

TMPR™

Total Metacarpophalangeal
Replacement

Operative Technique

Balanced Natural Movement

Forever **Active**

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TMPR™ implant design features

Construction is of standard joint replacement materials i.e. cobalt chrome and ultrahigh molecular weight polyethylene. The metacarpal bearing is a section of a sphere narrowed from side to side, with an offset centre of rotation which provides a cam action to tighten the collateral ligaments during flexion.

The dorsal surface has a groove for the location of the extensor tendon. Flanges cover the front and back of the metacarpal neck which is otherwise cut square. The phalangeal surface is a disc with a shallow concave surface congruent with the metacarpal head. Both implant stems extend to the mid shaft to spread the fixation stresses.

The thin metacarpal stem slides in a separate polyethylene plug. The metacarpal plug has thin flexible fins in the shape of truncated triangles conforming to the endosteal surface. The phalangeal stem bears similar fins in the shape of rounded rectangles conforming to the proximal phalanx canal. These fins flex during insertion and reduce the elastic stiffness at the bone/prosthesis interface to less than that of cortical bone. The fins protect against mechanical loosening by absorbing lateral stresses.

An important feature of the TMPR™ is the free sliding articulation between the cylindrical metacarpal stem and the polyethylene plug. This uncouples rotation and distraction forces from the bone/prosthesis interface and further protects against loosening.

Step 1

Sizing can be done preoperatively by applying the transparent template to a standard X-ray, or intraoperatively using the caliper to measure the metacarpal head.

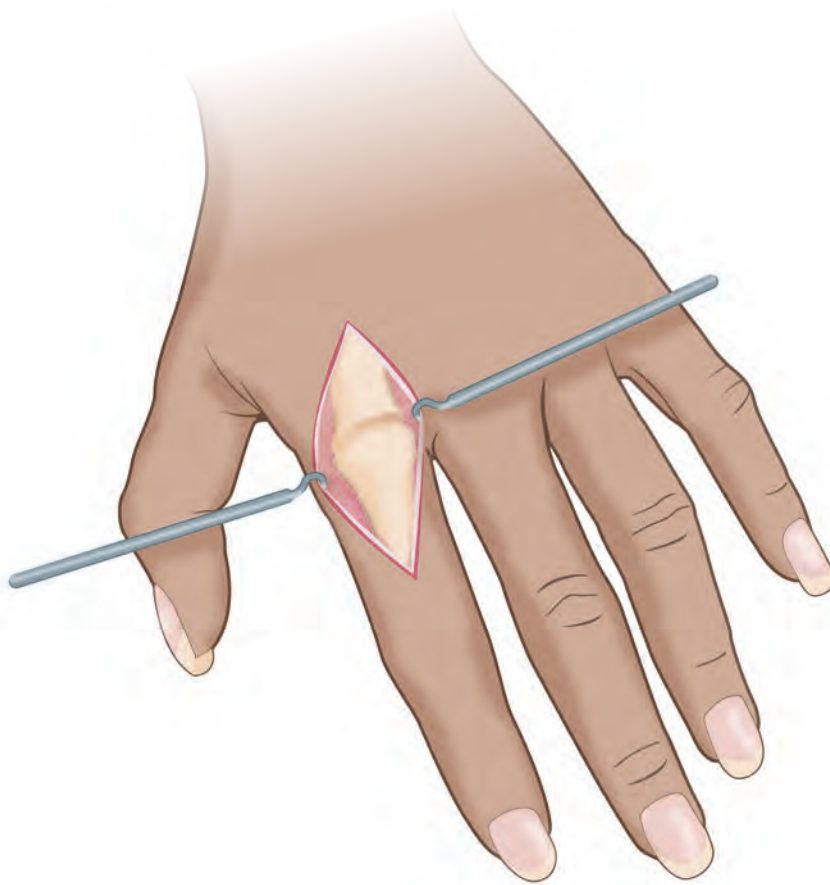
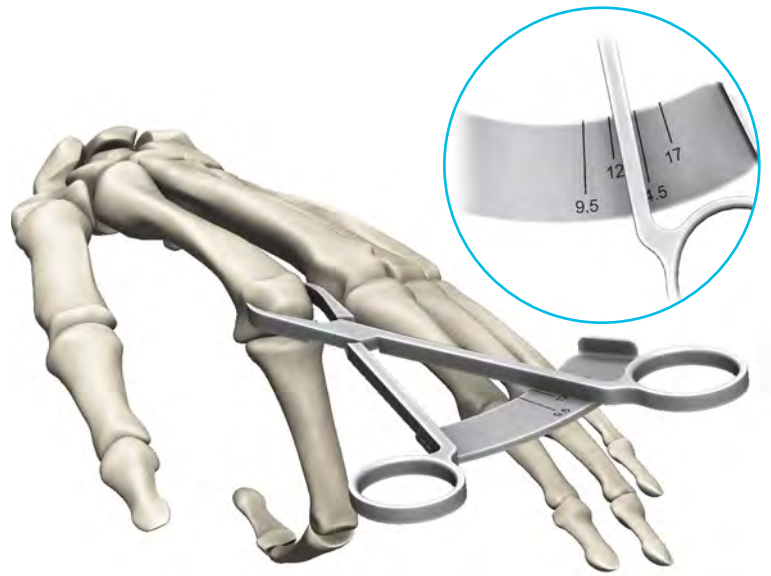
Step 2

Make a standard dorsal approach skin incision either axial or transverse as needed.

Open the capsule along the radial border of the extensor tendon.

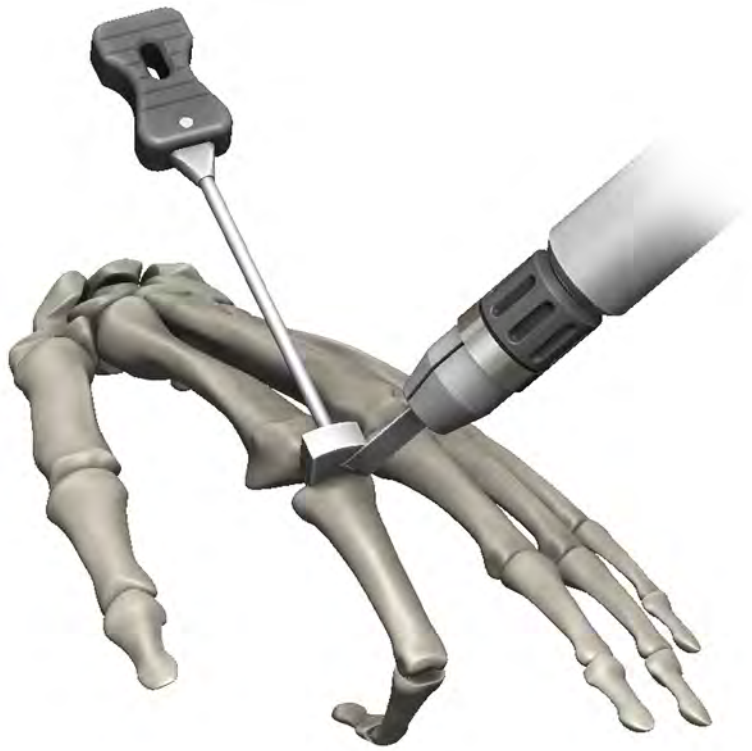
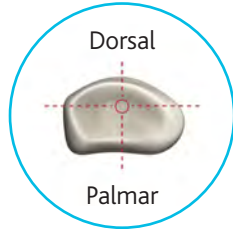
Flex the joint fully, releasing any adhesions and removing any synovial masses.

Check the collaterals and palmar plate for adhesions and integrity.



Step 3

Insert the spike of the Phalanx Cutting Guide just dorsal to the centre of the articular surface, along the axis of the bone. Line up the handle with the digit and ensure the conical face is snug to the joint surface.

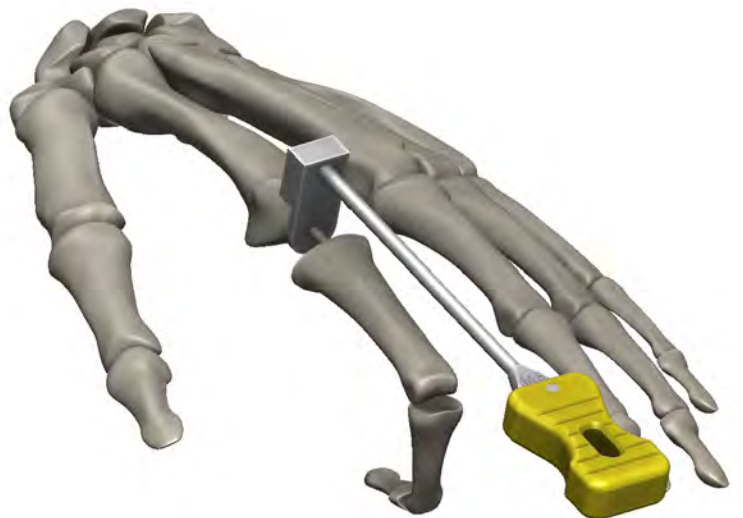
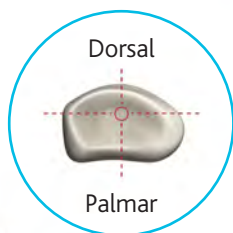
**Step 4**

Start the saw cut with the blade against the flat guide surface to remove minimum bone. Remove the jig to complete the cut.

Note: The collateral ligaments must be protected at all times.

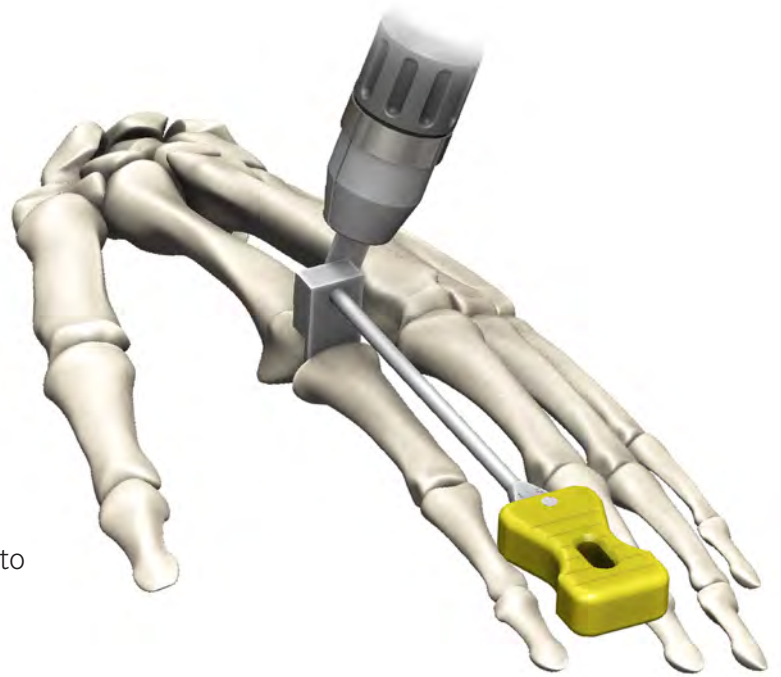
**Step 5**

In semi flexion, insert the spike of the correct size Metacarpal Distal Cutting Guide into the phalangeal surface along the axis of the bone.



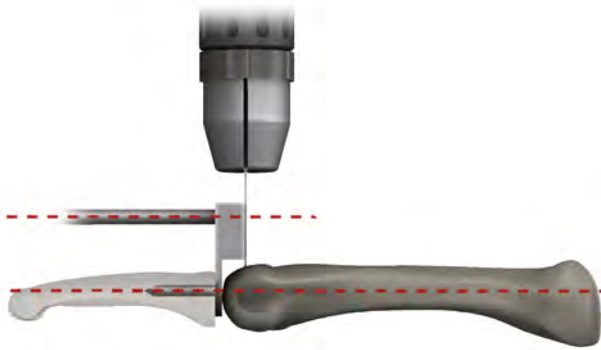
Step 6

Bring the finger into full extension. Without tension, hold the guide handle aligned to the finger and metacarpal axis.



Step 7

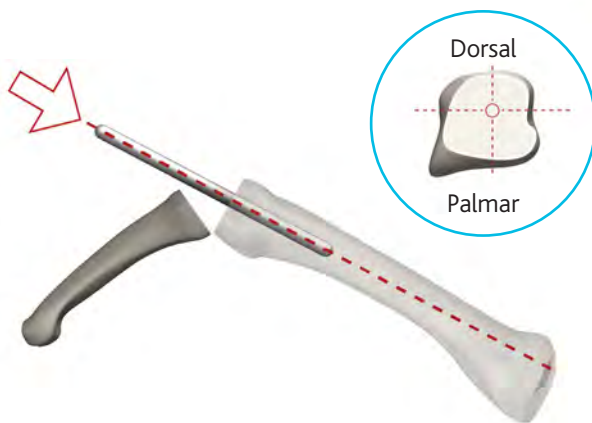
Place the blade of the saw on the flat guide surface to resect the metacarpal head square to the axis.



Step 8

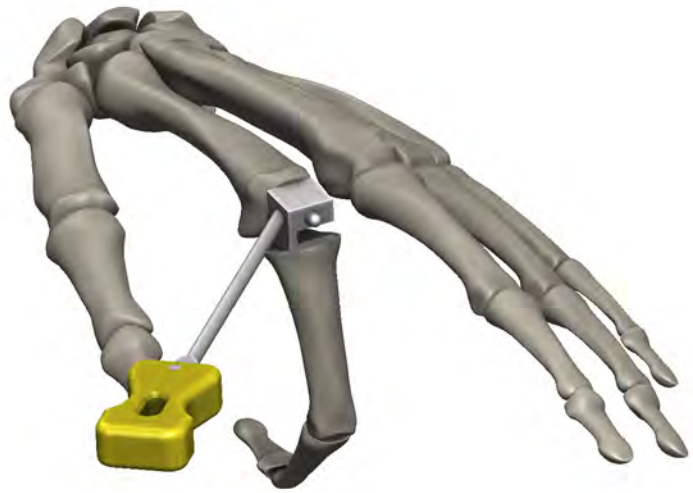
Insert the I/M Pin, ensuring that it is on the metacarpal axis.

To ensure axial alignment, make the entry point slightly dorsal to the midpoint of the metacarpal head.



Step 9

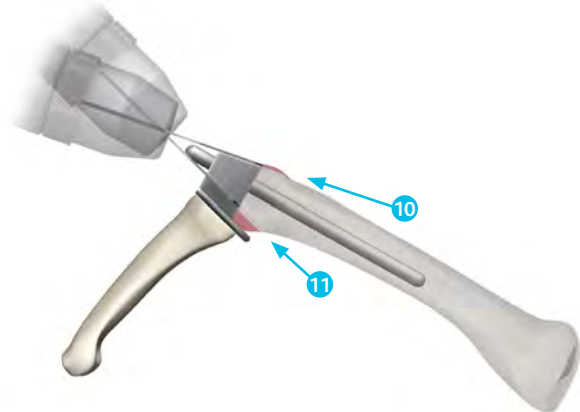
Place the Metacarpal Dorsal/Palmar Cutting Guide to fit snugly against the cut surface and stabilise using the handle.



Step 10

Use retractors to protect the collateral ligaments. McDonald Dissectors are useful.

Using the guide, cut the dorsal bevel using a small saw blade (1mm thick or less).

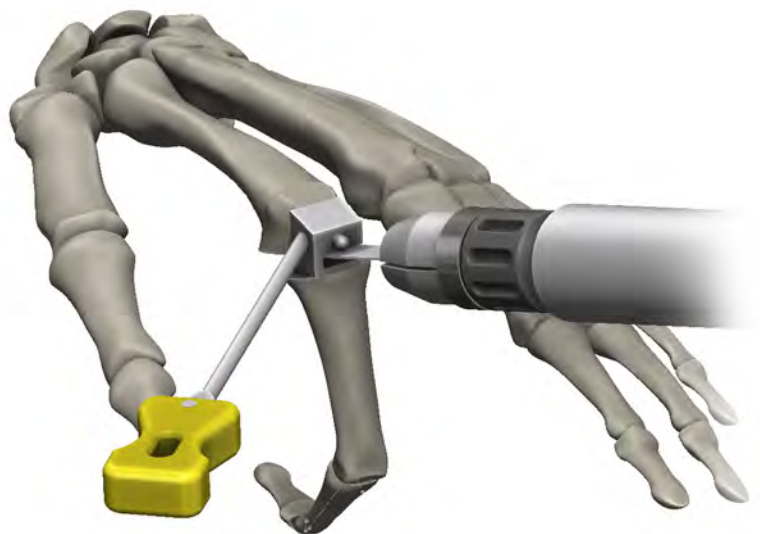


Step 11

Flex the joint and make the palmar bevel cut.

Do not let the saw plunge into the palmar plate and check there is no remaining ledge of bone. If the guide is placed too dorsally the dorsal chamfer cut will be reduced and the palmar chamfer increased. This could either create a step in the bone surface and obstruct the fit of the implant or lead to detachment of the palmar plate.

Note: Periodic saline irrigation throughout the entire procedure is good practice.



Step 12

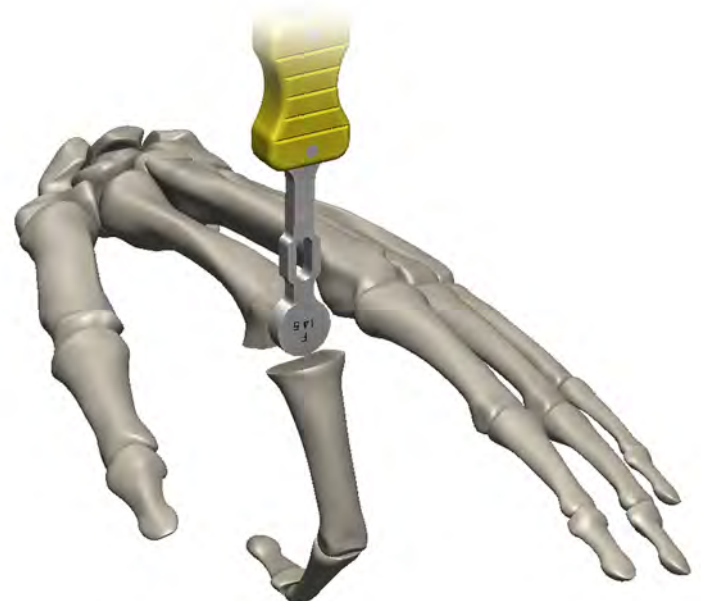
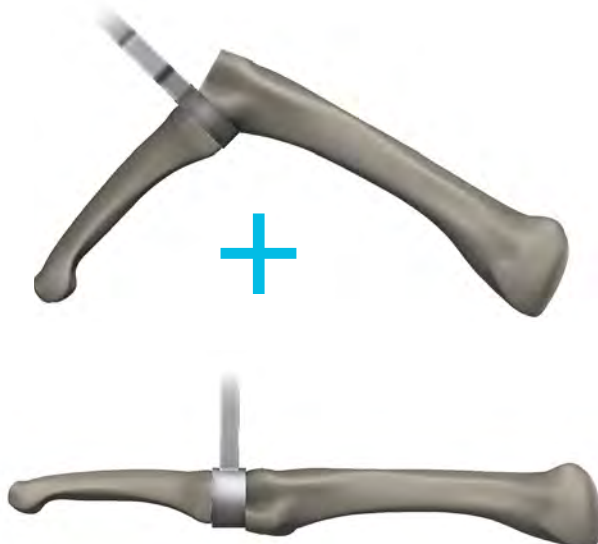
Trial the metacarpal implant to check the fit and position of the head against the cuts. Remove the head and make any necessary adjustments.



Step 13

Using the correct Feeler Gauge, assess the ligament tension in both flexion and extension.

The gauges are marked E (extension) and F (flexion) to identify the correct orientation.



Step 14

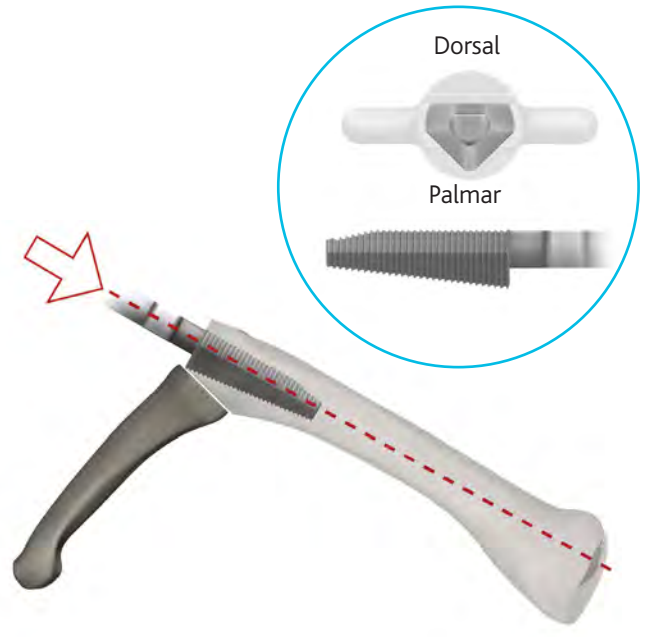
Prepare the metacarpal medullary cavity.

Starting with the smallest Metacarpal Rasp size, advance the Metacarpal Rasp into the soft bone, up to the shoulder of the Rasp. Repeat, sequentially increasing the Metacarpal Rasp size until the templated size is used.

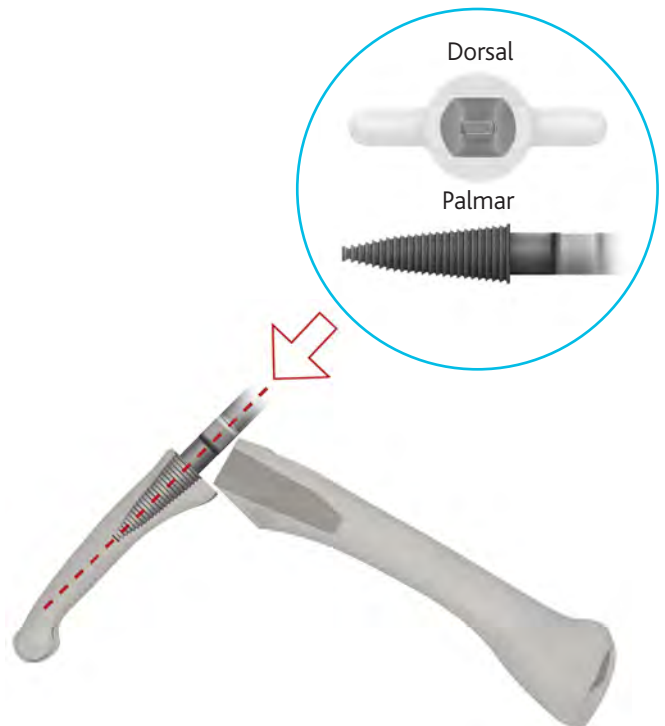
In harder bone, start with a Swanson Burr, Paton's Reamer or suitable awl.

If the cavity cannot be prepared for the preselected size, prepare for the next size down and select the small implant option of the templated Metacarpal Plug and Proximal Phalanx.

Note: For size compatibility, refer to the sizing chart on page 13. Note that the small option is not available for the 9.5mm metacarpal component.

**Step 15**

Repeat for the phalangeal medullary cavity, preparing for *the same size as the prepared metacarpal canal*.



Step 16

Insert the selected polyethylene Metacarpal Plug with the aid of the Metacarpal Impactor as required. The small bevel on the base of the plug must lie dorsally.

The flats on the lateral pins must be dorsal to ensure the correct orientation of the compactor tip.



Step 17

Insert the selected Phalangeal Component using the Phalanx Impactor as required, with the finger flexed and the P.I.P. joint supported against the table, cushioned with folded gauze.



Step 18

After thorough irrigation, slide the head of the metacarpal implant into position and reduce the joint into extension.



Step 19

If indicated, restore the collateral ligaments and centralise the extensor ligament.

Range of motion and tension can now be checked.



Step 20

Closure

Close the wound in the standard fashion.

If multiple joints are to be treated in one hand, it is convenient to carry out the same step in each joint before proceeding to the next stage.

The Size Indicator in the instrument tray should be used to keep track of the sizes chosen for each joint.

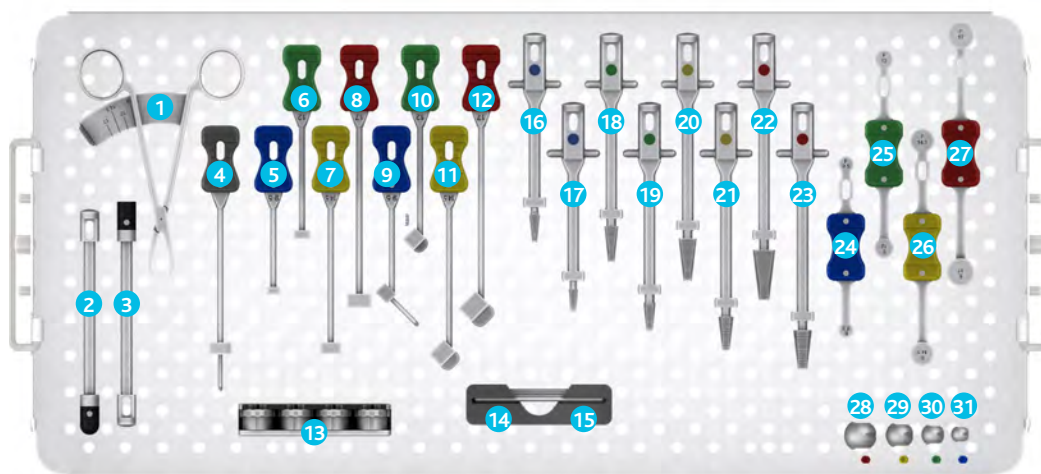
Step 20

Wound Dressing

It is recommended that a simple bulky dressing is applied in about 20-30° of flexion.

This is changed after 24-48 hours to a light dressing with 'buddy' strapping, or a dorsal slab in some flexion for 7-10 days. Gentle and progressive active movements are begun and gradually increased thereafter.

Pain relief generally is such that some caution is advisable especially for the more active patient until the wound has healed.



Item	Part No.	Description	Qty
1	259-175	Sizing Forceps	1
2	259-171	Phalanx Impactor	1
3	259-173	Metacarpal Impactor	1
4	259-101	Phalanx Cutting Guide	1
5	259-122	Metacarpal Distal Cutting Guide 9.5mm	1
6	259-123	Metacarpal Distal Cutting Guide 12.0mm	1
7	259-124	Metacarpal Distal Cutting Guide 14.5mm	1
8	259-125	Metacarpal Distal Cutting Guide 17.0mm	1
9	259-132	Metacarpal Dorsal/Palmar Cutting Guide 9.5mm	1
10	259-133	Metacarpal Dorsal/Palmar Cutting Guide 12.0mm	1
11	259-134	Metacarpal Dorsal/Palmar Cutting Guide 14.5mm	1
12	259-135	Metacarpal Dorsal/Palmar Cutting Guide 17.0mm	1
13	259-206	Size Indicator	1
14	259-177	IM Pins Short	2
15	259-179	IM Pins Long	2
16	259-151	TMPR Metacarpal Rasp 9.5mm	1
17	259-152	TMPR Phalangeal Rasp 9.5mm	1
18	259-153	TMPR Metacarpal Rasp 12.0mm	1
19	259-154	TMPR Phalangeal Rasp 12.0mm	1
20	259-155	TMPR Metacarpal Rasp 14.5mm	1
21	259-156	TMPR Phalangeal Rasp 14.5mm	1
22	259-157	TMPR Metacarpal Rasp 17.5mm	1
23	259-158	TMPR Phalangeal Rasp 17.5mm	1
24	259-162	Spacer 9.5mm	1
25	259-163	Spacer 12.0mm	1
26	259-164	Spacer 14.5mm	1
27	259-165	Spacer 17.0mm	1
28	259-215	Trial Metacarpal 17mm	1
29	259-214	Trial Metacarpal 14.5mm	1
30	259-213	Trial Metacarpal 12mm	1
31	259-212	Trial Metacarpal 9.5mm	1

TMPR™ Total Metacarpophalangeal Replacement

System Sizing Chart





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