



Radial Head Prosthesis

Surgical Technique



RADIAL HEAD PROSTHESIS

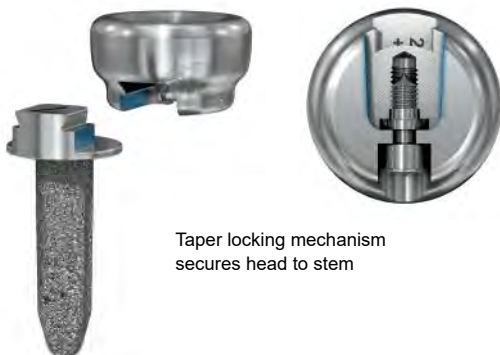
The Radial Head Prosthesis is intended to restore joint function.

System features

- Modular:
 - Two-piece construct can accommodate a variety of patient anatomies
- Side-loading head facilitates in situ insertion and assembly
- Implant components are locked together by taper locking and a connection screw

Radial head

- Round and symmetrical, allowing for adaptability and ease of sizing and implantation
- Slight trapezoidal shape features a smooth head-neck transition in order to accommodate the annular ligament
- Facilitates in situ placement through side loading application and intuitive instrumentation
- Integrated connection screw:
 - Aids in the construct assembly
 - Engages the taper locking connection
 - Indicates when the head is positively locked to the stem



Taper locking mechanism secures head to stem



Integrated connection screw captivated in head



Articulating Dish

- Dish depth grows 0.1 mm with head diameter from 1.9 mm–2.4 mm
- Centered in implant head

Radial Head Prosthesis System

For primary and revision joint replacement of the radial head

Radial stems

- Available in straight or curved option
- Fluted design for rotational stability
- Straight stem has beveled tip to facilitate insertion into the medullary cavity
- Curved stem is designed to fit the physiological bend of the proximal radius
- Thin collar aids in adjusting height and guiding the head onto the stem



Curved radial stem













Straight radial stem

SYSTEM COMPONENTS

24 Head Sizes (6 Diameters x 4 Heights)

Head Diameter:	Standard	+2 mm	+4 mm	+6 mm
18 mm				
20 mm				
22 mm				
24 mm				
26 mm				
28 mm				

10 Stem Sizes

Diameters:	6 mm	7 mm	8 mm	9 mm	10 mm
Short, Straight					
Long, Curved					

PREOPERATIVE PLANNING

Position patient

Position the patient supine on the table. Prepare the extremity from the axilla to the hand. This allows rotation of the forearm and flexion and extension of the elbow during the operative replacement of the radial head.

SURGICAL TECHNIQUE

1

Approach

A lateral approach is most commonly used.

Precautions:

- **Take care to avoid the deep branch of the radial nerve, which runs anterior to the capsule and the radial head.**
- **To minimize the risk of operative disruption of the lateral collateral ligament, keep the capsular incision in front of the anterior margin of the anconeus muscle and parallel to the fascial limit of the extensor carpi ulnaris.**

Open the annular ligament laterally or slightly anteriorly to allow full inspection of the damaged radial head. In selected cases, an osteotomy of the lateral epicondyle will allow an extensile approach.

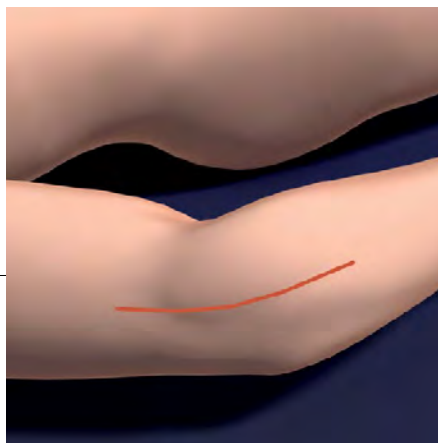


Figure 2

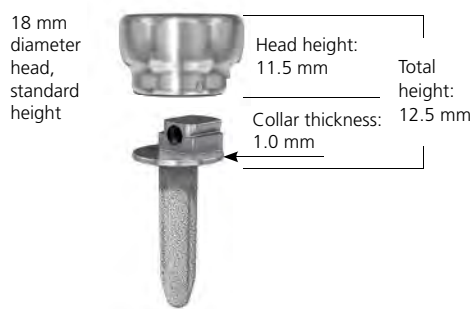


Figure 3

2

Resect radial head

If the radial head is fractured and is not repairable, remove the fragments to ensure no bone is left in the joint. Using a microsagittal saw, resect any remaining radial head at the level of the radial neck, perpendicular to the axis of the neck (Figures 1 and 2).

In order to determine the cut level, the shortest construct to consider yields a total height of 12.5 mm. The tallest possible construct is 21.0 mm. Be careful to avoid excessive neck resection.

Notes:

- **The collar on the stem adds 1.0 mm of height to the selected head.**
- **The shortest construct is obtained with the 18 mm diameter head, standard height (Figure 3).**



Figure 1



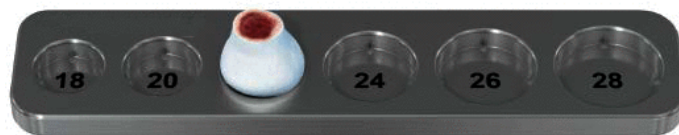
3**Determine radial head diameter and height****Instrument**

5000010001 Sizing Dish

Determine the head diameter by placing the resected head into the circular cutouts in the sizing dish. When there are multiple articular fragments, these can be assembled to recreate the native radial head. If the resected head is between sizes, select the smaller diameter. Make note of the diameter determined for use in later steps.

Notes:

- **Compare the resected head with a trial head to assess the head height.**
- **When selecting a trial head size, take into account that the collar on the stem adds 1 mm in height.**

**4****Open radial canal****Instrument**

5000010002 Canal Finder

If the elbow is unstable, varus stress and rotation of the forearm into supination allows improved access to the medullary canal. Retraction and elevation of the proximal radial shaft/ neck can allow medullary access. Use the canal finder to initially enter the canal.

**Optional technique: Planing****Instrument**

5000010003 Offset Planer

By gently rotating the planer, create a smooth contact surface on the radial neck, perpendicular to the longitudinal axis of the radial neck.

Note: Avoid excessive planing as this may increase the height of the implant head required.



5

Broach radial canal

Instruments

	Offset Broach, Straight Tip, 6 mm–10 mm
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	Offset Broach, Curved Tip, 6 mm–10 mm
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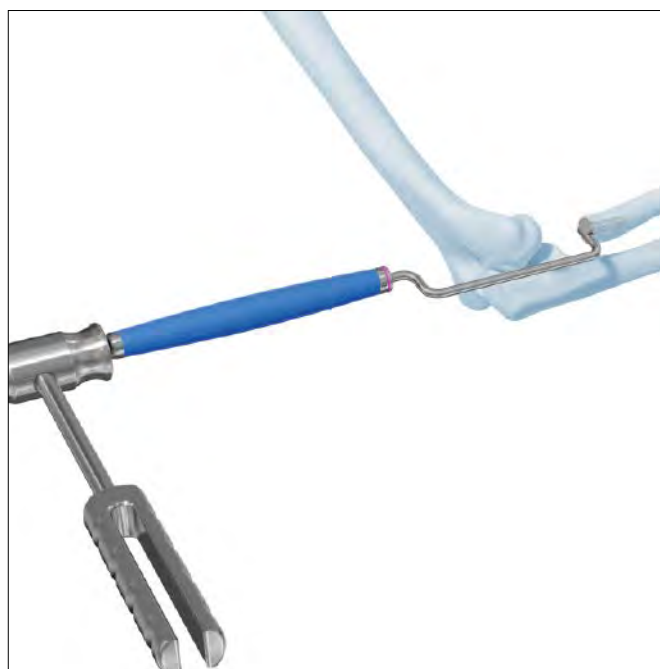
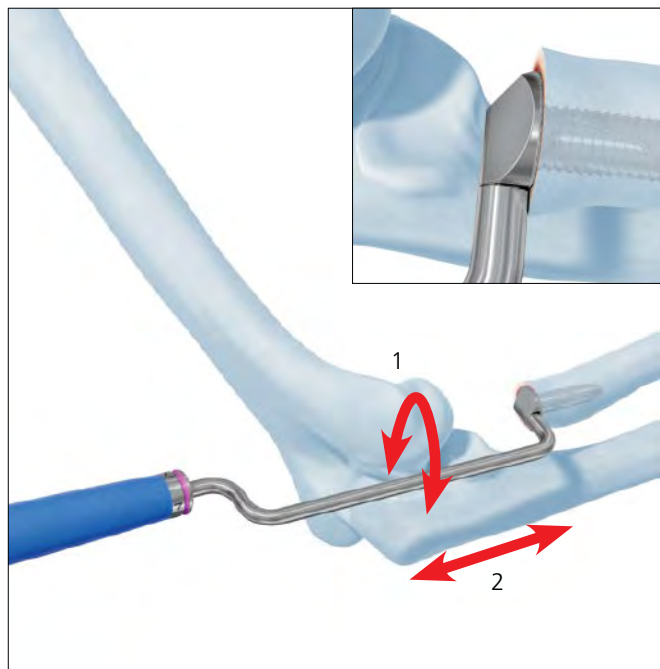
5210510013	Slide Hammer
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It is important to identify the proper axial orientation. The forearm should be in midrotation with the radial tuberosity directed medially. This position is favorable for broaching and implantation as the curved broaches/implant stems will point laterally, away from the radial tuberosity. Starting with the smallest broach, prepare the canal for the stem. Use sequentially larger broaches until a tight fit is achieved.

Precaution: Continuing to increase broach size after a tight fit is achieved, or using excessive force while broaching the canal, may produce a longitudinal radial neck fracture. Utilize special care during this step. Note that the implant stems are slightly larger than the broaches to ensure an adequate press fit.

Notes:

- **Straight broaching:** When broaching with a straight broach, use an in-line (on-axis) forward and backward technique with a twist motion (1 and 2).
- **Curved broaching:** When broaching with a curved broach, use ONLY an in-line (on-axis) forward and backward technique (2).
- If necessary, gently hammer to fully seat the straight or curved broach.



6

Insert trial stem

Instruments

	Straight Trial Radial Stems
	Curved Trial Radial Stems
5000010004	Offset Stem Inserter/Extractor

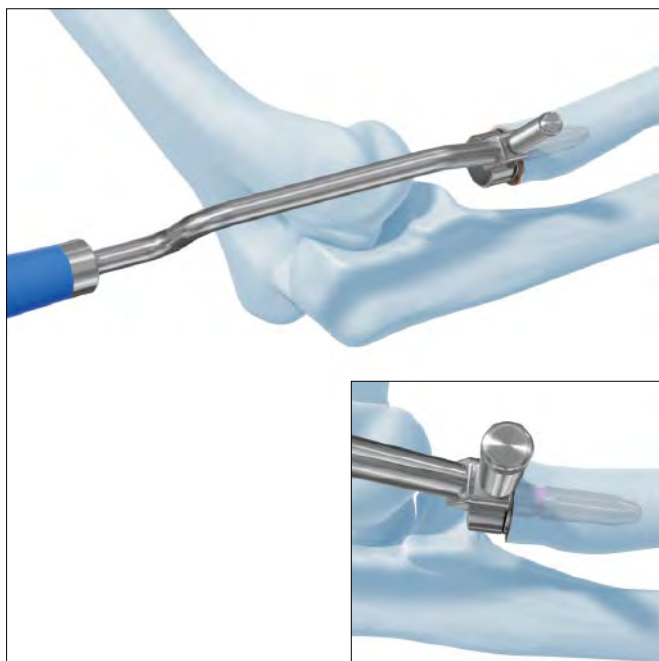
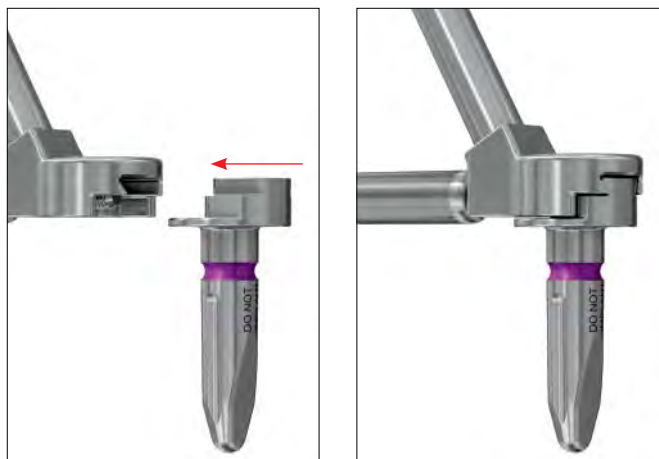
Choose the trial stem that corresponds to the last broach size used. Broaches and trial stems are color coded to facilitate the selection process.

Color	Stem diameter
White	6 mm
Purple	7 mm
Green	8 mm
Yellow	9 mm
Blue	10 mm

Secure the trial stem to the stem inserter/extractor by turning the knob and threading the stem onto the instrument. Introduce the trial stem into the canal, making sure it is fully seated. The knob of the stem inserter/extractor should face lateral and opposite the radial tuberosity. This will orient the trial stem properly for in-situ head assembly.

Notes:

- **The size of the trial stem is the same as the corresponding broach.**
- **Trial stems are smooth to facilitate insertion. Trial stems are slightly smaller than the implant stems.**
- **Trial stems will not have a press fit.**



7

Attach trial head

Instruments

Trial Radial Heads
Standard Height,
18 mm–28 mm diameter

2 mm Height Extension,
18 mm–28 mm diameter

4 mm Height Extension,
18 mm–28 mm diameter

6 mm Height Extension,
18 mm–28 mm diameter

Reduction Forceps with Points,
Broad, Ratchet

Screwdriver Shaft, T15 StarDrive, 165 mm

Handle, with quick coupling, small

Trial heads can be attached to the trial or definitive stem for determination of the implant height.

Select a trial head that appears to correctly fill the gap. Guide the trial head onto the trial stem by hand or using the reduction forceps.

Check the head height, positioning the implant flush with the upper edge of the sigmoid notch.

Continue using different trial heads until satisfied with the height.



Notes:

- Trial heads have a matte finish and an aqua-colored connecting screw. Implant heads have a shiny finish and a gray connecting screw.
- When using the reduction forceps to hold the trial head, invert the reduction forceps (jaws pointed upward) and insert tips of the forceps into the two adjacent holes. Firmly squeeze the forceps to secure the trial head.
- Secure the trial head to the stem using the screwdriver and handle with quick coupling.

Precautions:

- Do not overtighten the screw on the trial head.
- Do not use the torque limiting attachment to tighten the screw on the trial head.

8

Trial reduction

Secure the trial head to the stem using the screwdriver and handle with quick coupling.

Manipulate the elbow through a full range of elbow flexion-extension and forearm pronation-supination positions.

The head should articulate with the capitellum and the sigmoid notch smoothly through a full arc of motion. Some translation of the trial head relative to the capitellum is normal with forearm rotation.

The head should articulate up to the most proximal margin of the proximal radioulnar joint.

Taking an image intensification view may be helpful to visualize the ulnohumeral joint.

Precaution: Avoid unnecessary exposure to image intensification.

Confirm that the medial and lateral joints are close to symmetric and not overstuffing.

Warning: A prosthesis that is too large will result in varus alignment with opening of the medial ulnohumeral joint space relative to the lateral ulnohumeral joint space. Overstuffing may have a detrimental effect on motion.

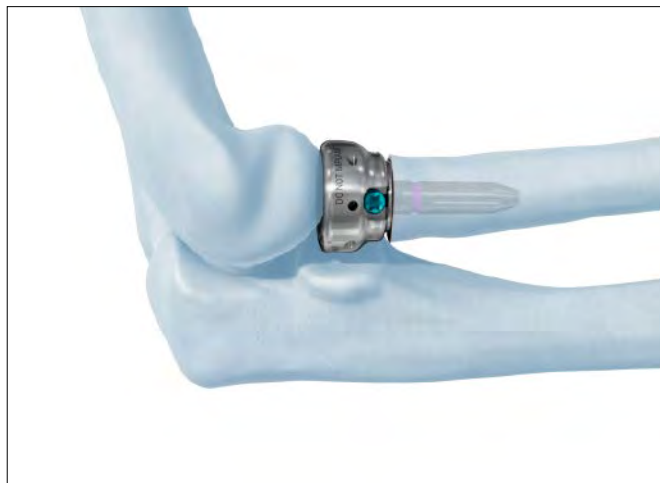
Continue to place different trial heads until satisfied with the size and motion.

Once desired size is determined, remove the trial head and the trial stem.

Loosen the screw on the trial head using the screwdriver shaft and handle with quick coupling to remove the trial head. Use the inserter/extractor to remove the trial stem.

Note: Do not use the torque limiting attachment to remove the trial head.

Precaution: Once desired size is determined, remove the trial head and the trial stem.



9

Insert implant stem

Instruments

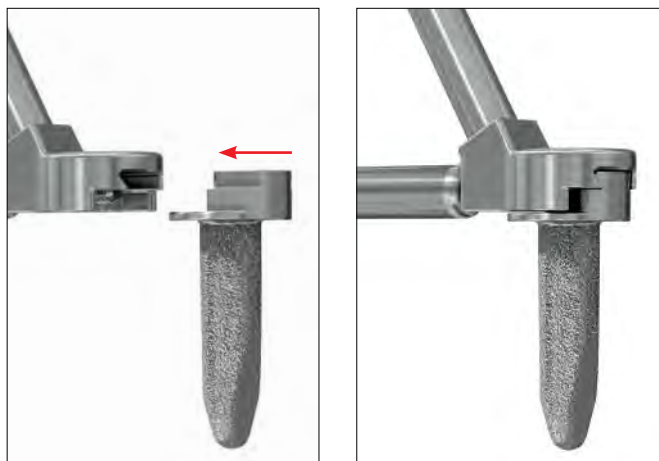
5000010004 Offset Stem Inserter/Extractor

5210510013 Slide Hammer

Choose the implant stem for insertion that corresponds to the last broach size used. Secure the implant stem to the stem inserter/extractor by turning the knob and threading the stem onto the instrument. Using the stem inserter/extractor, place the stem into the canal, making sure it is fully seated.

The knob of the stem inserter/extractor should face lateral and opposite the radial tuberosity during insertion, which will orient the implant stem properly for in situ head assembly.

The stem inserter/extractor can also be used as an impactor. Gently hammer to fully seat the stem.



10

Assemble implant head

Instruments

Handle for Torque Limiting Attachment

Screwdriver Shaft, T15 StarDrive, 165 mm

Choose the implant head that corresponds to the appropriate trial head found during trial reduction.

Assemble the implant head to the implant stem by hand or using the reduction forceps.

Manual assembly

Assemble the implant head to the implant stem by hand.

Assembly using reduction forceps

With the implant head inverted, tighten the jaws around the neck portion of the head.

Precaution: When applying the reduction forceps to the implant head, make certain the jaws do not interfere with assembly.

Using the 1.2 Nm torque limiting attachment with T15 StarDrive™ Screwdriver shaft, guide the implant head onto the implant stem by threading the captivated screw into the recess of the implant stem, engaging the taper connection. Maintain constant compression of the head to the stem during assembly.

Tighten the screw until an audible click of the screwdriver handle indicates the implant head is secure and locked onto the implant stem.



Optional insertion technique

Instruments

	Screwdriver Shaft, T15 StarDrive, 165 mm
5000010005	Convex Impactor
5210510013	Slide Hammer

Assemble the head to the stem on the table. Guide the implant head onto the implant stem.

Thread the integrated connecting screw into the recess of the implant stem using the 1.2 Nm torque limiting attachment and the T15 screwdriver shaft.

Tighten the screw on the head with the TLA until an audible click is heard, which indicates the head is secured to the stem.

Insert the assembled implant using the convex impactor and the slide hammer. Gently hammer to fully seat the stem.



IMPLANT REMOVAL

1

Remove implant head

Instruments

Screwdriver Shaft, T15 StarDrive, 165 mm

Using the handle with quick coupling and the T15 StarDrive Screwdriver shaft, begin backing the head off the stem by applying torque in a counterclockwise direction. Once the screw in the head is disengaged from the stem, remove the head.

Precautions:

- **Do not reuse implant heads.**
- **Do not use torque limiting attachment to remove the implant head.**



2

Remove implant stem

Instruments

5000010000 Hammer Guide for Slide/Fixed Hammer

5000010004 Offset Stem Inserter/Extractor

5210510013 Slide Hammer

Thread the hammer guide into the top of the stem inserter/extractor. Attach the stem inserter/extractor to the implant stem, as described in Step 9. The tuning fork section of the hammer slides onto the hammer guide. Extract the implant stem by applying gentle taps away from the proximal radius.

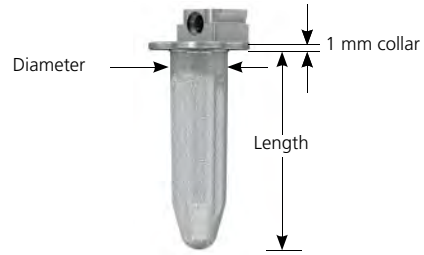
Precaution: Do not reuse implant stems.



Implants

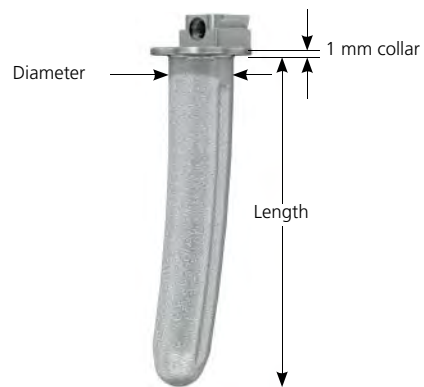
Titanium Straight Radial Stems

	Diameter (mm)	Length (mm)
4046401006	6	24
4046401007	7	26
4046401008	8	28
4046401009	9	30
4046401010	10	32



Titanium Curved Radial Stems

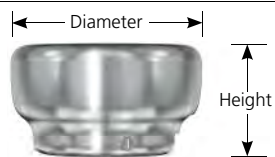
	Diameter (mm)	Length (mm)
4046402006	6	40
4046402007	7	42
4046402008	8	44
4046402009	9	46
4046402010	10	48



Implants

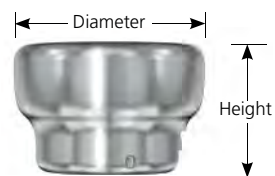
Radial Heads, standard height

	Diameter (mm)	Height (mm)
4047401018	18	11.5
4047401020	20	12.0
4047401022	22	12.5
4047401024	24	13.0
4047401026	26	13.5
4047401028	28	14.0



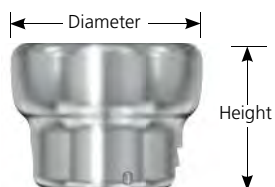
Radial Heads, 2 mm height extension

	Diameter (mm)	Height (mm)
4047402018	18	13.5
4047402020	20	14.0
4047402022	22	14.5
4047402024	24	15.0
4047402026	26	15.5
4047402028	28	16.0



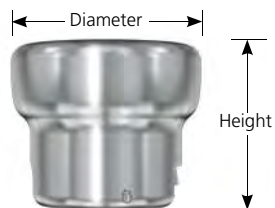
Radial Heads, 4 mm height extension

	Diameter (mm)	Height (mm)
4047404018	18	15.5
4047404020	20	16.0
4047404022	22	16.5
4047404024	24	17.0
4047404026	26	17.5
4047404028	28	18.0



Radial Heads, 6 mm height extension

	Diameter (mm)	Height (mm)
4047406018	18	17.5
4047406020	20	18.0
4047406022	22	18.5
4047406024	24	19.0
4047406026	26	19.5
4047406028	28	20.0



INSTRUMENTS

Handle with quick coupling, small



5210510013 Slide Hammer

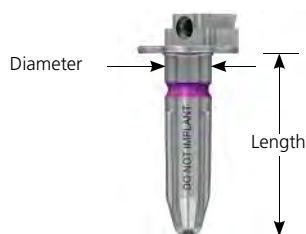


Reduction Forceps with Points, Broad, Ratchet



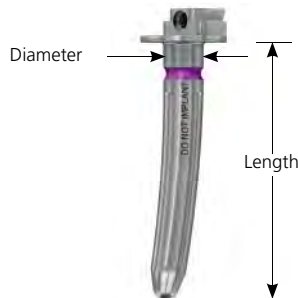
Straight Trial Radial Stems

	Diameter (mm)	Length (mm)
5046401006	6	24
5046401007	7	26
5046401008	8	28
5046401009	9	30
5046401010	10	32



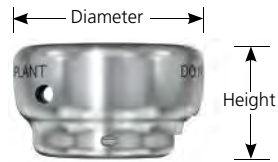
Curved Trial Radial Stems

	Diameter (mm)	Length (mm)
5046402006	6	40
5046402007	7	42
5046402008	8	44
5046402009	9	46
5046402010	10	48



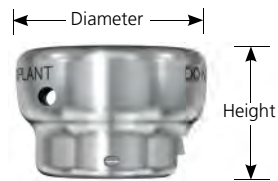
Trial Radial Heads, standard height

	Diameter (mm)	Height (mm)
5047401018	18	11.5
5047401020	20	12.0
5047401022	22	12.5
5047401024	24	13.0
5047401026	26	13.5
5047401028	28	14.0



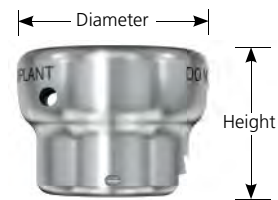
Trial Radial Heads, 2 mm height extension

	Diameter (mm)	Height (mm)
5047402018	18	13.5
5047402020	20	14.0
5047402022	22	14.5
5047402024	24	15.0
5047402026	26	15.5
5047402028	28	16.0



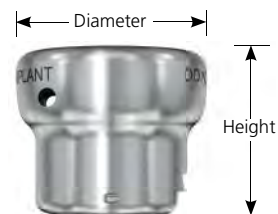
Trial Radial Heads, 4 mm height extension

	Diameter (mm)	Height (mm)
5047404018	18	15.5
5047404020	20	16.0
5047404022	22	16.5
5047404024	24	17.0
5047404026	26	17.5
5047404028	28	18.0



Trial Radial Heads, 6 mm height extension

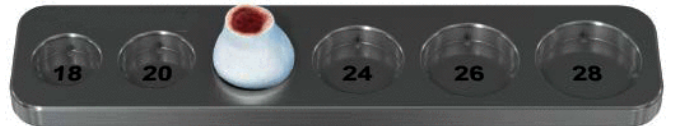
	Diameter (mm)	Height (mm)
5047406018	18	17.5
5047406020	20	18.0
5047406022	22	18.5
5047406024	24	19.0
5047406026	26	19.5
5047406028	28	20.0



5000010000 Hammer Guide for Slide/Fixed Hammer



5000010001 Sizing Dish



Handle for Torque Limiting Attachment



Screwdriver Shaft, T15 StarDrive, 165 mm



5000010002 Canal Finder



5000010003 Offset Planer



Offset Broach, Straight Tip

- 5000011006 6 mm white
- 5000011007 7 mm purple
- 5000011008 8 mm green
- 5000011009 9 mm yellow
- 5000011010 10 mm blue



Offset Broach, Curved Tip

- 5000012006 6 mm white
- 5000012007 7 mm purple
- 5000012008 8 mm green
- 5000012009 9 mm yellow
- 5000012010 10 mm blue



5000010004 Offset Stem Inserter/Extractor

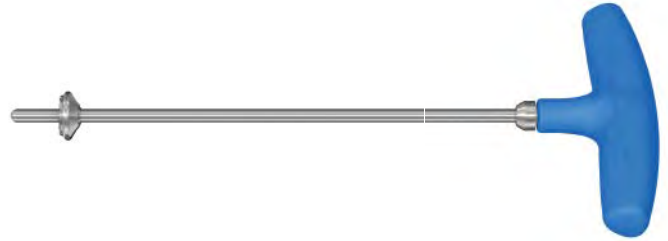


5000010005 Convex Impactor



ALSO AVAILABLE INSTRUMENTS

5000010006 Planer



Broach, Straight Tip

5000013006	6 mm	white
5000013007	7 mm	purple
5000013008	8 mm	green
5000013009	9 mm	yellow
5000013010	10 mm	blue



Broach, Curved Tip

5000014006	6 mm	white
5000014007	7 mm	purple
5000014008	8 mm	green
5000014009	9 mm	yellow
5000014010	10 mm	blue



5000010006 StemInserter/Extractor



5000011111 Radial Head Prosthesis Instrument Set



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