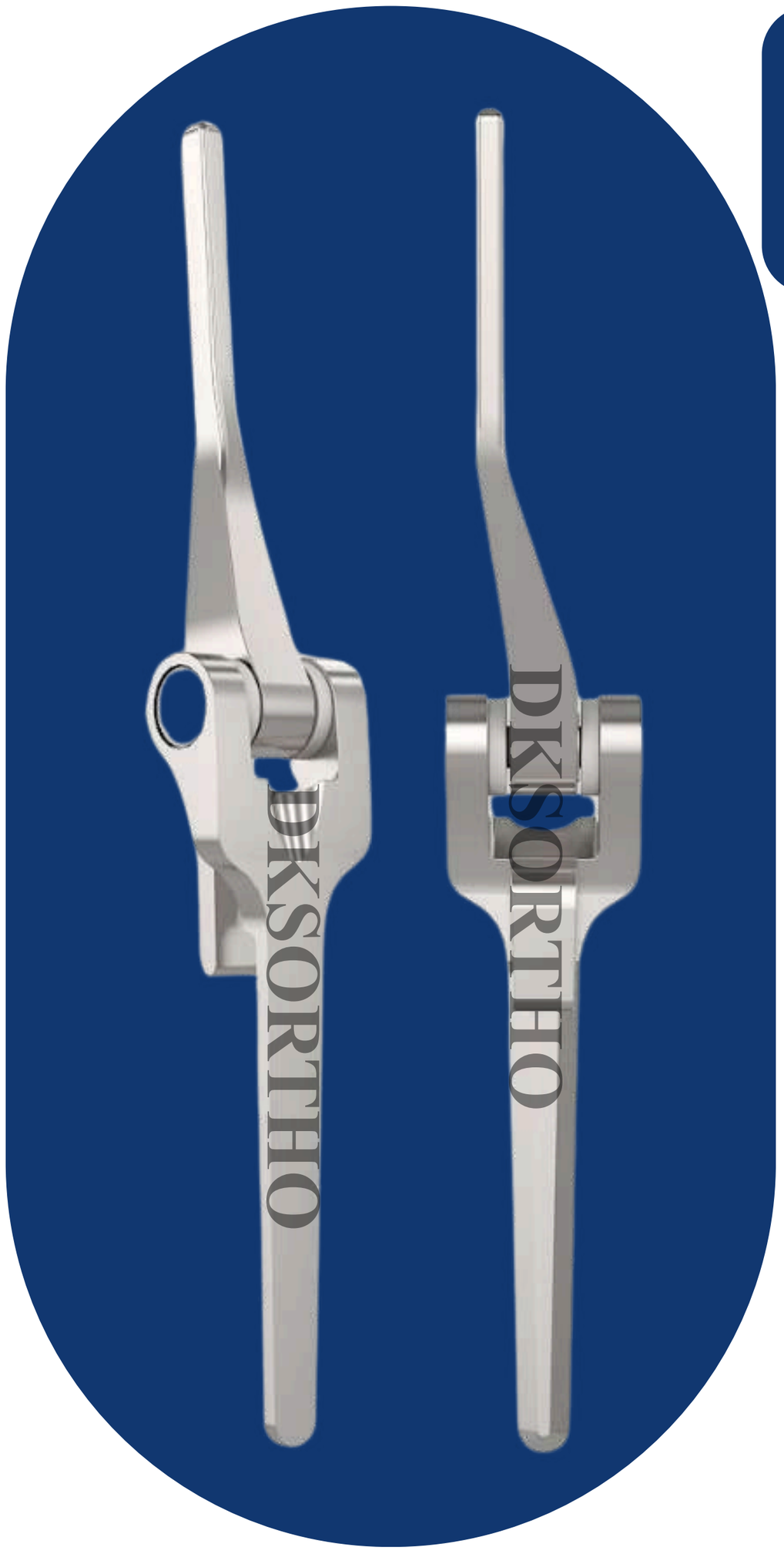
DKSORTHO®

ELBOW SYSTEM



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Introduction

DKSORTHO & SHARMA PHARMACEUTICAL PVT. LTD.

- **32 Years of Excellence in Orthopedic Solutions**
- **Presence in 93 Countries Worldwide**
- **Registered in More Than 32 Countries**
- **Wide Range of Products: Total Hip Replacement, Total Knee Replacement, Spine, Sports Medicine, and Trauma Products**
- **Advanced Manufacturing with State-of-the-Art High-Speed Machines**
- **Trusted by Medical Professionals Worldwide**
- **Committed to Quality, Innovation, and Patient Care**

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Address: 444, G.I.D.C Estate, Waghodia - 391 760, Vadodara, Gujrat, India
Contact: +91 - 98250 27792
Email: info@dksortho.com; **Website:** www.dksortho.com

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• HUMERAL STEM

Humeral stem	Size	CAT NO.
PRATHMESH Humeral stem with locking pinion	SMALL	S23.EP0001
PRATHMESH Humeral stem with locking pinion	MEDIUM	S23.EP0002
PRATHMESH Humeral stem with locking pinion	LARGE	S23.EP0003
PRATHMESH Humeral stem with locking pinion	EXTRA LARGE	S23.EP0004

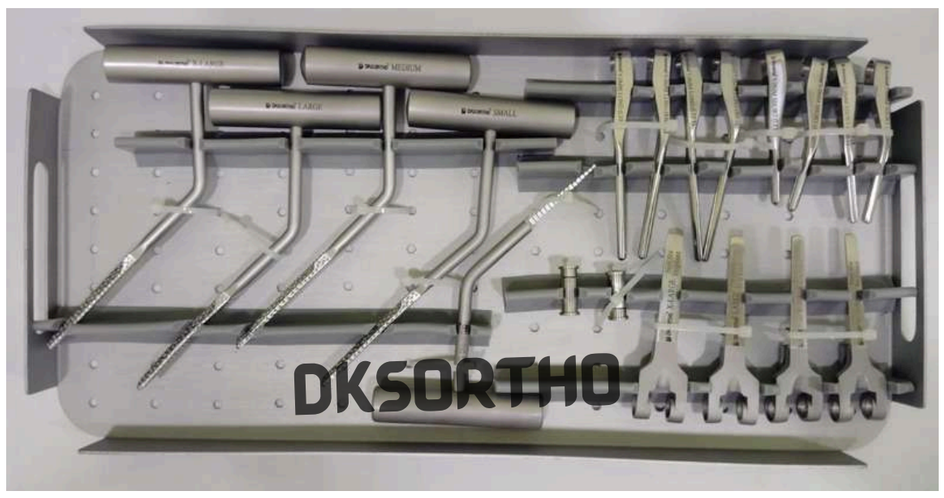
• ULNA COMPONENT

Ulna Component	Size	CAT NO.
PRATHMESH Ulna component	7MM SMALL (LEFT)	S23.EP0005
PRATHMESH Ulna component	7MM SMALL (RIGHT)	S23.EP0006
PRATHMESH Ulna component	9MM LARGE (LEFT)	S23.EP0007
PRATHMESH Ulna component	9MM LARGE (RIGHT)	S23.EP0008
PRATHMESH Ulna component	7MM SMALL (LEFT) EXTRA LONG	S23.EP0009
PRATHMESH Ulna component	7MM SMALL (RIGHT) EXTRA LONG	S23.EP00010
PRATHMESH Ulna component	9MM SMALL (LEFT) EXTRA LONG	S23.EP00011
PRATHMESH Ulna component	9MM SMALL (RIGHT) EXTRA LONG	S23.EP00012

- **LOCKING PINION**

Humeral stem	Size	CAT NO.
Male locking pinion	STD	S23.EP00013
Female locking pinion	STD	S23.EP00014

INSTRUMENT SET



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Surgical Technique

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INDICATIONS & CONTRAINDICATIONS

Indications include:

post-traumatic lesions or bone loss that contribute to elbow instability; ankylosed joints, particularly in cases of bilateral ankylosis caused by conditions other than sepsis; advanced rheumatoid or degenerative arthritis associated with incapacitating pain; revision arthroplasty; and severe instability or loss of motion in situations where the extent of joint damage makes less radical procedures unsuitable.

The candidate for total elbow arthroplasty should have joint destruction that significantly impairs activities of daily living. Patients with single-joint involvement, such as those with traumatic or degenerative arthritis, or those with significant lower limb disability requiring walking aids, are generally less suitable for this procedure compared to patients with advanced, predominantly upper limb involvement. Whenever possible, elbow replacement should be performed after hip or knee surgery to prevent excessive stress on the prosthesis caused by crutch walking during rehabilitation following total hip or knee replacement.

Prior infection, paralysis, joint neuropathy, significant hand dysfunction, or excessive scarring of the skin that may prevent adequate soft tissue coverage are considered distinct contraindications. Additionally, the use of the Coonrad/Morrey total elbow prosthesis should not be considered in patients whose activities would expose the implant to excessive stress, such as heavy manual labor, torsional loading, or participation in competitive sports.

Additionally, distant foci of infection such as genitourinary, pulmonary, skin (including chronic lesions or ulcerations), or infections at other sites are considered relative contraindications, as hematogenous spread to the implant site may occur. Therefore, these sources of infection should be appropriately treated before, during, and after implantation.

Joints that are neuropathic due to diabetes or other diseases involving peripheral neuropathy are considered relative contraindications to total elbow arthroplasty.

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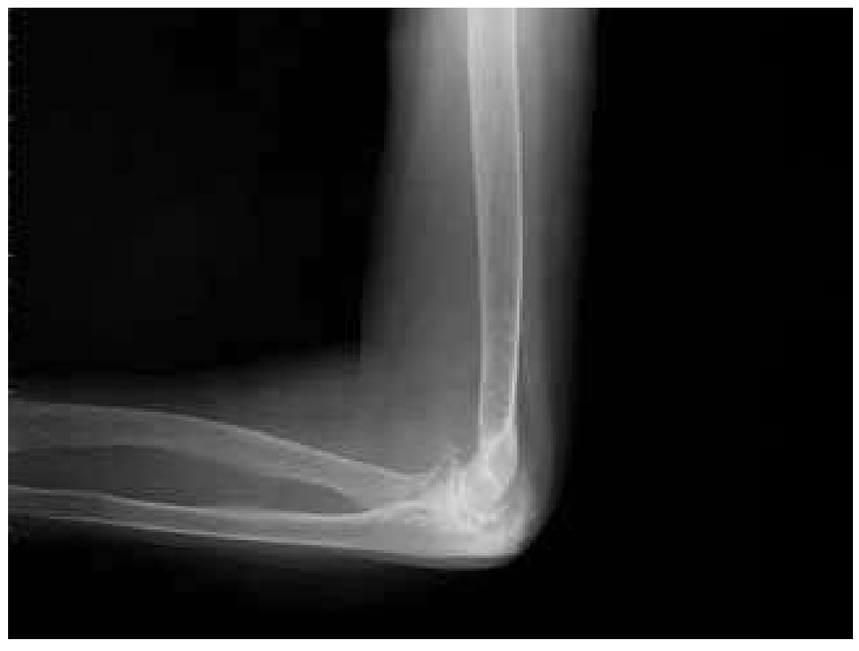
Preoperative Considerations

For those inexperienced in the technique of elbow arthroplasty, a trial with a fresh amputated, or cadaver specimen, is recommended. The surgeon should be aware of the coupling mechanism and the technique of articulating and disarticulating the two stems at the hinge joint. Attention should also be given to the need for bone grafting beneath the anterior flange. The insertion of a bone graft anteriorly enhances thickening of the bone stock at the point where maximum stress has been found to occur. The flange and bone graft were designed to resist torsional and posteriorly directed forces associated with loosening of the constrained implants.



Lateral View

In those patients having both shoulder and elbow pathology, the most severely involved joint should be done first. In patients with a pre-existing or anticipated ipsilateral shoulder replacement, the four-inch implant is to be used. A bone-graft plug is inserted in the canal at a depth of approximately 4.5 inches. At least 3 cm distance between the cement of the shoulder and elbow components is desirable.

Anterior/Posterior View

Surgical Technique

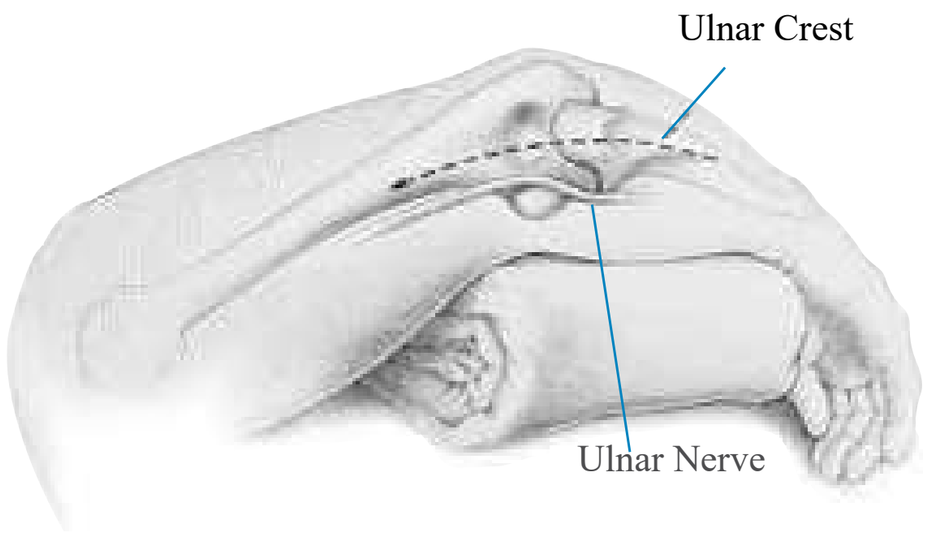


Figure 1

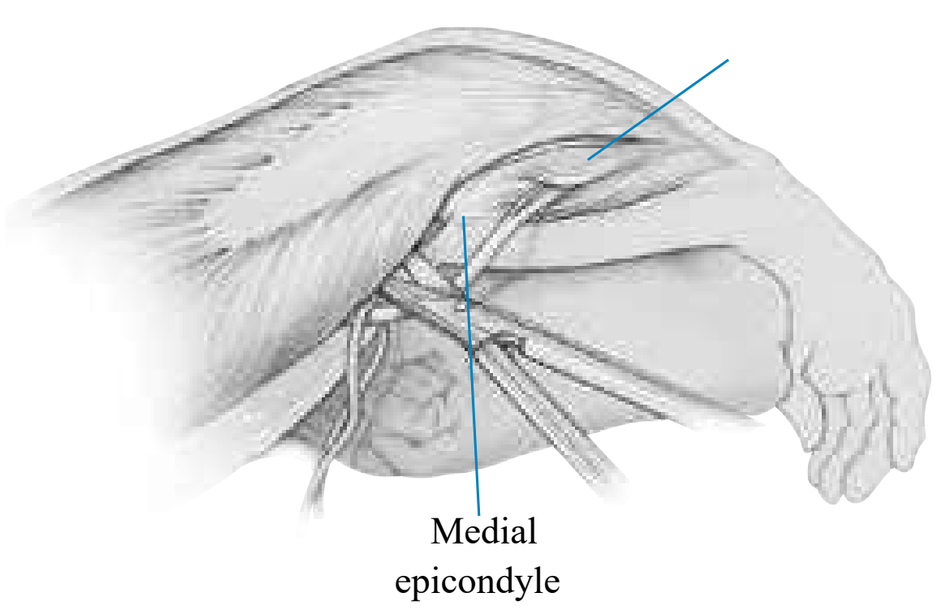


Figure 2

Incision

Position the patient according to preference. The recommended position is supine, with a sandbag placed under the scapula and the arm positioned across the chest. Make a straight incision approximately 15 cm in length, centered just lateral to the medial epicondyle and just medial to the tip of the olecranon (Figure 1). Identify the medial aspect of the triceps mechanism and isolate the ulnar nerve using loupe magnification and bipolar cautery. Mobilize the ulnar nerve up to its first motor branch and carefully transpose it anteriorly into the subcutaneous tissue (Figure 2). The nerve should be protected for the remainder of the procedure.

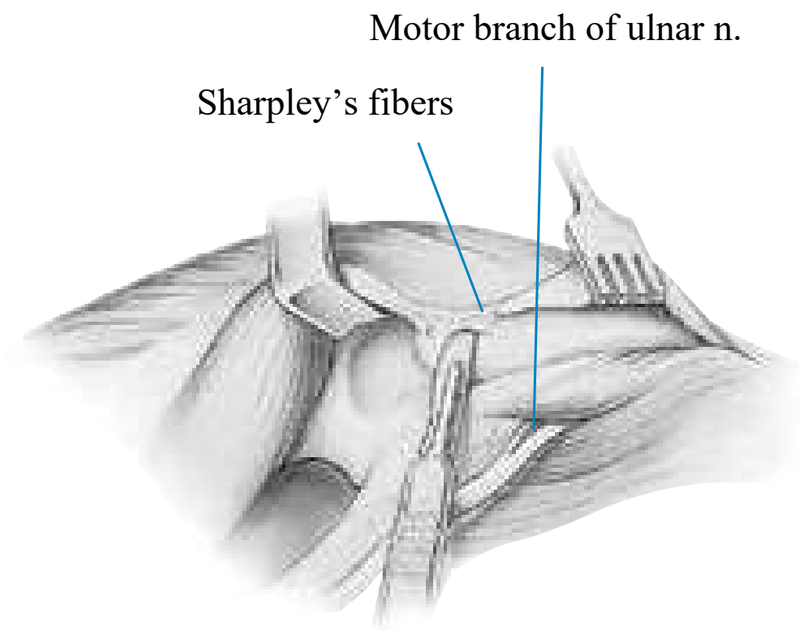


Figure 3

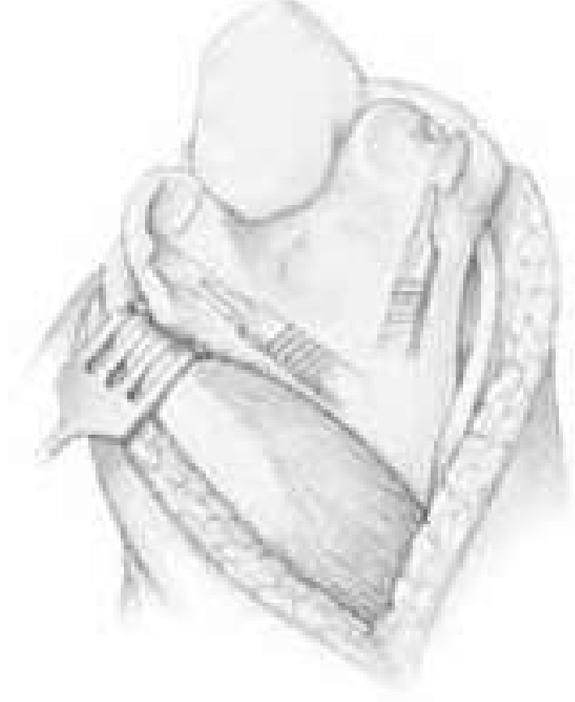


Figure 4

Make an incision over the medial aspect of the ulna and elevate the ulnar periosteum along with the forearm fascia (Figure 3). Then retract the medial aspect of the triceps together with the posterior capsule. Detach the triceps from the proximal ulna by releasing Sharpey’s fibers from their insertion. Further reflect the extensor mechanism laterally, including the anconeus, allowing complete exposure of the distal humerus, proximal ulna, and radial head (Figure 4). Finally, sublux the entire extensor mechanism laterally.

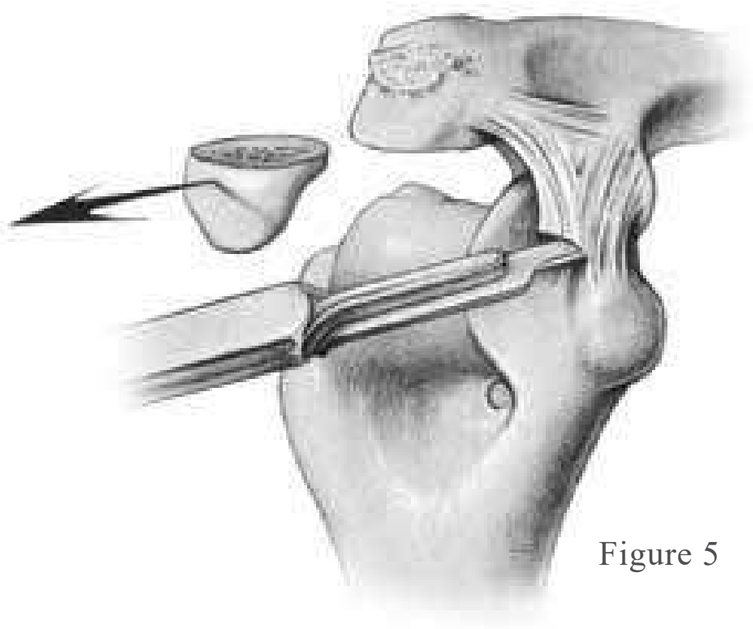


Figure 5

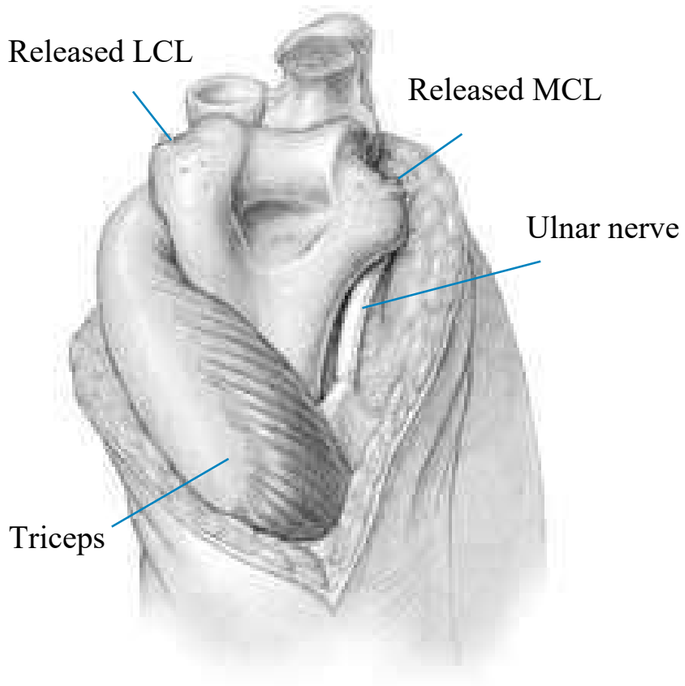


Figure 6

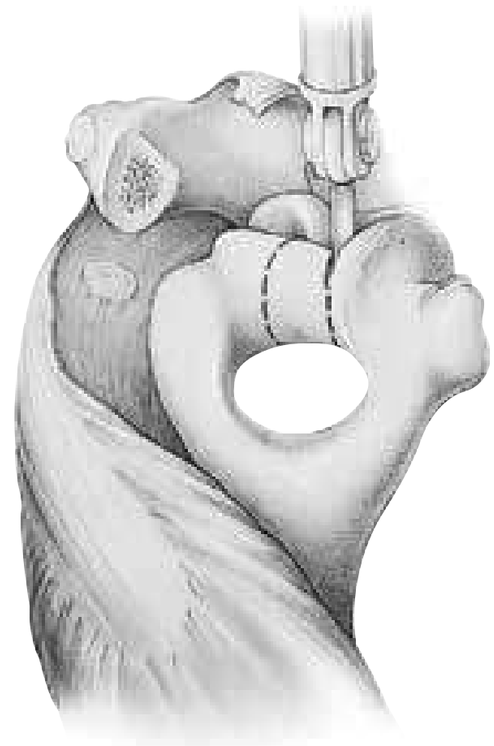


Figure 7

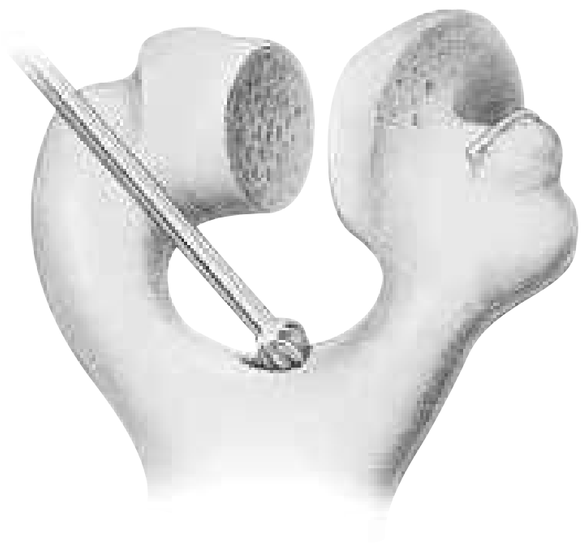


Figure 8

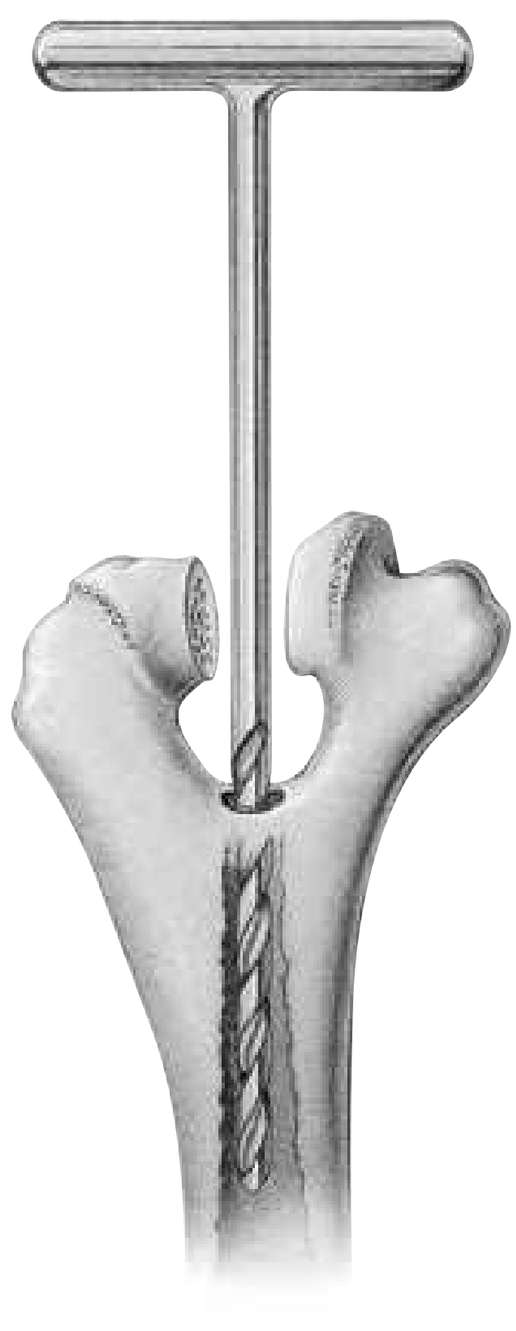


Figure 9

Remove the tip of the olecranon and release the medial and lateral collateral ligaments from their humeral attachment (Figure 5). Flex the elbow to separate the distal articulation from the humerus (Figure 6). Externally rotate the forearm to allow further flexion and separation of the articulation.

Humeral Resection

Remove the central portion of the trochlea using a rongeur or saw (Figure 7) to facilitate access to the humeral medullary canal. Identify the canal by removing a small portion of cortical bone from the roof of the olecranon fossa using a burr or rongeur (Figure 8). Then enter the medullary canal with the rasp-awl (Figure 9). Identify the medial and lateral aspects of the supracondylar columns and keep them visualized throughout preparation of the distal humerus to ensure correct alignment and orientation. Attach the T-handle to the Humeral Alignment Guide and insert the guide into the humeral canal. Position the lateral arm on the radial side of the selected-sized Humeral Cutting Guide so that the “Right” or “Left” indication on the lateral arm aligns with the corresponding marking on the cutting guide. Tighten the knurled knob.

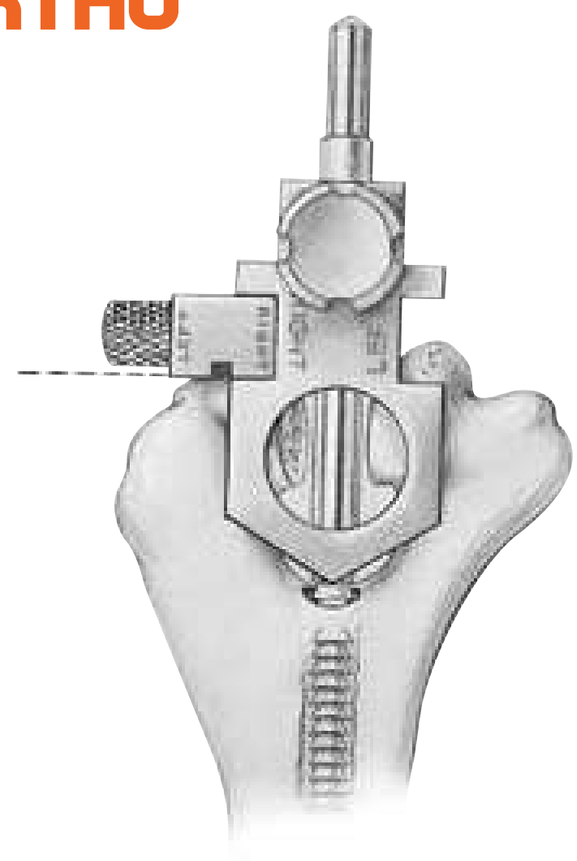


Figure 10

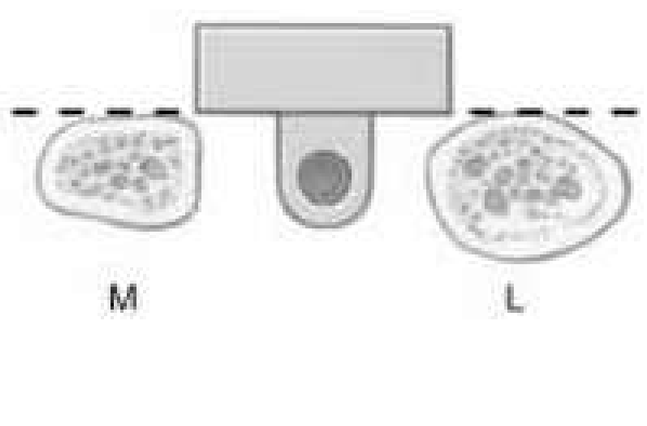
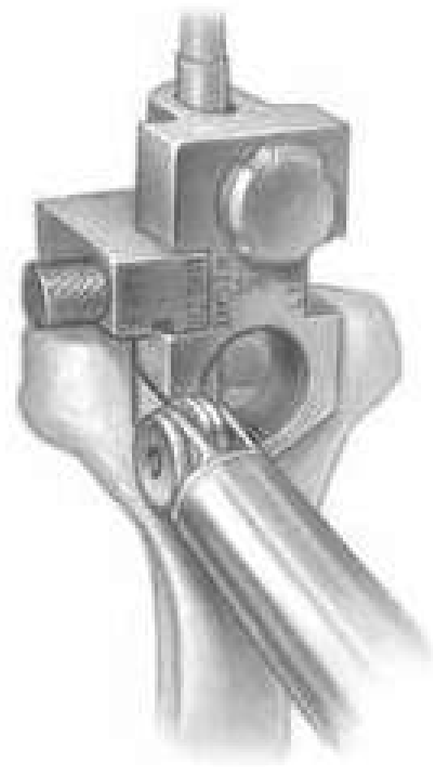


Figure 11



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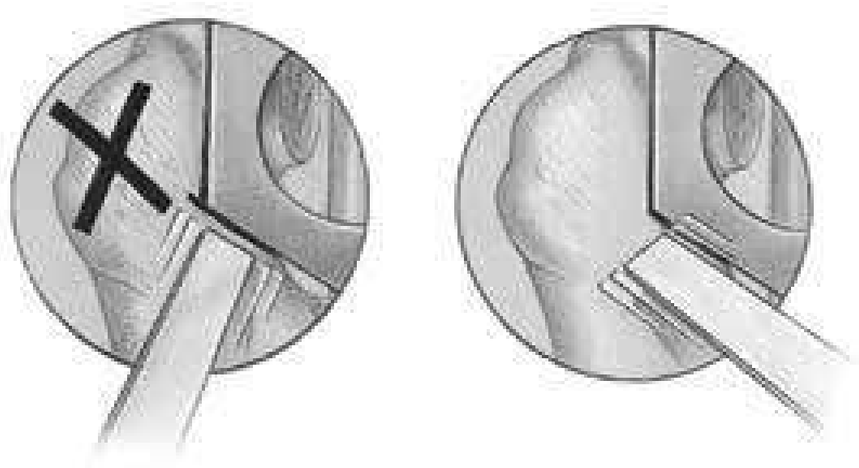


Figure 13

Remove the T-handle from the alignment guide and slide the cutting guide onto the posterior side of the alignment guide. The arm should rest on the capitellum to provide the appropriate depth of cut (Figure 10). Use the plane formed by the posterior cortices of the medial and lateral columns to determine the rotational orientation of the humeral resection (Figure 11). The cutting guide should be parallel to this plane. When the cutting guide is properly aligned, tighten the thumb screw.

The width of the humeral cutting guide corresponds to the selected size of the humeral component and allows accurate removal of the articular surface of the distal humerus. Use an oscillating saw to remove only the remaining trochlea by first cutting along the medial and lateral planes of the cutting guide (Figure 12), and then along the proximal planes. Care should be taken to avoid violating either supracondylar bony column, as this may create a stress riser that can lead to fracture of the structure (Figure 13). The proximal cut usually leaves the cortical bone intact on either side of the guide. If preferred, the cutting guide and alignment guide may be removed to complete the resection down to the roof of the olecranon fossa. The bone fragments are then removed. If desired, inserting the distal end of the appropriately sized humeral provisional between the bony columns can be used to check the accuracy of the cut.

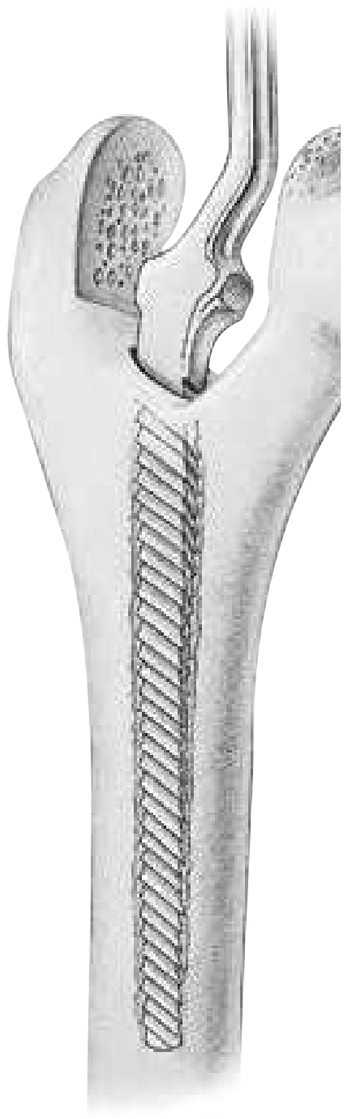


Figure 14

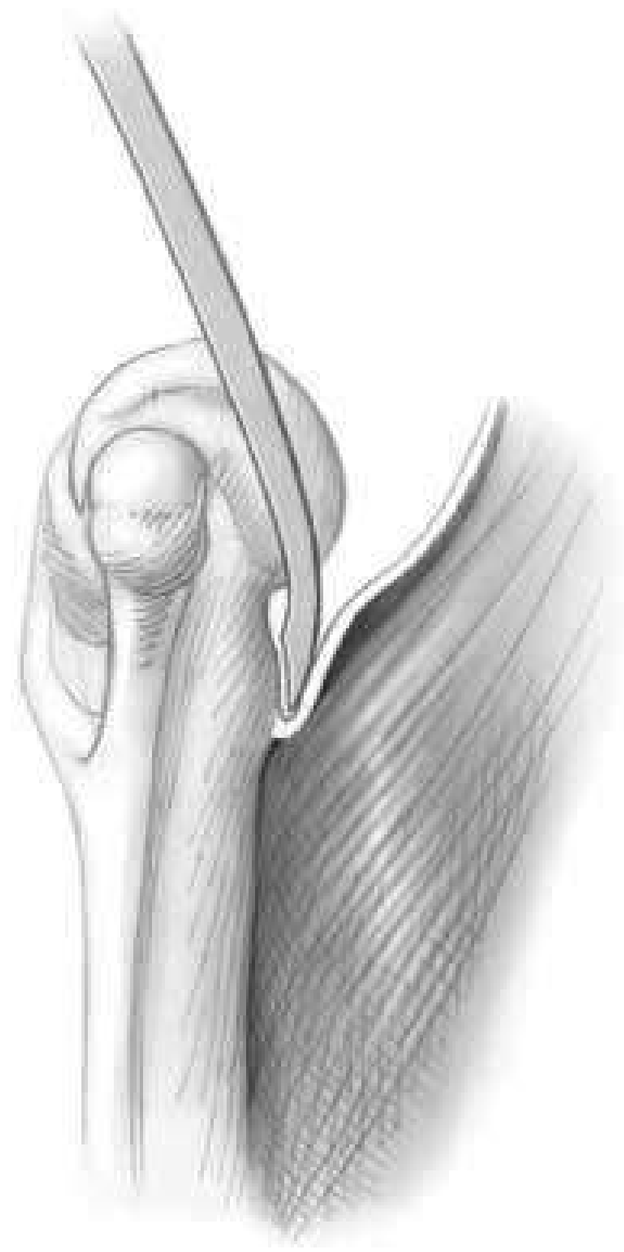


Figure 15

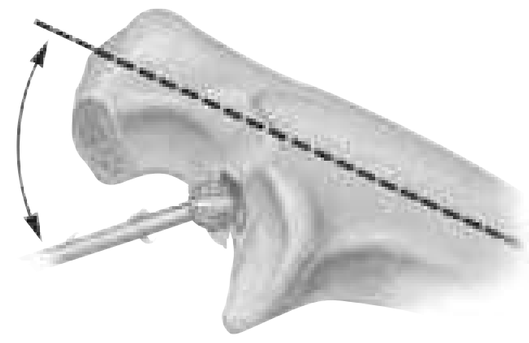


Figure 16

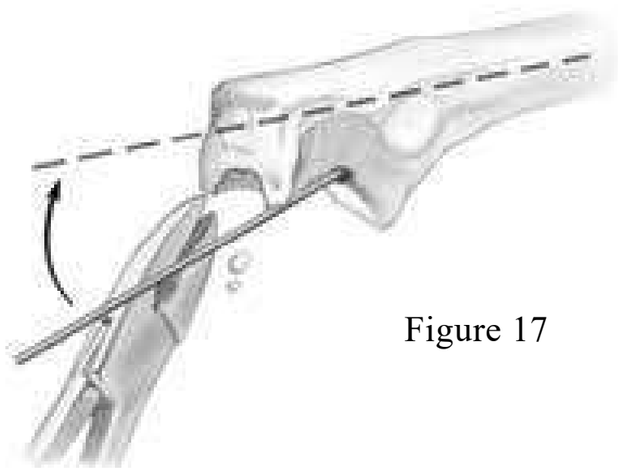


Figure 17

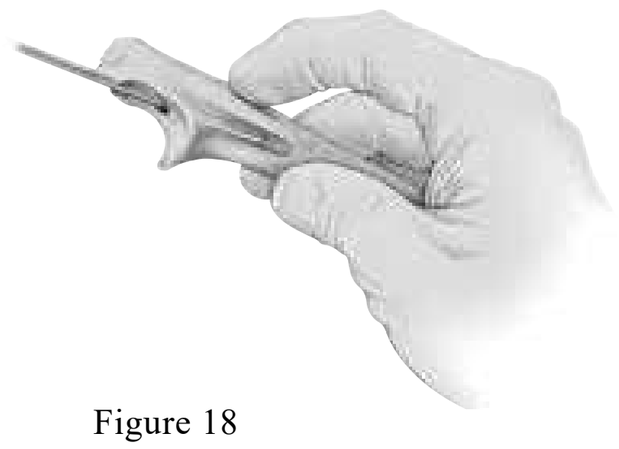


Figure 18

Begin rasping the humeral canal with the starter rasp. If necessary, gently twist the rasp to further open the canal. Then use the humeral rasp that corresponds to the selected size of the humeral component (Figure 14). If implanting the extra-small humeral component, only the starter rasp should be used; moderate burring of the distal portion of the canal may be required to ensure proper trial and implant fit. This results in a final opening in the roof of the olecranon fossa that is smaller than the diameter of the medullary canal. To prepare a position for the humeral flange and bone graft, release the anterior capsule from the anterior aspect of the distal humerus and use a 12–20 mm curved osteotome to elevate the brachialis muscle (Figure 15).

Preparation of the Ulna

Identify the ulnar medullary canal by using a high-speed burr to remove the subchondral bone at the base of the coronoid (Figure 16). If necessary, remove additional bone from the tip of the olecranon or notch it to allow the incrementally sized starter awls to be introduced axially into the ulnar medullary canal (Figure 17). Use the starter awls with a twisting motion to further identify and widen the canal. Place a finger over the exposed proximal shaft of the ulna to help prevent violation of the medullary canal (Figure 18).

Figure 19

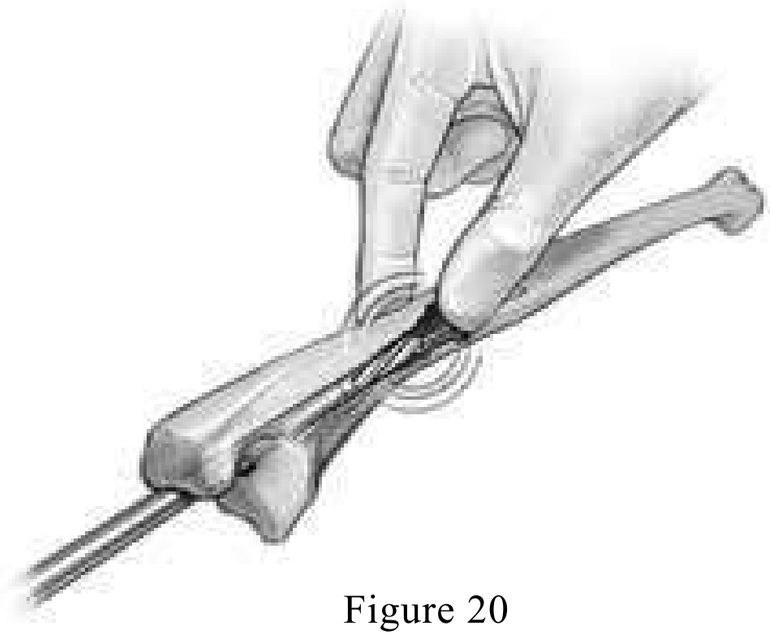


Figure 20

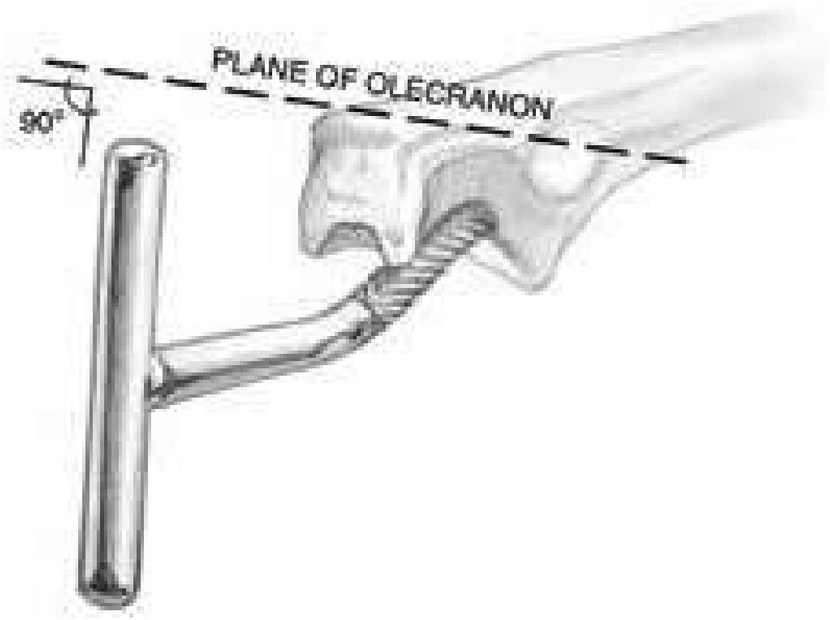


Figure 21

Use the pilot rasp to further open the canal. Then use the right or left starter rasp. If implanting the extra-small ulnar component, the starter rasp is the final rasp and must be fully seated to allow proper depth of insertion of the extra-small implant; this may require removal of additional intramedullary bone stock proximally using a Steinmann pin or similar instrument.

To prepare the final several millimeters of the ulnar canal, use a mallet to remove subchondral bone around the coronoid and the medullary canal. If desired, and if the canal is small, flexible reamers can be used to prepare the canal (Figure 20). Determine the final orientation of the implant by placing the rasp down the canal with the handle perpendicular to the “flat” of the olecranon (Figure 21).

If implanting a small or regular ulnar component, use a gentle twisting motion to insert the small or regular rasp in the appropriate right or left configuration (Figure 19). If implanting a small component and the canal is large enough, follow the small rasp with the regular rasp to provide a greater cement mantle around the implant.

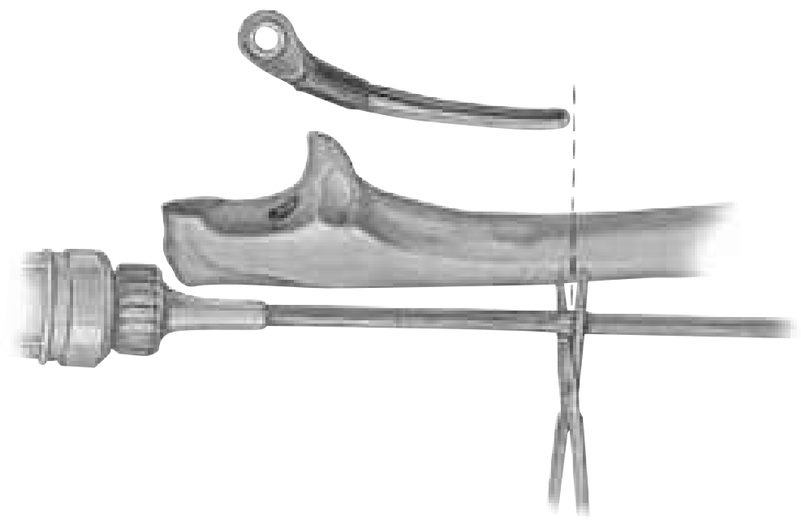


Figura 22

Figura 23

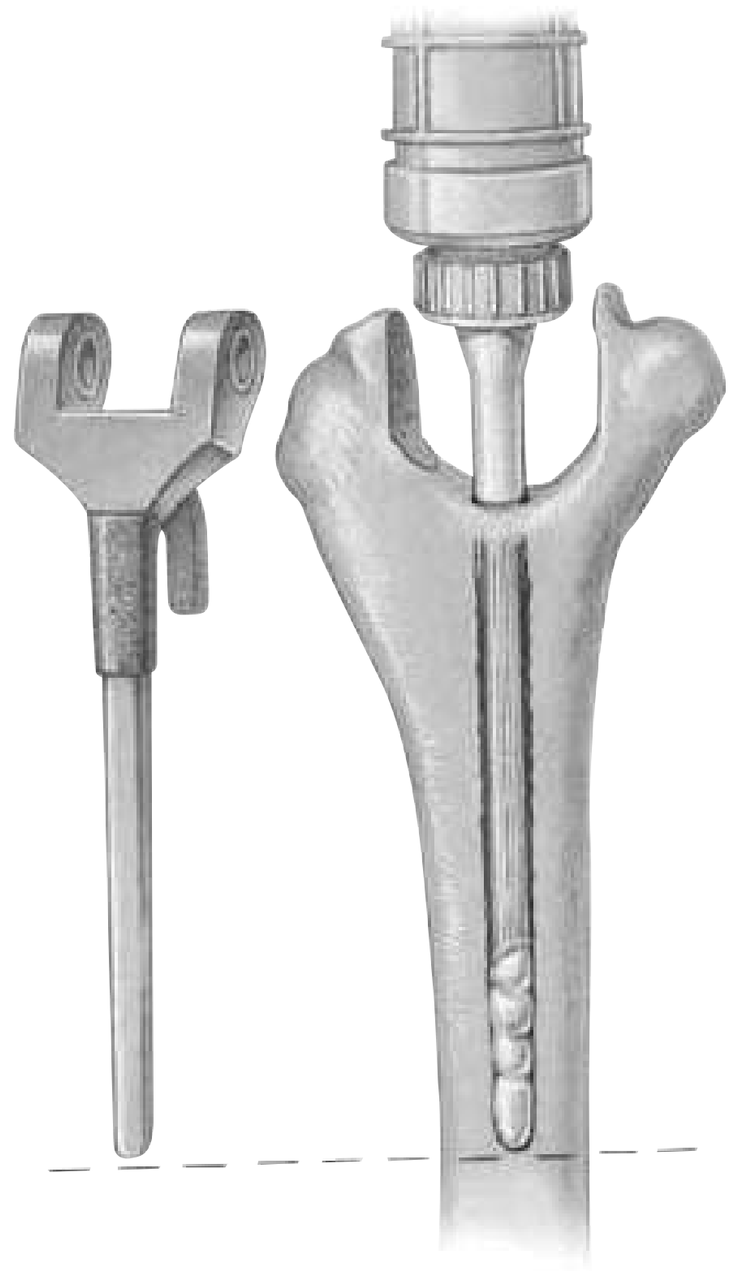


Figura 24

Trial Reduction

Insert the appropriately sized ulnar and humeral provisionals. Articulate the two provisionals and connect them by placing the pin provisional across both components. After the provisional prosthesis has been coupled, perform a trial reduction and assess the range of motion. Then remove the provisional components.

Cement Technique

Using a pulsatile lavage irrigation system, thoroughly clean and dry the medullary cavities of both bones. Inject cement into the ulnar medullary canal, or into both the ulna and humerus, using a delivery system designed to fit even the smallest ulnar canal. Cut the flexible tubing to the appropriate length for either the humeral or ulnar component (Figure 22). Because of high resistance, the cement should be injected early in the polymerization process.

Insert the ulnar component first, advancing it as far distally as the coronoid process. The center of the ulnar component should align with the projected center of the greater sigmoid notch (Figure 23). The flat of the ulnar component should be parallel to the flat of the olecranon.

After the cement has hardened and excess cement has been removed from around the ulnar component, repeat an identical process for injecting cement into the humeral canal. Remember that the humeral orifice is smaller than the medullary canal. When indicated, use a specially designed plug or pieces of bone graft to improve cement retention. Cut the injection tubing to the appropriate length and inject cement into the medullary canal in a routine manner (Figure 24).

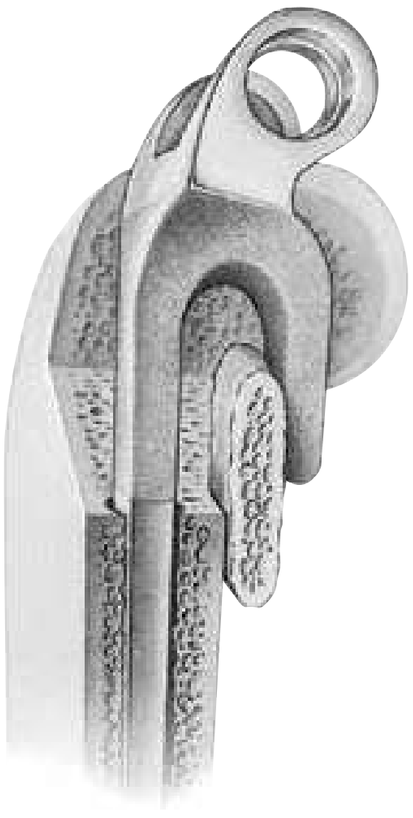


Figura 25

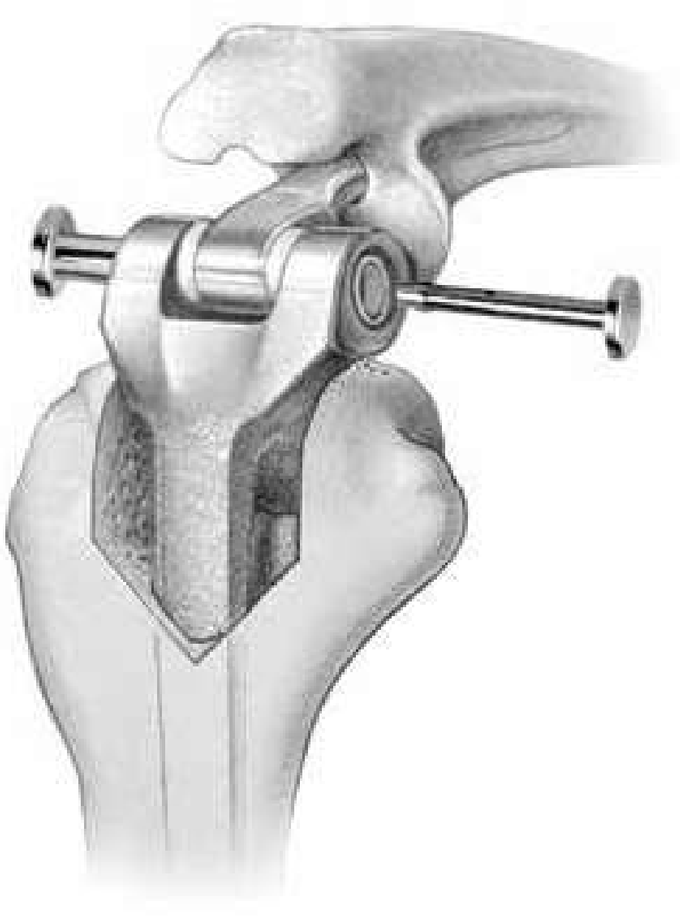


Figura 26

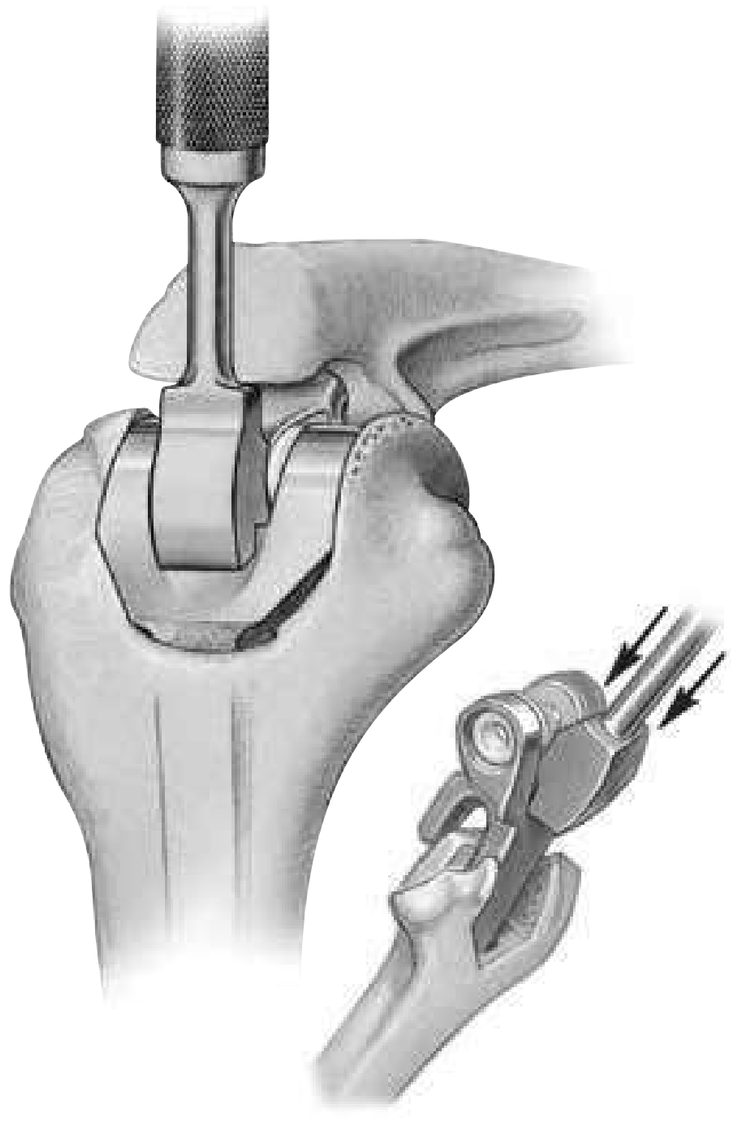


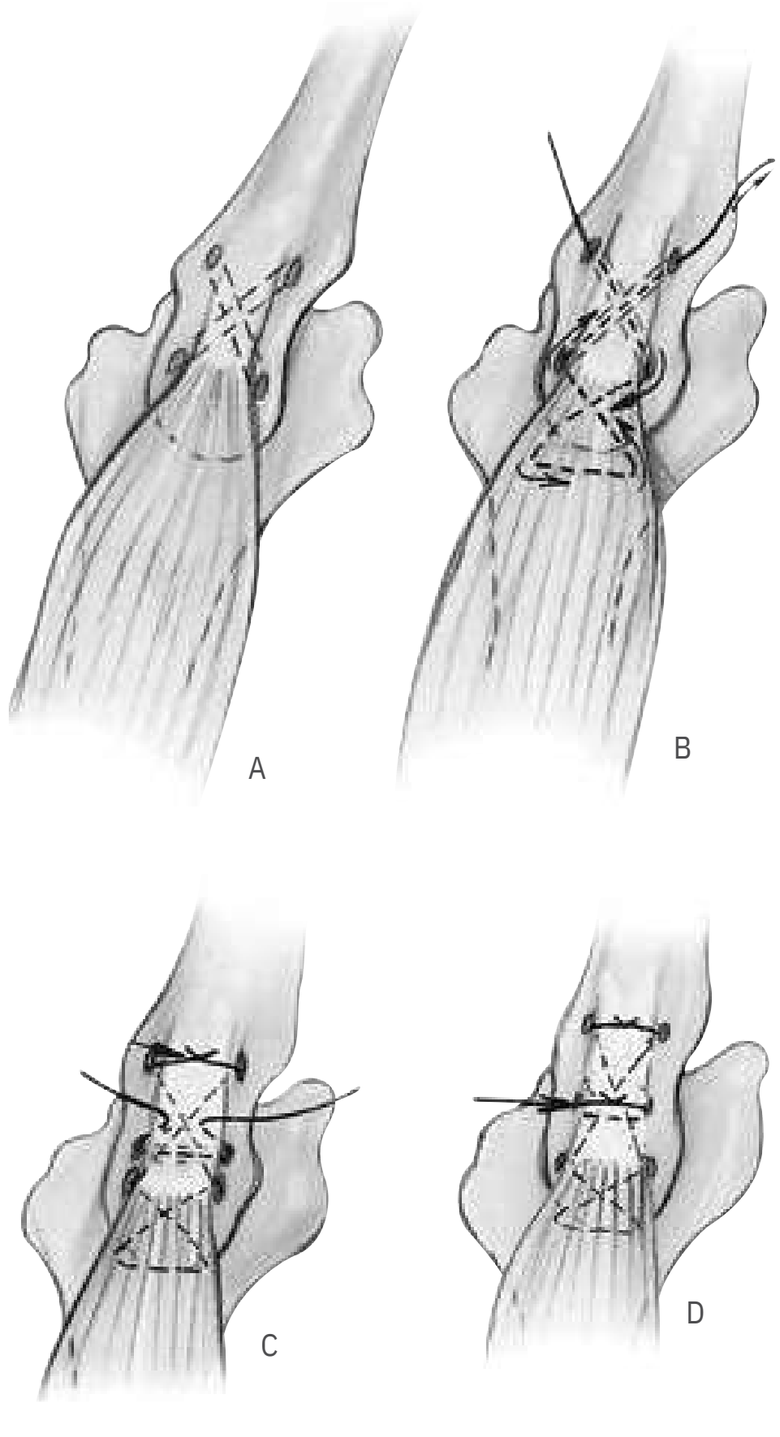
Figura 27

Humeral Bone Graft

Prepare a bone graft from the excised trochlea, or from the iliac crest or bone bank in revision cases. The graft should measure approximately 2–3 mm in thickness, 1.5 cm in length, and 1 cm in width. Place about one-half of the bone graft anterior to the anterior cortex of the distal humerus, leaving the other half exposed through the resected trochlea. Insert the humeral component down the canal to a level that allows articulation of the device. At this position, the bone graft is “captured” by the flange (Figure 25).

Assembly and Impaction

Articulate the ulnar and humeral components, and connect them by placing the hollow outer axis pin across both components and securing it with the solid internal axis pin (Figure 26). Ensure that both pins are fully engaged; a click should be heard and felt when proper engagement is achieved. If this is not felt, soft tissue is likely interposed between the pin and the implant, preventing complete seating. After the prosthesis has been coupled, use the humeral impactor to impact the humeral component down the medullary canal (Figure 27). Typically, the component should be positioned so that the axis of rotation of the prosthesis corresponds to the normal anatomic axis of rotation. This is approximately achieved when the base of the flange is flush with the anterior bone of the coronoid fossa. Remove any impinging bone with a rongeur to identify and eliminate areas of impingement, and flex and extend the elbow to confirm smooth motion.



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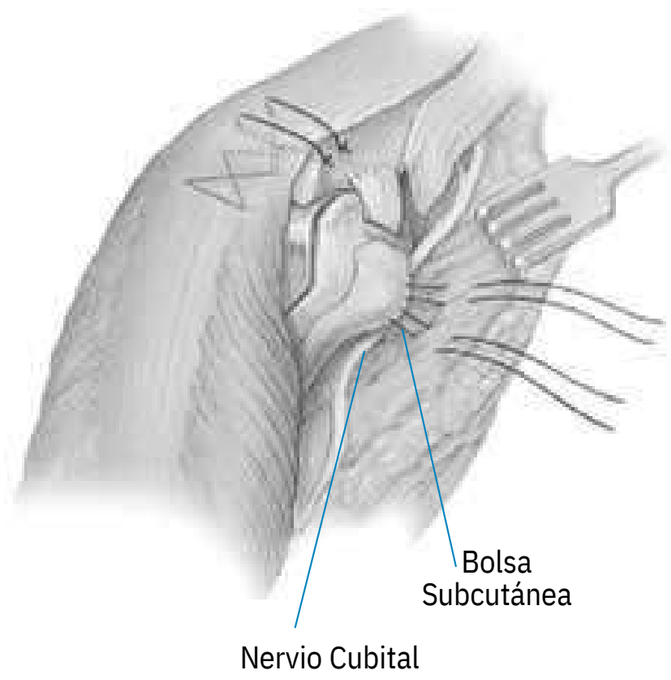

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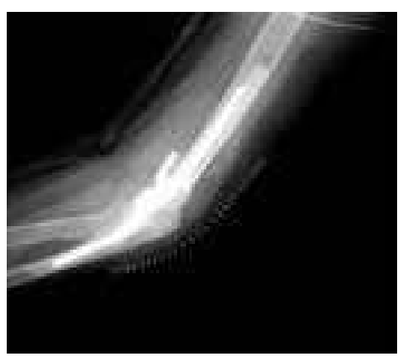
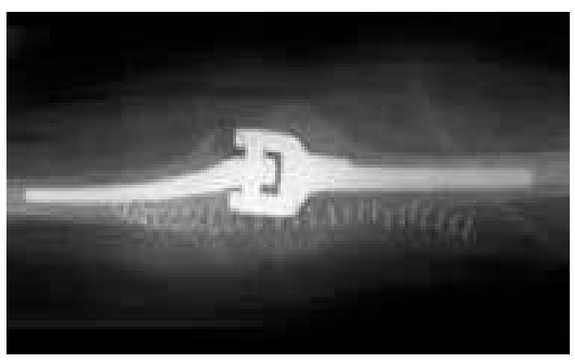


Vista Lateral



Vista Anteroposterior

Closure

Deflate the tourniquet and achieve hemostasis. Insert a drain if desired and close the wound in layers. Return the triceps mechanism to its anatomic position and secure it using sutures passed through cruciate and transverse drill holes in the proximal ulna. Place a heavy #5 nonabsorbable suture in a crisscross fashion through the triceps, along with a second transverse suture, and tie these with the elbow flexed at 90 degrees (Figure 28).

To protect the ulnar nerve, position it in a subcutaneous pocket (Figure 29). Repair of the collateral ligaments is not required. Use absorbable sutures to repair the remaining portion of the triceps mechanism, then complete wound closure in a standard layered fashion. Finally, apply a compressive dressing with the elbow in full extension.

Postoperative Management

Elevate the arm postoperatively for two to four days, keeping the elbow above shoulder level. Remove drains, if used, at approximately 24 to 36 hours, and remove the compressive dressing on the second postoperative day. Apply a light dressing and allow elbow flexion and extension as tolerated. Use a collar and cuff, and instruct the patient regarding activities of daily living.

Typically, formal physical therapy is not required unless needed for the shoulder or hand. Strengthening exercises should be avoided. The patient should be advised not to lift more than one pound during the first three postoperative months and not more than five pounds with the operated arm.

Contact your Dksortho representative or visit us at our website :
www.dksortho.com

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444, G.I.D.C Estate, Waghodia -391 760, Vadodara, Gujarat, India
+91-9825027792 info@dksortho.com www.dksortho.com

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