is inserted into the bone first, and then the cannulated screw is threaded over the guide wire and into the bone. Cannulated screws are often used in minimally invasive surgery or when the surgical site has limited visibility.

Cannulated screws are used for the fixation of various fractures, including those in long bones, such as the femur, tibia, and humerus, as well as in smaller bones, such as the hand and foot bones. They are instrumental when the accurate placement of the screw is critical, such as in fractures that involve the joint surface or those close to a nerve or blood vessel.

Some specific types of fractures that may be treated with cannulated screws include:

- Intracapsular fractures of the hip: Cannulated screws may be used to fix fractures that occur within the hip joint, such as femoral neck fractures.
- Fractures of the tibia or fibula: Cannulated screws may be used to fix fractures in the shaft of the tibia or fibula.
- Fractures of the hand or foot: Cannulated screws may be used to fix fractures that occur in the bones of the hand or foot, such as metacarpal or metatarsal fractures.



Self-Tapping Screws | Body fracture examples: emergencies, clavicle, hand, foot

Self-tapping screws have a sharp tip that allows them to be screwed directly into bone without needing a pre-drilled hole. They are often used when a pre-drilled hole may not be possible or when a surgeon wants to minimize the trauma to the bone.

Self-tapping screws are especially useful for quickly achieving strong and stable fixation, such as in emergency surgery or when the bone is too hard to insert a screw easily. They may also be used when the bone is too small to allow for pre-drilling, such as in small bones in the hand or foot.

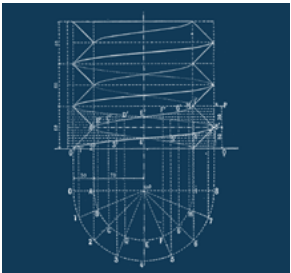
Some specific types of fractures that may be treated with self-tapping screws include:

- **Fractures of the hand or foot:** Self-tapping screws may be used to fix fractures that occur in the small bones of the hand or foot, particularly where the bone is too small to allow for pre-drilling.
- **Fractures of the clavicle:** Self-tapping screws may be used to fix fractures in the collarbone, particularly when the bone is too hard to allow for easy insertion of a screw.
- **Fractures requiring emergency surgery:** Self-tapping screws may be used in emergencies where it is necessary to achieve stable fixation quickly.

It is important to note that there are many variations of each of these types of screws. The specific type of screw used in a surgical procedure will depend on many factors, which we will discuss in Part 3 of this guide.

Part 2: Surgical Screw Manufacturing Process

The manufacturing process for surgical screws is a complex and precise procedure that requires careful attention to detail and quality control to guarantee their safety and effectiveness for medical procedures. This section will provide a detailed overview of the surgical screw manufacturing process, including the materials used, the CNC machining techniques employed, and the rigorous testing and quality control measures that ensure the screw's strength, durability, and performance.



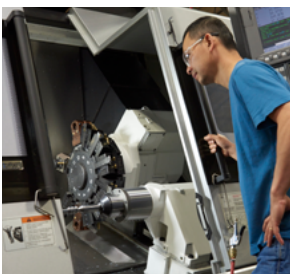
1. Design and specification

The first step in surgical screw manufacturing is to create a design for the screw and specify the required dimensions and material. Design for manufacturing (DFM), prototyping, and engineering services can optimize the design for the intended application and ensure it's manufactured efficiently and effectively.



2. Material selection

Once the design and specifications are finalized, it's time to select the appropriate medical-grade material for the surgical screw, such as titanium, stainless steel, or cobalt-chromium alloys. The material selection is critical in ensuring the safety and efficacy of the screw, as different materials may have different strengths, biocompatibility, and resistance to corrosion or wear.



3. CNC machining

Advanced computer numerical control (CNC) machining techniques ensure the screw is manufactured to precise specifications and tolerances for consistent and reliable performance. State-of-the-art CNC technologies cut, drill, and shape the material with high precision, resulting in the highest quality screws. The combination of precision machining and material quality control measures helps to ensure the safety and efficacy of the surgical screw for use in medical procedures.



4. Finishing

Once the screw is machined, it undergoes an advanced finishing process to achieve the desired surface finish and appearance. Finishing may involve polishing, sandblasting, or other techniques to remove imperfections or roughness, depending on the application and specifications.

Part 2: Surgical Screw Manufacturing Process (Continued)



5. Quality control testing

Rigorous testing is critical throughout surgical screw manufacturing to ensure strength, durability, and performance. Coordinate measuring machines (CMM), vision equipment, and other testing technologies that allow surgical screw manufacturers to tightly control screw quality. In addition, metallurgical testing helps verify the quality and consistency of the material, which involves analyzing its microstructure, composition, and properties to ensure that it meets the required standards for strength, biocompatibility, and corrosion resistance.



6. Packaging and sterilization

Finally, the screws are sent to be packaged and sterilized for use in surgical procedures. Packaging and sterilization is the final step to help guarantee the safety and efficacy of the screw for use in medical procedures.

The manufacturing process for surgical screws involves multiple complex and precise steps crucial for ensuring a high-quality final product. The design and specification, material selection, CNC machining, heat treatment, finishing, quality control testing, and packaging and sterilization are all critical steps that must be carefully executed to produce surgical screws that meet the required standards for strength, biocompatibility, and corrosion resistance.

Part 3: How to select the right surgical screw for proper fixation of fractures

Selecting the right surgical screw for proper fracture fixation is critical for successful outcomes in orthopedic surgeries. When selecting a surgical screw, there are several factors to consider, including the type of fracture, the fracture's location, and the patient's overall health.

Type of fracture

One of the most important factors to consider when selecting a surgical screw is the type of fracture. Different types of fractures require different kinds of screws, such as cortical screws for stable cortical bone fractures, cancellous screws for cancellous bone fractures that require compression, or locking screws for fractures in osteoporotic bone. Understanding the type of fracture will help determine the appropriate screw to use.

Location of the fracture

The location of the fracture is also an important consideration when selecting a surgical screw. For example, fractures near joints or other critical areas may require specific types of screws to provide additional stability or allow for a better range of motion. Additionally, consider the size and shape of the bone to ensure that the screw will fit properly and provide adequate fixation.

Patient health and medical history

Another important consideration when selecting a surgical screw is the patient's health and medical history. For example, certain medical conditions or medications may affect the patient's bone density or healing ability, impacting the choice of screw.

Ultimately, selecting the right surgical screw requires carefully assessing the fracture, the bone, and the patient's medical history to optimize surgical outcomes and promote faster healing. It is also essential for patients to follow their surgeon's post-operative instructions carefully to ensure proper recovery and avoid complications.

Conclusion

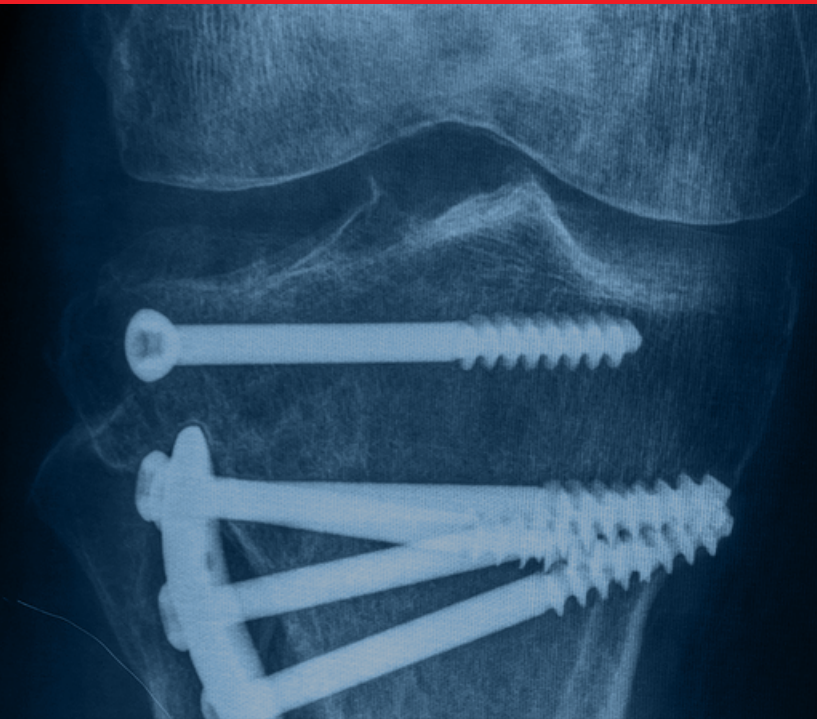


Surgical screws are essential to orthopedic surgeries, and selecting the right screw is critical to fix fractures properly. This guide provides a comprehensive list of surgical screws for different body fractures and explores how these screws are manufactured to meet the highest quality standards. By providing this information, we hope to assist orthopedic surgeons in selecting the right screw for their patients to ensure the screws used in surgeries are of the highest quality.

Time is of the essence for surgeons who need to select the right surgical screw for a particular bone fracture. Our ability to provide industry-leading solutions and services allows us to meet these demands. With an impressive 170,000-square-foot manufacturing facility, advanced machinery, skilled personnel, and a dedication to quality, we are a trusted provider of high-quality surgical screws and other medical components to clients worldwide.

We have optimized our planning and manufacturing processes to provide superior service to medical OEMs by implementing lean methodologies and a fully integrated SAP system. We understand the importance of hitting launch dates and delivering replenishment orders on time. Our vertical approach to manufacturing and processing ensures shorter lead times and tighter quality control for your implant and component needs. In addition, our products are shipped with certificates of compliance, giving you peace of mind that our products meet the highest quality standards.

Learn more about our contract manufacturing services for the medical industry and our stringent Quality Systems on our website, or contact us for personalized assistance with your medical manufacturing challenges.



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