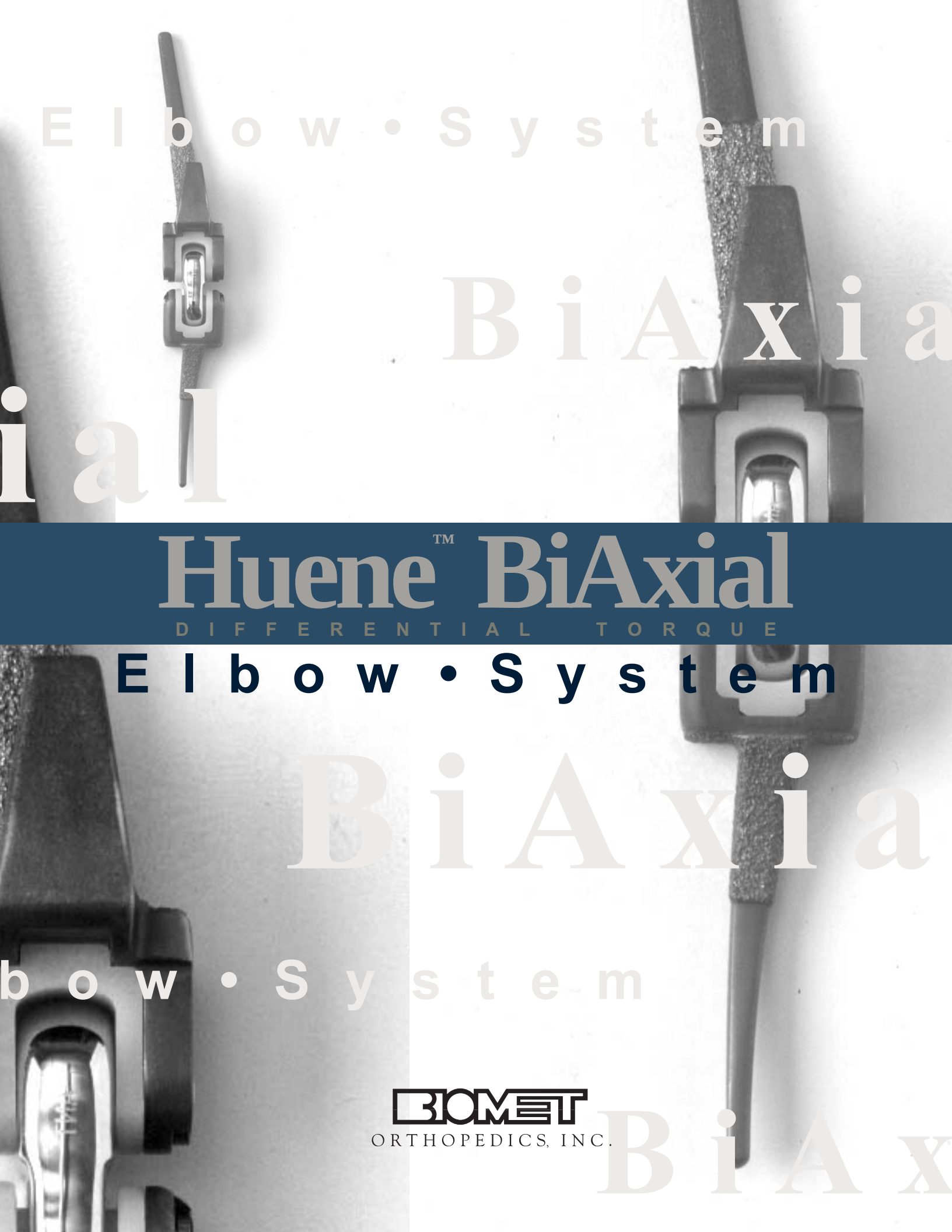
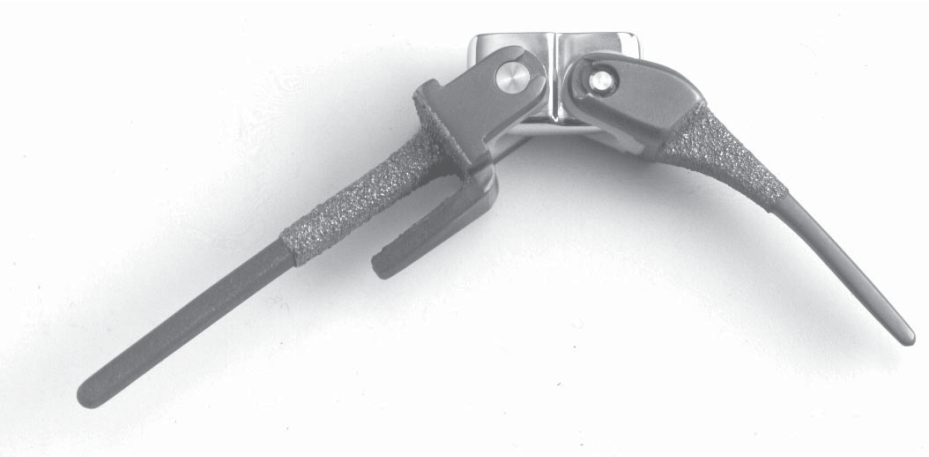


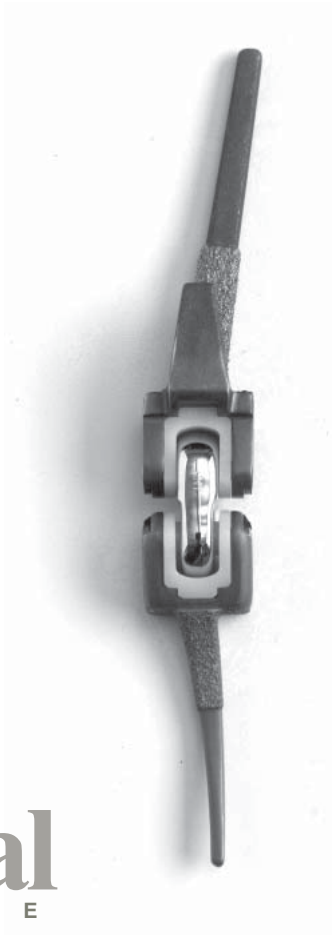
Huene™ BiAxial

DIFFERENTIAL TORQUE

Elbow • System

BIOMET ORTHOPEDICS, INC.





Huene™ BiAxial

DIFFERENTIAL TORQUE

Elbow • System

Huene™ BiAxial

Elbow Arthroplasty

Introduction

Total elbow replacement has become a common procedure for treatment of the unstable elbow. Early elbow prostheses had a "constrained" hinge that only moved in one plane.[1,2] Because these constrained prostheses experienced reported loosening, hinge laxity was introduced to allow for varus-valgus movement.[2,6,7] These "semiconstrained" prostheses provide between five to seven degrees of varus-valgus laxity to minimize the stress on the implant and subsequently reduce the incidence of complication.[2,5,6,7]

Design Rationale

Biomechanically, it is difficult to reproduce the normal kinematic motion of the elbow with a single axis prosthesis. Such a design cannot completely account for the translocation of the axis of rotation that occurs during normal articulation of the elbow.[1–4] The Huene™ BiAxial prosthesis more accurately reproduces the anterior translocation of the ulna, resulting in exceptional motion of the elbow joint.

The Huene™ BiAxial prosthesis allows for 16 degrees of varus-valgus laxity and 10 degrees of rotational laxity to further reduce the chances of implant loosening, component fracture, and polyethylene wear. The ulnar axis of the Huene™ BiAxial implant is designed to allow greater varus-valgus laxity than the humeral axis. Consequently, less force is required to rotate the implant around the ulnar axis than the humeral axis. The result is more stability in the humeral axis, and a reduction of simultaneous movement of both axes. This contributes to more natural elbow motion.

Indications

Absolute indications include: 1) rheumatoid arthritis, 2) non-inflammatory degenerative joint disease including osteoarthritis and avascular necrosis, 3) correction of severe functional deformity, 4) revision procedures where other treatments or devices have failed, 5) treatment of acute chronic fractures with humeral epicondyle involvement which are unmanageable using other treatment methods, and 6) treatment of elbows presenting either intact or limited soft tissue structures about the elbow. Patient selection factors to be considered include: 1) need to obtain pain relief and improve function, 2) ability of patient to follow instructions, including control of weight, 3) a good nutritional state of the patient, and 4) the patient must have reached full skeletal maturity.

Contraindications

Absolute contraindications include: infection, sepsis, and osteomyelitis. Relative contraindications include: 1) uncooperative patient or patient with neurologic disorders who is incapable of following directions, 2) osteoporosis, 3) metabolic disorders which may impair bone formation, 4) osteomalacia, 5) distant foci of infections which may spread to the implant site, 6) rapid joint destruction or bone resorption apparent on roentgenogram, and 7) vascular insufficiency, muscular atrophy, and neuromuscular disease.

Preoperative Considerations

The Huene™ BiAxial elbow prosthesis incorporates design changes from traditional elbow implants. Templating the X-ray for proper size and alignment is indicated for all cases. Special attention should also be given to bone resection and trial reduction for proper insertion and articulation of the implant. Surgeons and surgical staff should take time to familiarize themselves with this technique and the mechanical function of the prosthesis prior to the surgery.

When unpacking the implant, care should be taken to remove all packaging materials from the implant. Additionally, the axle-locking clips should only be inserted one time, as multiple insertions and removals may compromise their mechanical strength. Spare clips are included with the implant.

The Huene™ BiAxial is indicated for use with bone cement only.

The Huene™ BiAxial Elbow was designed in conjunction with Donald R. Huene, M.D., of Fresno, CA.

This technique is presented to demonstrate the surgical technique utilized by Donald R. Huene, M.D. Biomet, as the manufacturer of this device, does not practice medicine and does not recommend this or any other surgical technique for use on a specific patient. The surgeon who performs any procedure is responsible for determining and utilizing the appropriate techniques for each individual patient. Biomet is not responsible for selection of the appropriate surgical technique to be utilized for an individual patient.

Surgical Technique

Step 1

Patient Placement & Incision

The patient is placed in the supine position. The arm is draped free to expose the posterior elbow. A 12 to 15cm longitudinal incision is made slightly posterior to the medial epicondyle (Fig. 1).

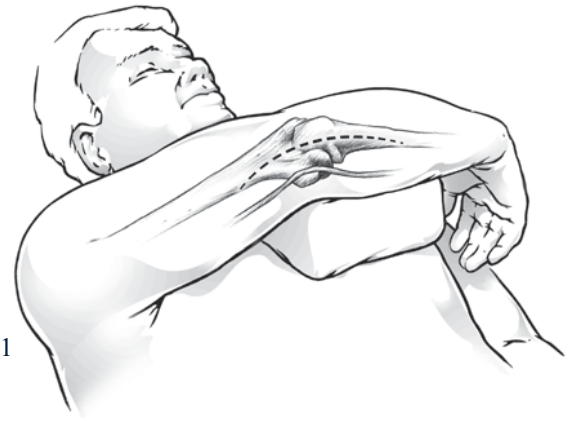


Fig. 1

Step 2

Dissection of the Ulnar Nerve

The ulnar nerve is freed and placed anteriorly along the skin incision. A penrose drain is used to demarcate the position of the nerve (Fig. 2).

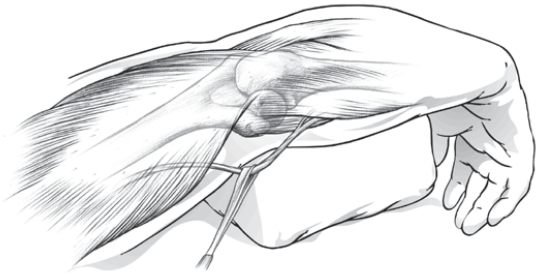


Fig. 2

Step 3

Reflection of the Triceps

Dissect the medial 1/3 of triceps insertion away from the ulna (Fig. 3).

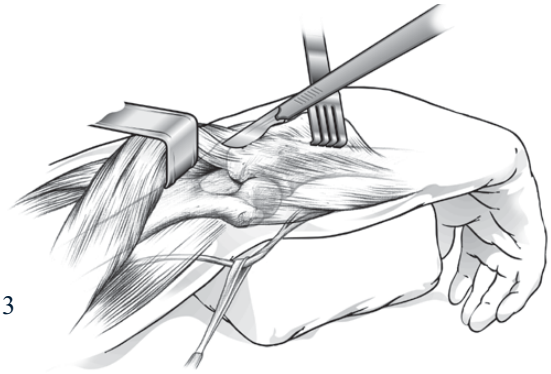


Fig. 3

Step 4

Medial Elbow Dislocation

Expose the humerus using subperiosteal dissection, and release the collateral ligaments. The elbow is then dislocated to the posterior medial side (Fig. 4).

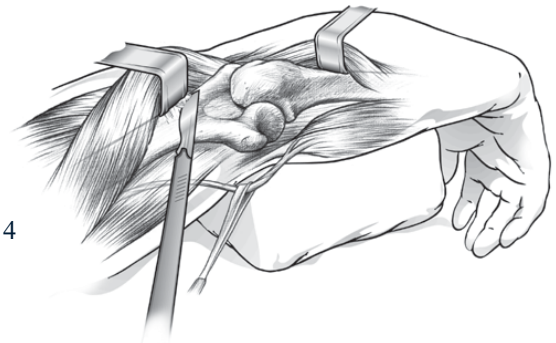


Fig. 4

Step 5

Radial Head Resection

Use an oscillating saw to resect the radial head down to the proximal border of the annular ligament (Fig. 5). Occasionally, a second lateral incision may be necessary to remove large lateral osteophytes.

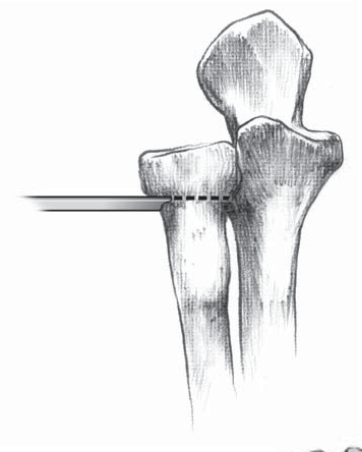


Fig. 5

Step 6

Initial Bone Resection

An oscillating saw is used to remove the central trochlea (Fig. 6).

Fig. 6

Step 7

Preparation of the Medullary Canal

A rotating burr is used to open the medullary canal, and T-handled reamers are used to progressively widen the canal (Fig. 7).

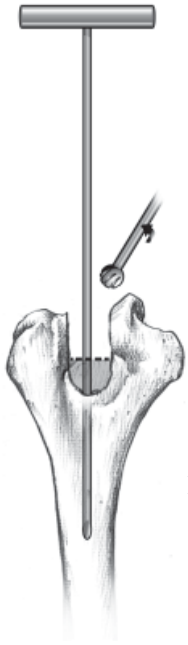


Fig. 7

Step 8

Insertion of the Cutting Guide

The cutting guide is inserted into the medullary canal using the right and left markers to orient the medullary rod. Additional proximal resections may be neccessary to seat the implant at the proximal end of the coronoid fossa. An oscillating saw is placed in the guide for the humeral cut (Fig. 8).

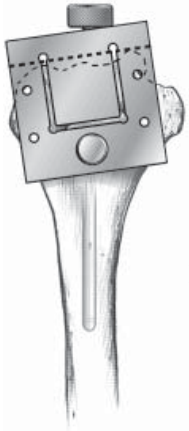


Fig. 8

Step 9

Humeral Rasp/Trial

The humeral rasp is used to enlarge the humeral canal (Fig. 9). Standard or long extension rasps are then used to rasp further proximally if a standard or long stem is desired.

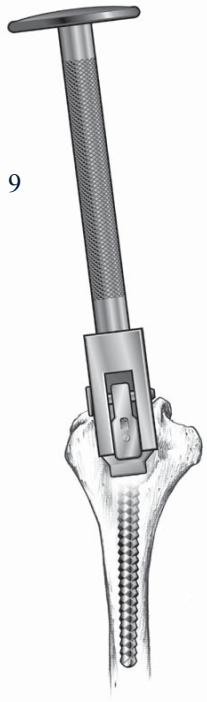


Fig. 9

Step 10

Rasp Handle Disassociation

The rasp handle is removed and the humeral component is used as a trial (Fig.10).

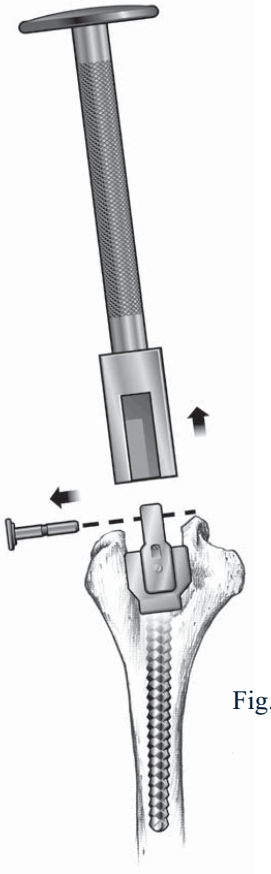


Fig. 10

Step 11

Ulnar Resection

The ulnar resections are completed with an oscillating saw and rotating burr. The olecranon is resected along the plane of the ulnar canal, and 3mm of the coronoid process are resected to allow for full insertion of the ulnar component (Fig. 11).

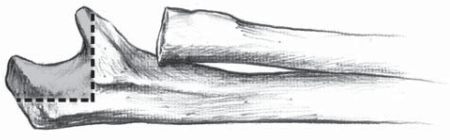


Fig. 11

Step 12

Preparation of the Medullary Canal

A rotating burr is used to open the medullary canal, and T-handled reamers are used to progressively open the diameter of the canal (Fig. 12).

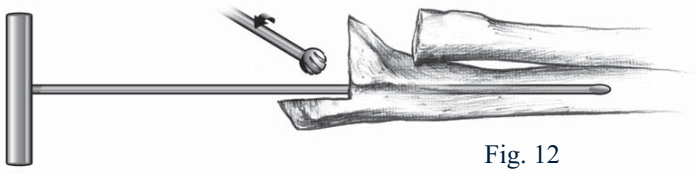


Fig. 12

Step 13

Ulnar Rasp/Trial

The ulnar rasp is inserted along the plane of the ulnar canal (Fig. 13). Care should be taken to be sure that the rasp is parallel to the ulna axis.

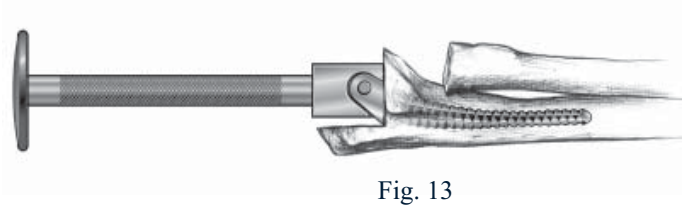


Fig. 13

Step 14

Rasp Handle Disassociation

The rasp handle is removed and the ulnar component is used as a trial (Fig. 14).

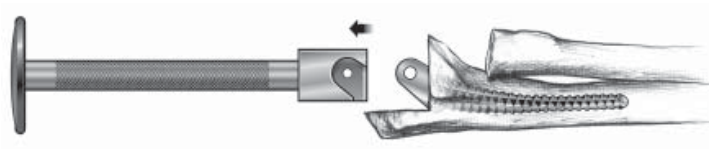


Fig. 14

Step 15

Trial Components

The trial components are assembled and a trial articulation is completed to assure free movement of the components (Fig. 15). The proximal ulna olecranon process resection should be sufficient to prevent interference with the central link in extension or flexion.

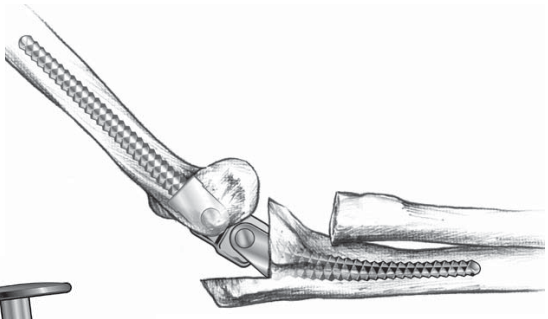


Fig. 15

Step 16

Humeral Components

After the humeral cement is in place, insert the humeral component until the anterior flange is fully seated against the anterior cortical surface of the distal humerus (Fig. 16). A bone plug may be necessary to prevent proximal cement migration.

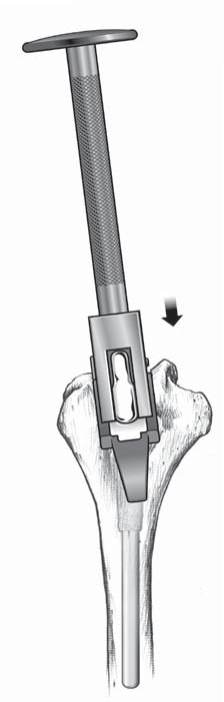


Fig. 16

Step 17

Bone Graft

A bone graft is inserted under the anterior flange (Fig. 17).

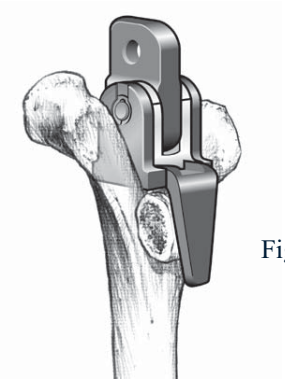


Fig. 17

Step 18

Ulnar Component

After the cement is inserted, use the ulnar impactor to insert the ulnar component (Fig. 18).

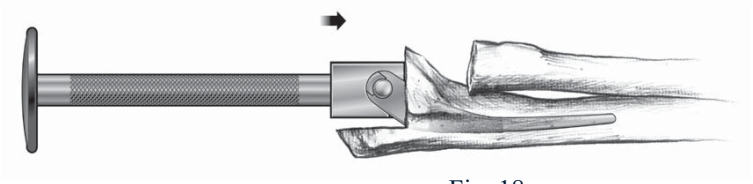


Fig. 18

Step 19

Joining Components

The humeral component is joined with the ulnar component by assembling the axle bearing, saddle bearing, axle, and locking clip (Fig. 19), as illustrated in the next 3 steps.

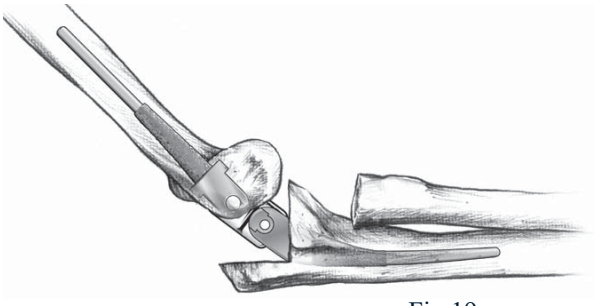


Fig 19

Step 20

Ulnar Bearing Assembly

Place the ulnar axle bearing through the round holes in the saddle bearing and connecting segment, and insert the assembly into the ulnar stem (Fig. 20).

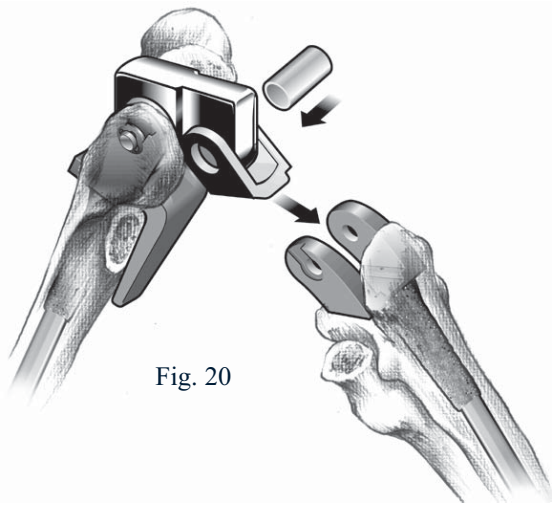


Fig. 20

Step 21

Axle Insertion

Align the central link of the humeral component with the ulnar component and then insert the axle through either side of the implant (Fig. 21).

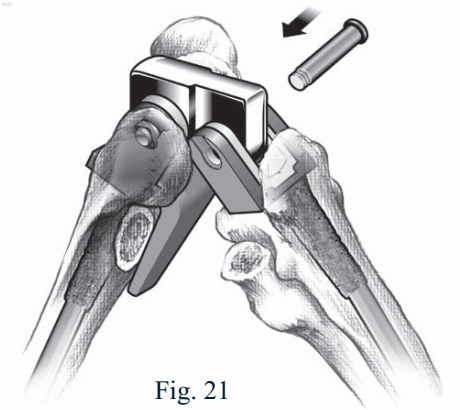


Fig. 21

Step 22

Clip Insertion

1. Place the locking clip in the clip inserter by sliding the retaining sleeve of the inserter rearward (Fig. 22a) and place the locking clip over the end post (Fig. 22b). Once the clip is in place, release the retaining sleeve to secure the clip on the clip inserter (Fig. 22c).
2. Using a finger to keep the axle seated, place the flat side of the clip inserter flush with recessed axle housing and push forward until the locking clip clicks into place over the axle. Slide the retaining sleeve rearward and disengage the clip inserter (Fig. 22).

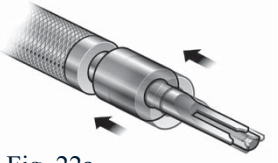


Fig. 22a

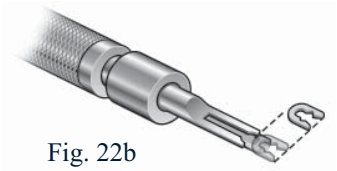


Fig. 22b

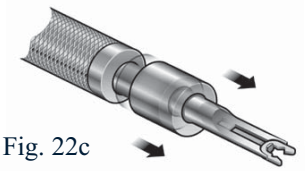


Fig. 22c

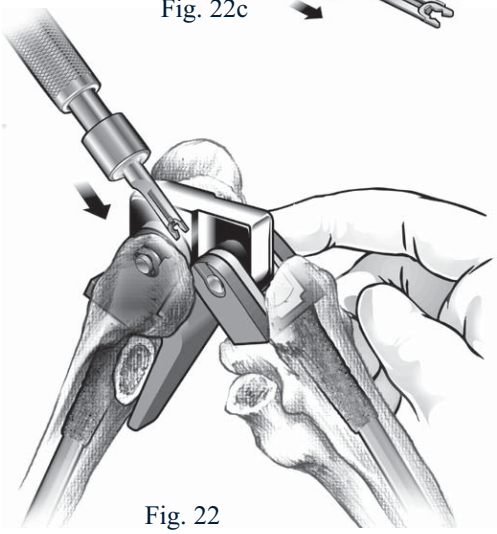


Fig. 22

Postoperative Considerations

A bulky compressive dressing is applied, and the elbow is splinted to maintain 90 degrees of flexion. The dressing is usually removed on the second or third day, and is replaced with an elastic dressing. At this point, the patient may begin passive or active range of motion exercises as indicated. The elastic dressing is then removed between seven to ten days postoperatively. No lifting is permitted during the initial eight weeks of movement. Thereafter, the patient should limit lifting to weights of five pounds or less.

The Huene™ BiAxial Elbow System

Huene™ BiAxial Humeral Components	
Part No.	**Description**
113304	Small Short Right
113306	Small Short Left
113308	Small Med. Right
113310	Small Med. Left
113312	Small Long Right
113314	Small Long Left
113316	Std. Short Right
113318	Std. Short Left
113320	Std. Med. Right
113322	Std. Med. Left
113324	Std. Long Right
113326	Std. Long Left

Huene™ BiAxial Ulnar Components	
Part No.	**Description**
113334	Small Right
113336	Small Left
113338	Std. Right
113340	Std. Left

Huene™ BiAxial Central Link & Clip	
Part No.	**Description**
113347	Standard
113348	Long
113349	X-Long

Huene™ BiAxial Bearing Kits*	
Part No.	**Description**
113352	Ulnar
113354	Humeral

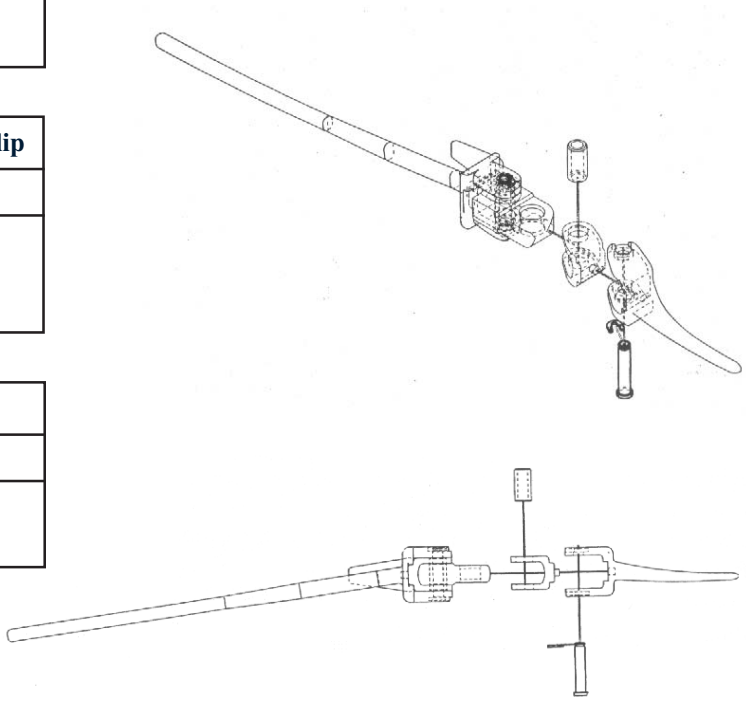
*Each kit includes two axle clips.

Humeral Stem Dimensions:

- **Small Cross Section**–5x6mm (at the proximal tip)
- **Standard Cross Section**–6x7mm (at the proximal tip)
- **Small Length**–85mm
- **Medium Length**–135mm
- **Long Length**–185mm

Ulnar Stem Dimensions:

- **Small Length**–8cm
  Cross Section–3.3x3.5mm (at the distal tip)
- **Standard Length**–10.5cm
  Cross Section– 4.0x4.2mm (at the distal tip)



Huene™ BiAxial Instrumentation

Huene™ BiAxial Humeral Rasp

407160	Small Short Right
407161	Small Short Left
407162	Small Med. R/L
407163	Small Long R/L
407170	Std. Short Right
407171	Std. Short Left
407172	Std. Med. R/L
407173	Std. Long R/L

Huene™ BiAxial Ulnar Rasp

407180	Small Right
407181	Small Left
407185	Std. Right
407186	Std. Left

Humeral Inserter/Extractor

407190

Ulnar Inserter/Extractor

407191

Templates

407155	Small X-ray Templates
407156	Std. X-ray Templates

Humeral Resection Block

407192

Humeral I/M Rod

407193

Clip Inserter/Extractor

407194

Connecting Segment Trials

407187	Standard
407188	Long
407189	X-Long

Axle Trial Pins

407196

Bone Nail

32-349218

Instrument Case

595065

T-Handled Reamers

471330	3mm
471334	4mm
471338	5mm

References

[1]An, K.N.; Morrey, B.F.; Biomechanics of the Elbow, The Elbow and Its Disorders, Morrey, B.F., Harcourt Brace Jovanovich, Inc., 1985.

[2]Bednar, J.M.; Total Elbow Arthroplasty. *Operative Techniques in Orthopedics*, 6-2; 64–68, April 1996.

[3]Connor, P.M.; An, K.N.; Biomechanics of Total Elbow Arthroplasty, *Seminars in Arthroplasty*, 9-1; 25–31, January 1998.

[4]London, J.T.; Kinematics of the Elbow, *Journal of Bone and Joint Surgery*, 63-A; 529–532, April 1981.

[5]Morrey, B.F.; Bryan, R.S.; Semiconstrained Arthroplasty for the Treatment of Rheumatoid Arthritis of the Elbow, *Journal of Bone and Joint Surgery*, 74-A; 479–490, April 1992.

[6]Morrey, B.F.; Bryan, R.S.; Total Joint Replacement, The Elbow and Its Disorders, Morrey, B.F., Harcourt Brace Jovanovich, Inc., 1985.

[7]Ramsey, M.L.; Total Elbow Arthroplasty: The Historical Development, *Seminars in Arthroplasty*, 9-1; 1–11, January 1998.

BiAx

BIOMET
ORTHOPEDICS, INC.

P.O. Box 587, Warsaw, IN 46581-0587 • 574.267.6639 •
web site: www.biomet.com • eMail: biomet@biomet.com
Form No. Y-BIV-008/061502
Not Available in Print