Surgical Technique

TaperSet™ Hip System

Shalby Advanced Technologies, Inc.
Restoring Mobility, Improving Lives.

INDICATIONS FOR USE

The TaperSet™ Hip System is designed for total or partial hip arthroplasty and is intended to be used with compatible components of the Consensus Hip System.

The indications for use are:

A. Significantly impaired joints resulting from rheumatoid, osteo, and post-traumatic arthritis.

B. Revision of failed femoral head replacement, cup arthroplasty or other hip procedures.

C. Proximal femoral fractures.

D. Avascular necrosis of the femoral head.

E. Non-union of proximal femoral neck fractures.

F. Other indications such as congenital dysplasia, arthrodesis conversion, coxa magna, coxa plana, coxa vara, coxa valga, developmental conditions, metabolic and tumorous conditions, osteomalacia, osteoporosis, pseudarthrosis conversion, and structural abnormalities.

The TaperSet™ hip stem is indicated for cementless use.

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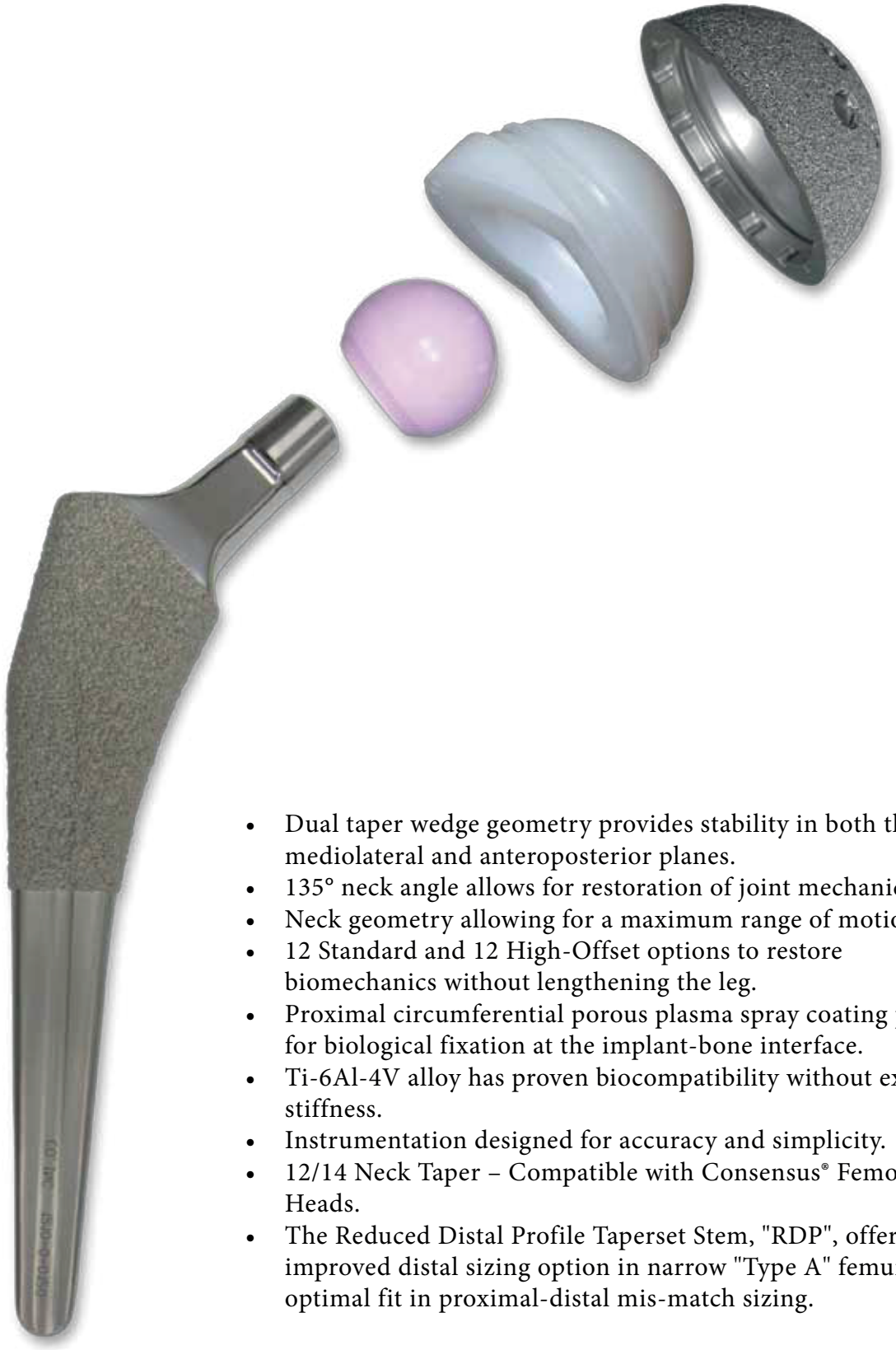
Introduction

The TaperSet Total Hip System was designed to provide surgeons a proven hip system with offset versatility based upon the experience and success of the Mueller flat tapered stems of the past 30 years. The TaperSet Total Hip System incorporates the following design features:



- Dual taper wedge geometry provides stability in both the mediolateral and anteroposterior planes.
- 135° neck angle allows for restoration of joint mechanics.
- Neck geometry allowing for a maximum range of motion.
- 12 Standard and 12 High-Offset options to restore biomechanics without lengthening the leg.
- Proximal circumferential porous plasma spray coating provides for biological fixation at the implant-bone interface.
- Ti-6Al-4V alloy has proven biocompatibility without excessive stiffness.
- Instrumentation designed for accuracy and simplicity.
- 12/14 Neck Taper – Compatible with Consensus® Femoral Heads.
- The Reduced Distal Profile Taperset Stem, "RDP", offers an improved distal sizing option in narrow "Type A" femurs and optimal fit in proximal-distal mis-match sizing.

Resection Guide

Templating/Pre-Operative Planning

Selection of the appropriate TaperSet component should be planned pre-operatively to predict hip alignment, implant size, offset, and position. Consensus® acetabular component and TaperSet component x-ray templates are available.

Patient Positioning/Surgical Approach

Multiple surgical approaches can be used with The TaperSet Total Hip System from postero lateral to the anterior approach. Surgeon experience and patient needs should dictate which approach is used.

Acetabular Preparation/Implantation

The TaperSet Stem has been approved and designed to be implanted with the Consensus® Bipolar/Unipolar and CS2™ Acetabular Components. Surgical techniques are available for each of these implant systems from Consensus Orthopedics.

After implantation or selection of acetabular or endo-prosthesis, femoral preparation can proceed.

Neck Resection

Utilizing the TaperSet ***Femoral Neck Resection Guide*** or any TaperSet broach the femoral neck osteotomy level can be determined. Align the neck resection guide down the long axis of the femur (Figure 1). Determine the resection level by measuring a preoperatively determined distance above the lesser trochanter. Once properly aligned, mark the resection line using electrocautery or methylene blue. Resect the femoral head.

Femoral Neck
Resection Guide

Fig. 1

Femoral Preparation

The ***Box Chisel*** should be used to open the lateral neck and prepare a lateral entry to the femoral canal (Figure 2). Portions of the medial greater trochanter may need to be removed to allow for correct lateralized entry of TaperSet broaches. Maximizing lateralized entry position will assist in preventing implant under-sizing and varus positioning.

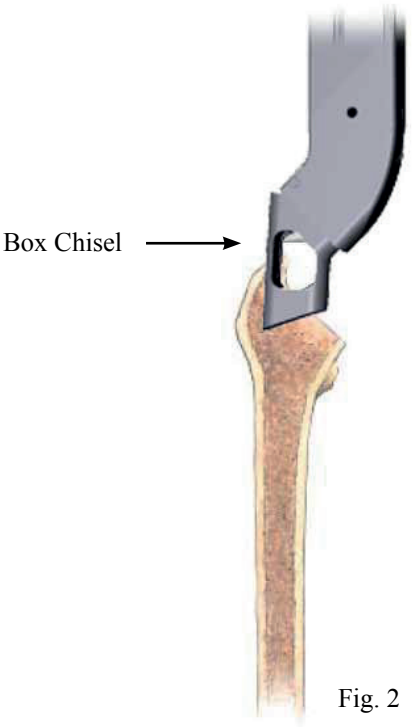


Fig. 2

A ***Canal Finder/Starter Reamer*** is used to locate the medullary canal (Figure 3); the instrument should be positioned laterally for intramedullary canal positioning.

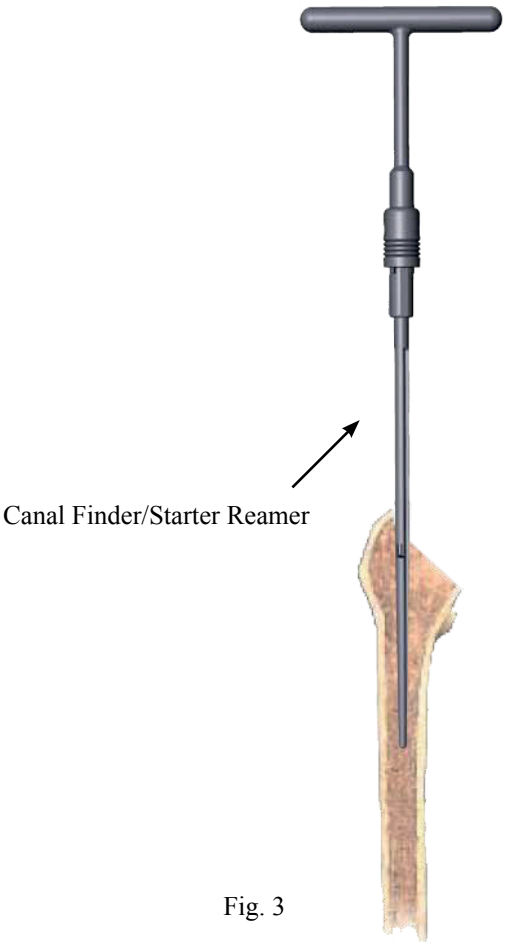


Fig. 3

Box Chisel

Universal T-Handle (Quick Connect) 0800-0-1600

I.M. Rod,Distal Femoral Alignment, Short (Quick Connect) 2810-0-0101

Mini Broach

Broach Rasp

The ***Mini Broach*** is used to begin the femoral broaching. Orient the broach for planned version and begin lateralization of subsequent broaches (Figure 4).

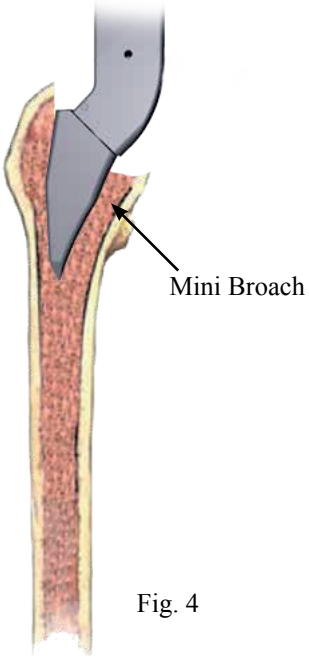


Fig. 4

The ***Broach Rasp*** can be used to remove bone laterally in the canal, smooth any endosteal irregularities, and further prevent varus positioning of broaches (Figure 5). Progressive broaching with the appropriate broach, Standard or RDP, is followed until the preoperative sized broach is seated, or an appropriate sized broach is seated and has filled the proximal femur in the mediolateral (ML) plane.

Note: The distal portion of RDP broaches have been TiN coated to appear purple, represented by crosshatched section (Figure 6)

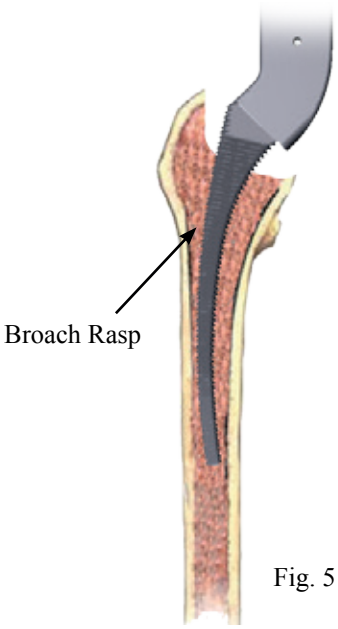


Fig. 5

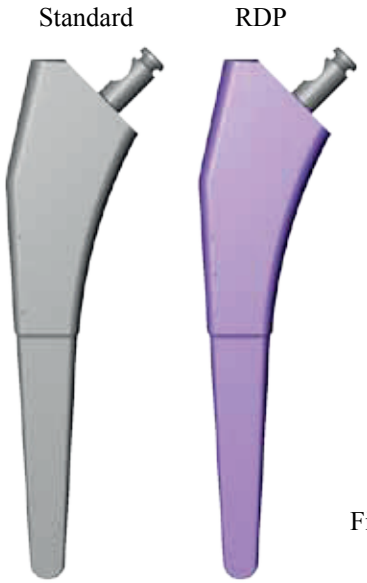
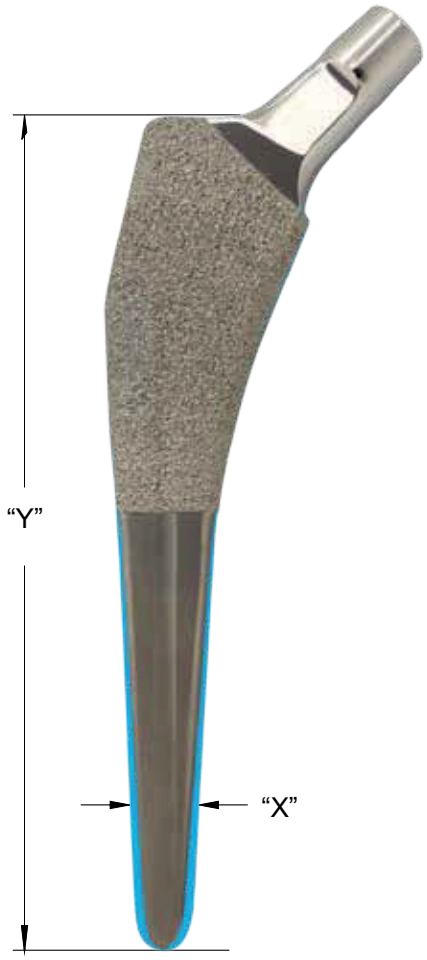


Fig. 6

TaperSet™ Stem Options

Sizing Chart



Size	"Y"
5mm	129mm
6mm	131mm
7.5mm	134mm
9mm	137mm
10.5mm	139mm
12mm	142mm
13.5mm	145mm
15mm	148mm
16.5mm	152mm
18.5mm	155mm
21mm	160mm
24mm	166mm

Table 1

	"X"	
Size	**Standard**	**RDP**
5mm	5mm	N/A
6mm	6mm	N/A
7.5mm	7.5mm	N/A
9mm	9mm	N/A
10.5mm	10.5mm	9mm
12mm	12mm	10.5mm
13.5mm	13.5mm	10.5mm
15mm	15mm	12mm
16.5mm	16.5mm	13.5mm
18.5mm	18.5mm	15mm
21mm	21mm	16.5mm
24mm	24mm	18.5mm

Table 2

Taperset Broach

Taperset RDP Broach

The ML axis of the broaches should be oriented with the ML axis of the femoral neck and provide correct anteversion (Figure 7).

Anticipate some residual AP gap which will not compromise stem fixation. This may optionally be addressed with a small amount of bone graft after the stem insertion.

The final broach should fit in the ML plane without excessive effort, seat fully, and be rotationally and axially stable in the canal.

Note: There is 0.25mm of press in the implant relative to the broaches. Depending upon bone quality, the broach rasp may now be used to further smooth the possible endosteal irregularities. Press tolerance is near one-to-one and designed to give the surgeon an accurate representation of implant positioning during broaching.

Final calcar trimming should be accomplished by freehand saw technique, with broach removed, to minimize risk of neck fracture.

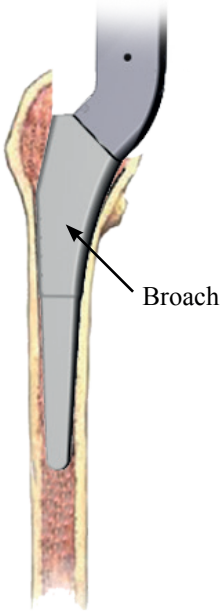


Fig. 7

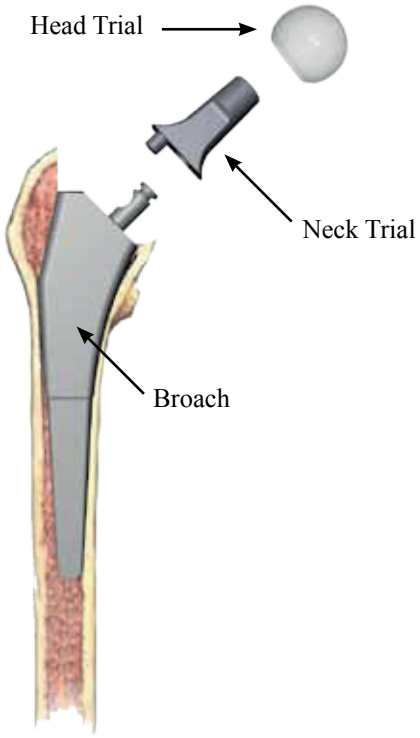


Fig. 8

Trialing

Standard and lateral offset ***Neck Trials*** are available for each stem size. Each neck trial fits two different sized broaches. Offset is increased, via direct lateralization, by 7mm from the standard to the High Offset option. Place the appropriate neck and femoral ***head trial*** (femoral head diameter is determined by the acetabular implant selected) on the ***broach*** (Figure 8)*. The hip is then reduced to assess leg-length and joint stability through a full range of motion.

When trial reduction is completed, remove trial head and trial neck. Reattach the ***Broach Handle*** and remove the broach, being careful not to enlarge the prepared canal.


Standard Neck Trial


Lateral Neck Trial


Femoral Head (28mm)


Femoral Head (32mm)


Femoral Head (36mm)


Taperset RDP Broach


Taperset RDP Broach

Stem Driver

Femoral Head Impactor

Implant Insertion

The selected TaperSet Femoral component, standard or RDP is attached to the ***Stem Driver***, threading it to the stem.

Align the stem with the prepared femur and insert the stem manually until resistance is encountered (Figure 9). Final positioning can be progressed using a mallet to drive and seat the stem. Caution should be used if unusual resistance is encountered while driving the implant to prevent possible fractures. Should resistance be encountered remove and reevaluate the femoral canal preparation. Consider further broach rasp expansion of ML dimensions.

Once the femoral component is seated, femoral head trials can be used to reassess hip stability and leg length. This can assure proper final implant position and identify any differences between trial and final implant seating.

Though not essential for fixation, bone grafting of any residual AP gap may further seal the femoral canal depending upon surgeon preference.

The appropriate sized Femoral Head is selected and seated to the stem. Using the ***Femoral Head Impactor*** (Figure 10), seat the Femoral Head using gentle taps of the mallet. Cleaning and drying of the tapers is recommended to prevent debris between the tapers.

The hip is then reduced and ROM assessed before closure.

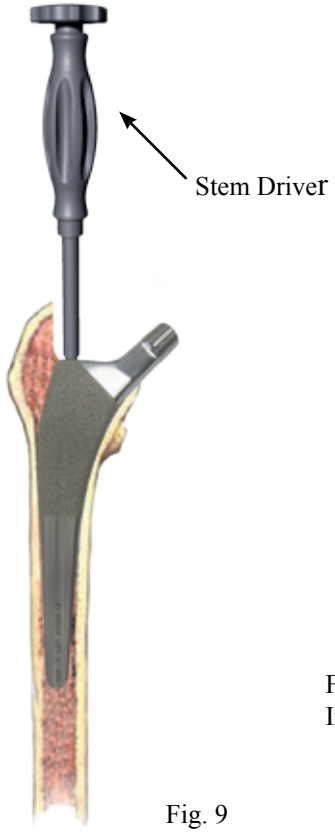


Fig. 9

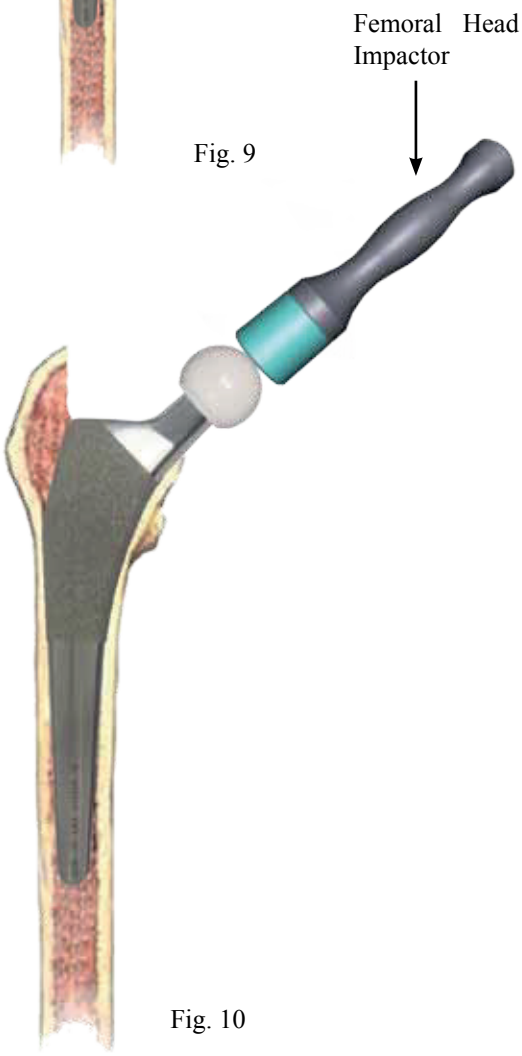


Fig. 10

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