JUST
MEDICAL

AUSK

AUSK Mobile-bearing Unicompartmental Knee System

Surgical technique

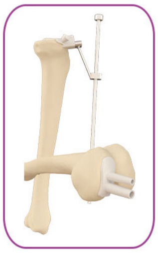
Highly Cross-linked Polyethylene Bearing

JUST MEDICAL

KNEE STEPWISE SU

Dynamic fatigue tests after 10 million cycles in the international

Dynamic wear tests after 5 million cycles in the international Enc



PSI AUSK
Partial Knee

AUSK
Mobile-bearing

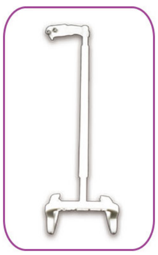
AUSK
Fixed-bearing

FEMORAL COMPONENT

SXI

SXII CR

SXI



PSI HTO

AUSK
Mobile-bearing

AUSK
Fixed-bearing

TIBIAL BEARING

SXI

SXII CR/AS

SXI

AUSK
Mobile-bearing

AUSK
Fixed-bearing

TIBIAL TRAY

SXI

PSI Total Knee

STEM & AUGMENT

Neutral Stem

Offset Stem

Tibia

AUSK
Mobile-bearing Partial Knee

AUSK
Fixed-bearing Partial Knee

SKI™ PS
Primary TKA System

SKII™ CR
Primary TKA System

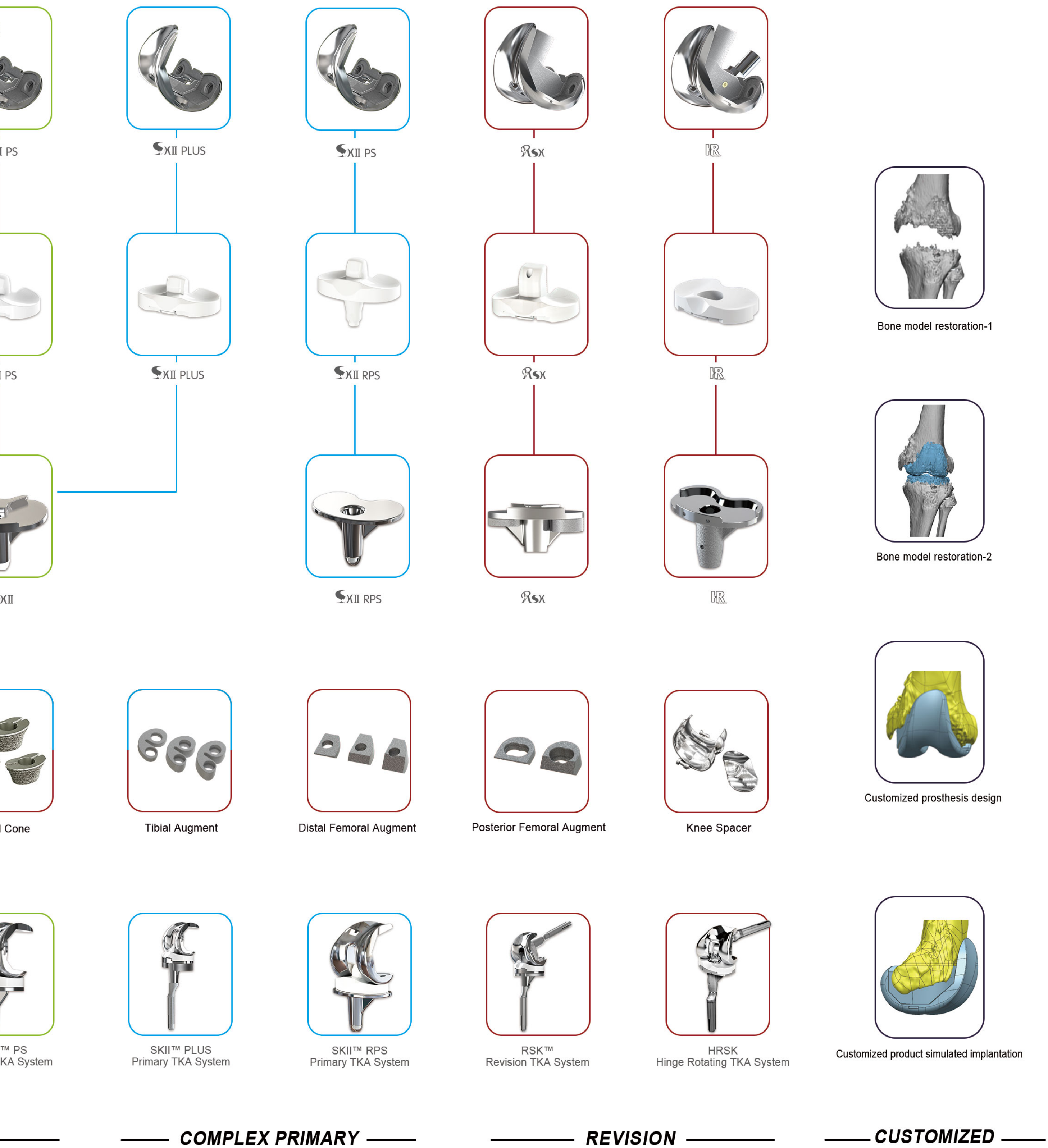
SKII
Primary T

PSI — KNEE PRESERVATION — PRIMARY

RGICAL SOLUTIONS

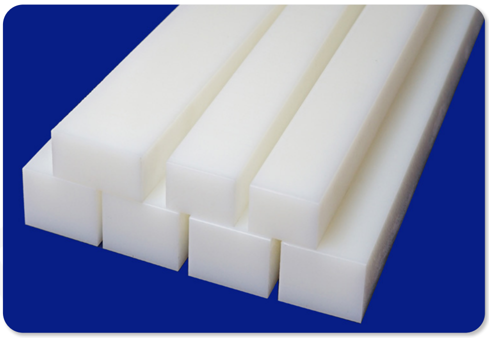
CNAS laboratory shows excellent results and no risk of fracture.

dolab® laboratory in Germany shows excellent wear resistance.

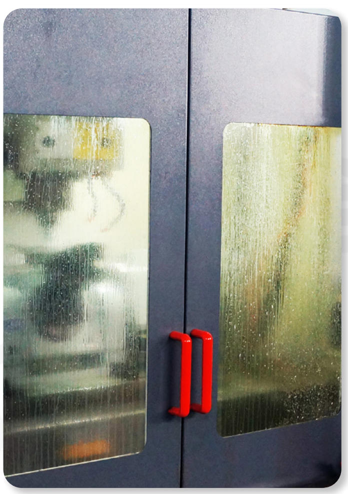


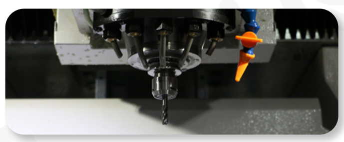
Imported Raw Material

All raw material of HXLPE inserts were manufactured in Germany, meeting the technical requirements in ISO 5834 part 2 and ASTM F648.



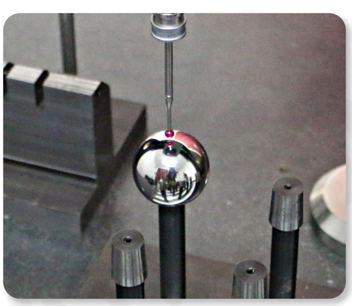
Precise Processing





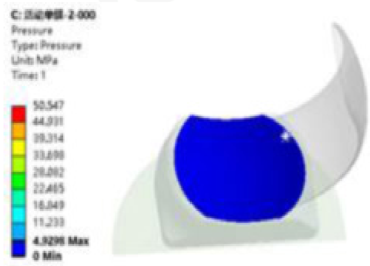
Strict Inspection

JUST MEDICAL Inspection Center

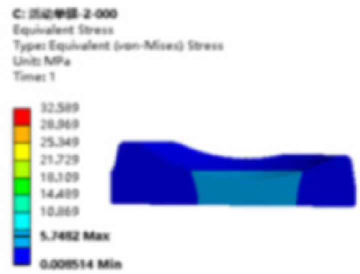


Stress Analysis

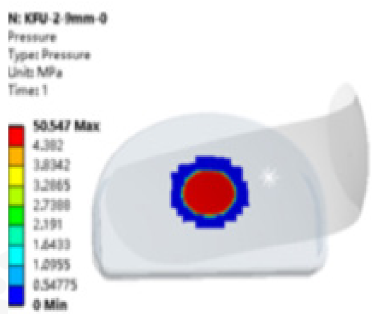
The finite element analysis shows that the mobile bearing has a larger contact area and can achieve a lower stress level



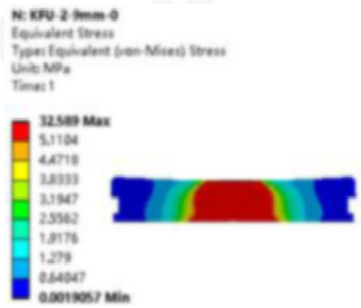
Contact Stress of MB



Equivalent stressof MB



Contact Stress of FB



Equivalent stress of FB

Within the same stress range, the Stress Distribution of Mobile-Bearing (MB) and Fixed-Bearing (FB) knee prostheses during Knee Flexion

Clinical Research & Fundamental Researche

Early efficacy of double-column mobile bearing unicompartmental knee prosthesis in treating medial knee osteoarthritis

Wear simulation of UKA prosthesis under deep flexion motion

Simulation analysis of wear performance for tibial insert of unicompartmental knee prosthesis under gait load

Biomechanical Study of Tibial Plateau Proximal Before and After Healing After Unicompartmental Knee Arthroplasty

Experimental study on mechanical mechanism of the UKAP mobile-bearing dislocation

Patent Certificate

Patent No. ZL 2018 1 1066453.9

Tibial Tray Fixture and Fatigue Test Setup for Unicompartmental Knee Prosthesis

Patent No. ZL 2018 2 1180023.5

Fixed-Bearing Unicompartmental Knee Prosthesis

Patent No. ZL 2019 2 0551896.0

the Mill Using in Unicompartmental Knee Replacement

Product Features

- Conforming, spherical design minimizes contact stress throughout entire range of motion
- Twin pegs for strengthened rotational stability
- Curved inner geometry for minimal bone removal and stability throughout entire range of motion

- Increased wear resistance with cross-linked polyethylene(XLPE)
- Mobile bearing designed to remain fully congruent with femoral component throughout entire range of motion
- Raised anterior lip & square lateral side to prevent bearing dislocation

- True mobile meniscal bearing knee system
- Anatomical shape for optimal bone coverage
- A straight keel design, as a guider,making the operation more convenient

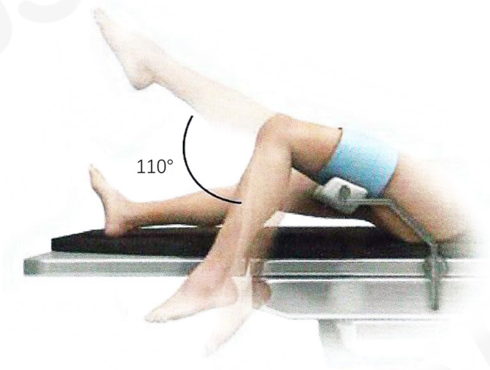


Figure 1

I Positioning the Limb

Inflate a thigh tourniquet and place the draped leg on a thigh support, with the hip flexed to about 30 degrees and the leg dependent. The knee must be free to flex fully and the leg should hang with the knee flexed about 110degrees (Figure 1). The thigh support must not be placedin the poplitealfossa as this will increase theriskofdamag etothepoplitealvessels.

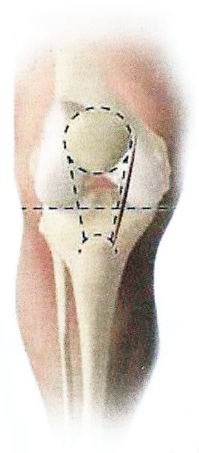


Figure 2

II Incision

With the kneeflexed to 90 degrees,make a medial parapatellarskinincisionfromthemedialmarginof the patella to a point 3 cm distal to the joint line (Figure 2).Deepentheincisionthroughthejointcaps ule.At its upper end, the capsular incision should extend proximally about 2 cm into the vastus medialis. It should pass around the patella and down beside the patella tendon.

Expose the front of the tibia in the lower part of the wound from the tibial tubercle to the anteromedial rim of the plateau. Excise as much of the medial meniscusaspossible.Donot'release'anyofthefibers ofthemedialcollateral ligament.

Surgeons who are learning the technique should make a larger incision to improve the exposure. The patella shouldbesubluxedbutnotdislocated.

Excise part of the retropatellar fat pad and insert retractors into the synovial cavity. The ACL can now be inspected to ascertain that it is intact. (Absence of a functioning ACLis a contraindication. If this is found, the operation should be abandoned in favor of a total knee replacement).

Figure 3

III Osteophyte Excision

The assistant extends and flexes the knee, moving the incision up and down, allowing the various osteophytes to come into view.

Figure 4

Osteophyte of Femoral Condyle

All osteophytes must be removed from the medial margin of the medial femoral condyle and from both margins of the intercondylar notch (Figure 3). With a narrow chisel (6 mm), remove the osteophytes from beneath the medial collateral ligament (Figure 4) and from the posterolateral margin of the medial condyle. This creates room to insert the saw blade into the intercondylar notch during the next step.

Osteophyte of Tibial Plateau

Osteophytes on the tibial plateau in front of the insertion of the ACL and in the top of the notch must be removed to allow the fixed flexion deformity to correct.

Osteophyte of Patella

If there are large osteophytes around the patella they should also be removed.

Figures 5

IV Tibial Plateau Resection

With the knee in flexion, insert the femoral sizing spoon (based on preoperative estimate sizing) starting with 1 mm spoon. With all retraction removed, assess the ligament tension. Usually the 1 mm thick femoral sizing spoon achieves the proper ligament tension, but if it does not, replace it with a thicker sizing spoon until the proper tension is achieved. The optimal size of the femoral component is confirmed by examining the relationship of the front of the spoon and an estimate of where the cartilage surface would have been before the arthritis. The correct sizing spoon should be inserted centrally in the medial compartment.

Apply the tibial saw guide with its shaft parallel with the long axis of the tibia in both planes (Figures 5 and 6). The ankle piece should be pointing towards the anterior superior iliac spine and the standard 0 mm tibial shim should be used. The tibial saw guide has 7 degrees of posterior slope built in.

The femoral sizing spoon, tibial saw guide and G-clamp, when used together, will accurately establish the bony Figure 5 Figure 6 resection. Select either the 3 or the 4 G-clamp and apply to the femoral sizing spoon and to the medial side of the tibial saw guide to ensure access to pin holes. Manipulate the upper end of the guide so that its face lies against the exposed bone. A recess accommodates the skin and the patellar tendon laterally (Figure 6). Engage the cam, by pulling the lever downwards, to lock the three components together.

Once the G-clamp is locked holding the femoral sizing spoon and tibial saw guide in place, pin the guide.

Note: When pinning the guide, the two medial pin holes may be used to secure the guide utilizing one headed and one headless pin, or the single hole directly anterior to the shaft may be pinned to minimize the number of perforations in the tibial bone.

Once the tibial saw guide is pinned in place, unlock the G-clamp and remove along with the femoral sizing spoon.

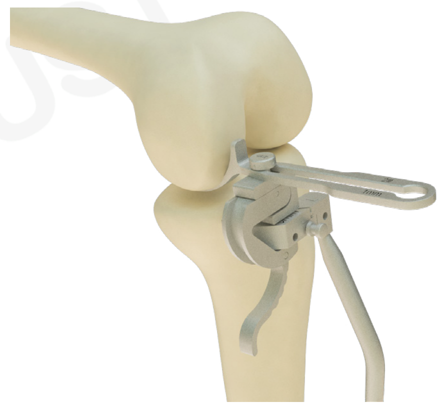


Figure 6

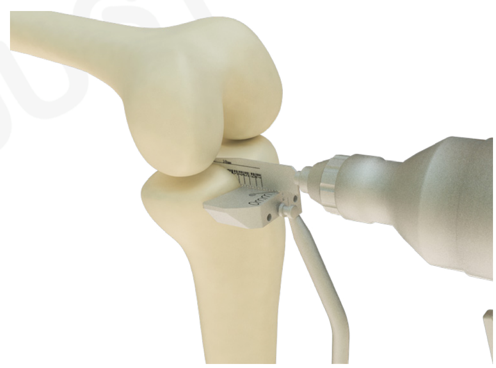


Figure 7

Tibial Plateau Resection (cont.)

Confirm the proposed level of resection is correct. The saw cut should pass 2 or 3 mm below the deepest part of the erosion, unless the erosion is very deep in which case the cut should be above the bottom of the defect.

Use a reciprocating saw with a stiff narrow blade to make the vertical tibial saw cut. The Saw Blade Kit contains blades with markings to indicate the depth to safely divide the posterior cortex. Push the blade into the intercondylar notch close to the lateral margin of the medial femoral condyle, from which the osteophytes were removed previously. The saw cut should be just medial to the apex of the medial tibial spine. It will pass through the edge of the ACL insertion. Point the blade toward

Figure 8

the anterior superior iliac spine or flexion plane (Figure 7).
The saw must reach the back of the tibial plateau and a little beyond. This is achieved by lining up the appropriate mark on the saw with the anterior cortex. Advance the saw vertically down until it rests on the surface of the saw guide (Figure 8). The saw must remain parallel to the guide. Do not lift the saw handle as this will dip the saw blade and increase the risk of tibial plateau fracture.
Before making the horizontal cut, insert a medial collateral ligament (MCL) retractor. Ensure this retractor is between the saw and the MCL.
Use a 12 mm wide oscillating saw blade with appropriate markings to excise the plateau (Figure 9). Ensure the saw blade is guided along the MCL retractor to completely cut the medial cortex. To cut the posterior cortex, deepen the cut until the appropriate mark on the saw blade is aligned with the anterior cortex. When the plateau is loose, lever it up with a broad osteotome and remove. Soft tissue attachments posteromedially may need to be cut with a knife.

Note: When making the horizontal cut a slotted shim may be used. This can be done by replacing the standard shim with the corresponding slotted shim. The slotted shim helps maintain the 7 degree posterior slope during the resection.

The excised plateau should show the classical lesion of anteromedial osteoarthritis, erosion of cartilage and bone in its mid and anterior parts and preserved cartilage posteriorly (Figure 10). Osteophytes around the edge of the plateau remain attached after its removal.
Lay tibial templates of the opposite side on the cut surface of the excised plateau to choose the tibial component with the appropriate width.
If the tibial component of the appropriate width appears short, consider repeating the vertical cut 2 or 3 mm further lateral so that a wider (and longer) component may be used.

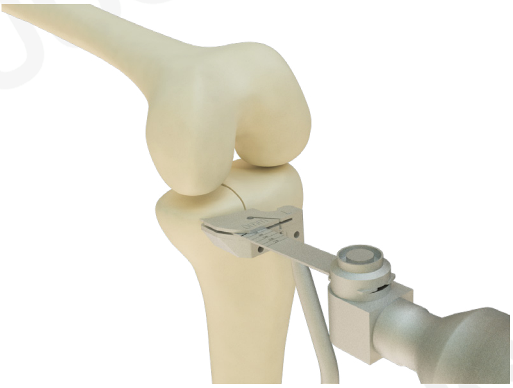


Figure 9

Figure 10

V The Femoral Drill Holes and Alignment

With the knee in about 45 degrees flexion, make a hole in the intramedullary canal of the femur with the 4 mm drill. This should be completed with the 5 mm awl (Figure 11).
The hole must be situated approximately 1 cm anterior to the insertion of the PCL and 2-3 mm lateral to the medial wall of the intercondylar notch (Figure 12). It should aim for the anterior superior iliac spine.
Insert the intramedullary (IM) rod until it stops against the bone (Figure 13).
Flex the knee to 90 degrees. This must be done with care, as the medial border of the patella abuts the IM rod. Using methylene blue or diathermy, draw a line down the center of the medial condyle.

Figure 11

Figure 12

The Femoral Drill Holes and Alignment (cont.)

Insert the femoral drill guide to assess the thickness of the gap (Figure 14).
The thickness of bone removed from the tibia must be enough to accommodate the femoral drill guide set at a 3 or 4. If a 3 G-clamp was used, the gap must be large enough to accept the femoral drill guide set to 3. If the 4 G-clamp was used, the gap must be large enough to accept the femoral drill guide set to 4.

Note: Whenever using the femoral drill guide or feeler gauges to gap measure the retractors must be removed. If left in, they have the effect of tightening the soft tissues, which artificially diminishes the gap.

If the correctly adjusted femoral drill guide cannot be inserted or feels tight, more bone must be excised from the tibia. To do this, remove the initial 0 mm shim from the guide using the small nub on the IM Rod Removal Hook. Once the shim is removed, revisit the vertical resection, then resect off the surface of the guide without the shim to remove 2 mm of additional bone. After additional resection, recheck the gap.
Insert the IM link into the IM rod and into the nearside/lateral hole of the femoral drill guide. This will ensure correct alignment of the guide.

Figure 13

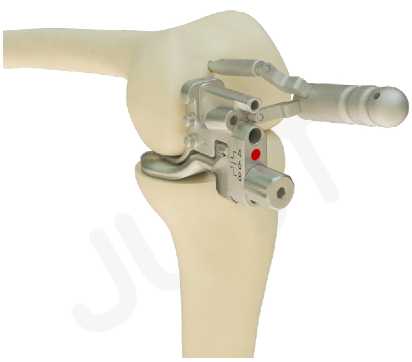


Figure 14

There are two alignment requirements for the femoral drill guide:

1. The femoral drill guide must lie in the center of the medial condyle. This is done by ensuring the medial and lateral bollards adjacent to the 6 mm hole of the femoral drill guide are equal distance from the condyle edges. It can be confirmed by looking into the 6 mm hole and verifying the position of the methylene blue line. If the line is not central adjust the guide position (Figure 15).

2. The femoral drill guide must be placed against the distal bone of the medial femoral condyle.

Pass the 4 mm drill through the upper hole in the guide. Drill into the bone up to its stop and leave in place. Confirm all alignments ensuring the guide does not move medially or laterally. Advance the 6 mm drill through the lower guide hole until it stops. Remove 4 mm and 6 mm drill along with the femoral drill guide.

Figure 15

Femoral Saw Cut

Insert the posterior resection guide into the drilled holes and tap home (Figure 16).
Insert a retractor to protect the MCL. Using the 12 mm broad sagittal saw, excise the posterior femoral condyle. The saw blade should be bent slightly by dropping the saw to ensure it is guided by the underside of the posterior resection guide (Figure 17). Take care to avoid damage to the medial collateral and anterior cruciate ligaments.
Remove the guide with the slap hammer, ensuring that it is withdrawn in line with the femoral drill guide holes as to not damage them. Remove the posterior bone fragment.
There is now good access to the back of the joint and any remnants of the medial meniscus should be removed. In the region of the MCL, a small cuff of meniscus should be left to protect the MCL from the tibial component. The posterior horn should be completely removed.

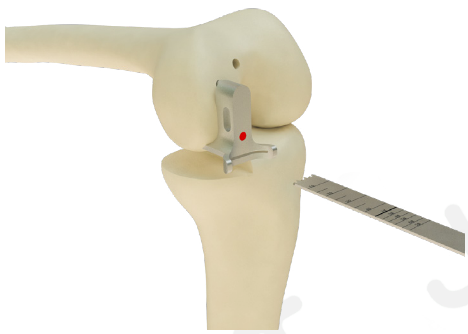


Figure 16

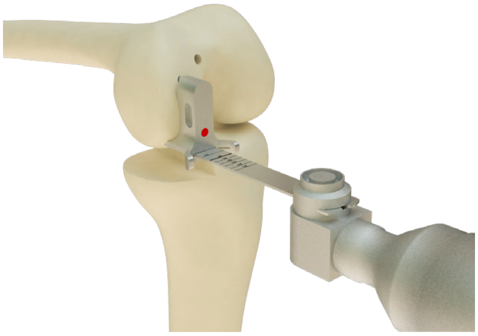


Figure 17

Before advancing to the following surgical steps, consult the special note below.

Special Note

The numbers marked on the feeler gauges and the meniscal bearings represent their least thicknesses in millimeters.

The scale of numbers of the spigots is in 1 mm increments, in an inverse ratio to the thickness of their flanges.

The spigots must be used as described below:

- **First Milling**
The 0 spigot is designed to automatically remove sufficient bone to allow the femoral component to seat. This amount varies with the degree of arthritic erosion of the condyle.

- **Second Milling**
Spigots 1 to 7 allow bone to be removed in measured quantities (in mm) from the level of the first mill cut. Thus, the number 3 spigot removes 3 mm, the number 4 spigot removes 4 mm, etc.

- **Subsequent Milling**
If the last spigot used was a number 3, a number 4 spigot will remove an additional 1 mm of bone (i.e. a total of 4 mm since the first milling). However, if the last spigot used was a number 4, a number 5 spigot is required to remove 1 mm of bone (i.e. a total thickness of 5 mm since the first milling).

Remember: The spigot number represents the total thickness of bone it removes from the level of the first mill cut.

First Milling of the Condyle

Insert the 0 spigot, which has the thickest flange, into the large drill hole and tap until the flange abuts the bone (Figure 18). The 0 spigot is the only spigot that may be tapped into place. All other spigots should be placed and seated by finger pressure.

By extending the knee slightly and retracting the soft tissues, maneuver the spherical cutter onto the spigot (Figure 19) and into the wound so that the teeth touch the bone (Figure 20). Take care to avoid trapping soft tissues.

When milling, push firmly in the direction of the spigot axis, taking care not to tilt the mill. Mill until the cutter will no longer advance and the spigot can be seen, in the window, to have reached its end stop.

If in doubt, continue to mill; the mill cannot continue beyond the amount permitted by the collar of the selected spigot.

Figure 18

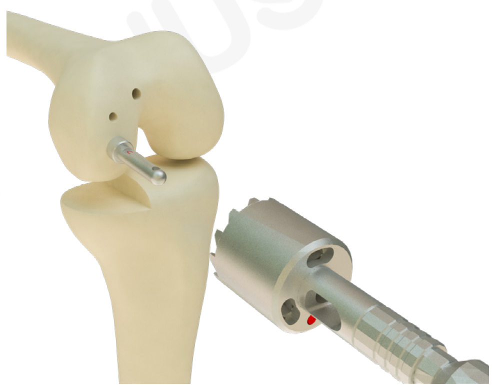


Figure 19

First Milling of the Condyle (cont.)

Remove the mill and the spigot and trim off the bone protruding from the posterior corners of the condyle that lie outside the periphery of the cutting teeth (Figure 21). These corners should be removed tangentially to the milled surface, taking care not to damage the flat posterior surface of the condyle.

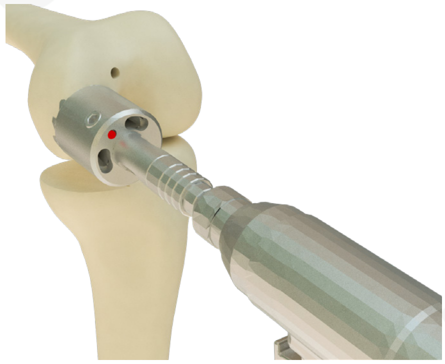


Figure 20

Equalizing the Flexion and Extension Gaps

With the knee in 100 degrees of flexion, carefully insert the tibial template and apply the twin peg femoral trial component to the milled condyle, tapping it home with the femoral impactor angled at 45 degrees to the femoral axis.

Figure 21

Part A

With the knee in about 100 degrees of flexion carefully measure the flexion gap with the feeler gauges (Figure 22). (A previous step has already ensured that the gap is wide enough to accept at least the 4 mm gauge, 3 mm in small patients). The gauge thickness is correct when natural tension in the ligaments is achieved. Under these circumstances, the feeler gauge will easily slide in and out, but will not tilt. Confirmation of the correct size is obtained by confirming that a gauge 1 mm thicker is firmly gripped and 1 mm thinner is loose.

Figure 22

Part B

Remove the feeler gauge. It is important to remove the gauge before extending the knee because the extension gap is always narrower than the flexion gap at this stage. If it is left in place, the gauge may stretch or rupture the ligaments as the knee extends.

Part C

Measure the extension gap (Figure 23) in 20 degrees of flexion, not full extension. In full extension, the posterior capsule is tight, and its influence gives a false under-measurement. The extension gap is usually less than 4 mm, if the thinnest (1 mm feeler gauge) cannot be inserted, the gap is assumed to be 0 mm.

Subtract the extension gap from the flexion gap to calculate additional bone removal. For instance, if the flexion gap measured 4 mm and the extension gap 1 mm, then the amount of bone to be milled is 3 mm. To achieve this, insert a 3 spigot and mill until the cutter will not advance further.

After each milling, it is necessary to remove the remaining bone on the posterior corners of the condyle. Also, if the circular disc of bone left under the flange of the spigot is more than 1 mm thick, it should be removed by using the bone collar remover (Figure 24). The reference for the spigot will not be lost, as its tip continues to reference off the bottom of the drill hole.

The formula for balancing the flexion and extension gaps is as follows:
Flexion Gap (mm) – Extension Gap (mm) = Thickness of bone to be milled from femur (mm)
= Spigot number to be used

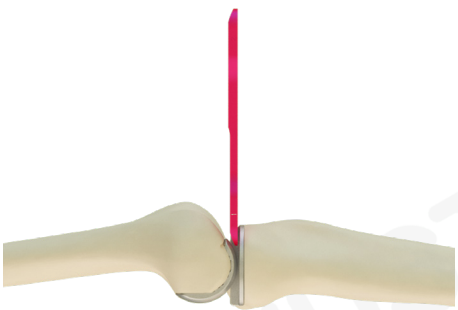


Figure 23

Figure 24

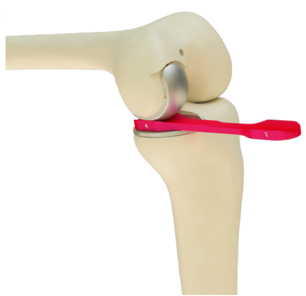


Figure 25

Confirming Equality of the Flexion and Extension Gaps

With the tibial template and the twin peg femoral trial component in place, re-measure the flexion and extension gaps. They will usually be found to be the same (Figures 25 and 26).

If the extension gap at 20 degrees of flexion is still smaller than the flexion gap, remove more bone with the mill. This can be done, 1 mm at a time, by using the sequence of spigots. In the previous example, an additional 1 mm of bone could be removed by using a 4 spigot.

Usually the knee is balanced with a 3, 4, or 5 spigot.

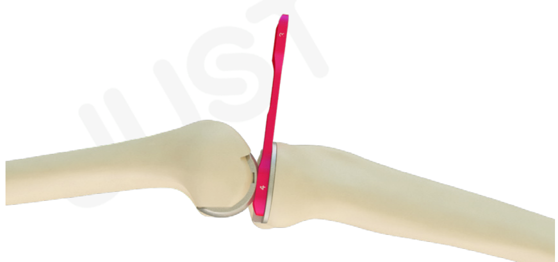


Figure 26

Preventing Impingement

Trim the anterior and posterior condyle of the femur to reduce the risk of impingement of bone against the bearing in full extension and full flexion.

Apply the anti-impingement guide to the condyle and use the anterior mill to remove anterior bone and create clearance for the front of the bearing in full extension. When milling, push firmly in the direction of the peg axis, taking care not to tilt the mill. Mill until the cutter will not advance further (Figure 27).

Ensure that impingement does not occur between the mill and tibia by adjusting flexion.

Leave the anti-impingement guide in place and use the osteophyte chisel to remove any posterior osteophytes (Figure 28). This should be done medially and laterally as well as centrally. Remove the guide and any detached osteophytes. Palpate, with a finger, the proximal part of the condyle to ensure all osteophytes are removed.

Insert the tibial template, then the twin peg femoral trial and a trial bearing of appropriate size. With the trial components in place, manipulate the knee through full range of motion to ensure there is no impingement of bone against the bearing in full flexion and full extension (Figures 29 and 30).

Ensure the bearing is not hitting the vertical wall. If a narrow dissector put between the bearing and the wall is gripped by the bearing, consider redoing the vertical cut laterally.

Remove the trial components using the appropriate extractors.

Note: Previously, feeler gauges have been used to measure the gaps because they do not stretch the ligaments. The meniscal bearings have a 3 mm high posterior lip which, after multiple insertions, may stretch the ligaments.

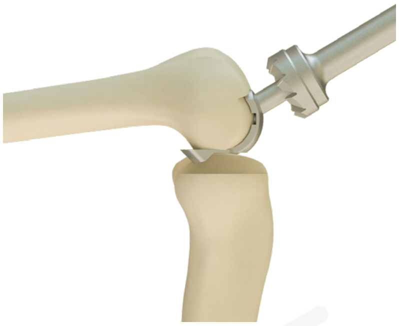


Figure 27

Figure 28

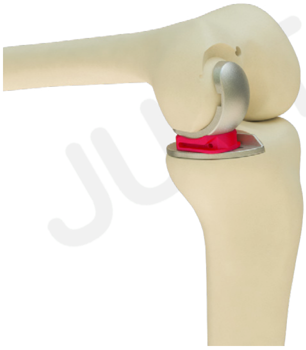


Figure 29

Figure 30

Final Preparation of the Tibial Plateau

Insert the appropriate size tibial template. To ensure the correct size, position the tibial template with its posterior margin flush with the posterior tibial cortex (Figure 31). This is facilitated by passing the universal removal hook over the posterior cortex of the tibia. The tibial template should be flush with the medial cortex or overhanging slightly. If it overhangs by 2 mm or more use a smaller size tibial component.

Force the tibial plateau laterally against the vertical cut and pin in place(Figure 32). Hold the pin throughout sawing to prevent movement.

Introduce the keel-cut saw into the front of the slot and saw until sunk to its shoulder (Figure 33). The saw blade is lifted up and down as it is advanced posteriorly. Confirm the cut is complete by holding the pin and feeling the saw hit the front and back of the keel slot. Once the saw cuts are complete, remove the tibial template.

Figure 31

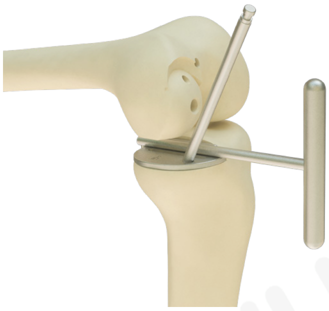


Figure 32

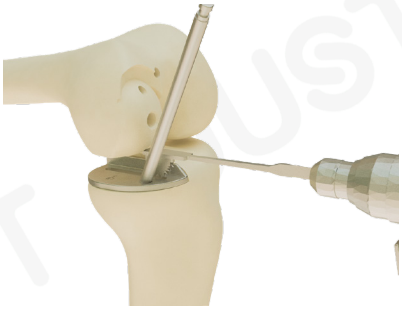


Figure 33

After removing the tibial template, excavate the groove to the correct depth by scooping out the bone with the blade of the tibial gouge, taking care not to damage the anterior and posterior cortices (Figure 34).

The safest way to prepare the back of the groove is to feel the posterior cortex with the tibial keel pick and then move it anteriorly by 5 mm before pushing down and bringing forward to empty the groove.

Insert the trial tibial component and tap with the tibial impactor until fully seated (Figure 35).

Ensure component is flush with the bone and the posterior margin extends to the back of the tibia.

If the component does not seat fully remove it and clean the keel slot out again with the tibial gouge.

Use only the toffee hammer to avoid the risk of plateau fracture.

Figure 34

Figure 35

Final Trial Reduction

Insert the femoral trial component and ensure it is fully seated by tapping home with the femoral impactor at 45 degrees to the femoral axis (Figure 36).

Insert a trial meniscal bearing of the chosen thickness (Figure 37).

With the bearing in place, manipulate the knee through a full range of motion to demonstrate stability of the joint, security of the bearing and absence of impingement. The thickness of the bearing should be such as to restore the ligaments to their natural tension so that, when a valgus force is applied to the knee, the artificial joint surfaces distract a millimeter or two.

This test should be done with the knee in 20 degrees of flexion. In full extension, the bearing will be firmly gripped because of the tight posterior capsule.

Remove the bearing with the bearing extractor.

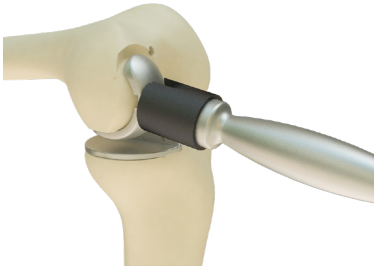


Figure 36

Figure 37

Cementing the Components

Roughen the femoral and tibial surfaces including the posterior condyles, by making multiple small drill holes with the cement key drill (Figure 41).

The components are fixed with two separate mixes of cement.

The Tibial Component

Place a small amount of cement on the tibial bone surface and flatten to produce a thin layer covering the whole under surface. Insert the component and press down, first posteriorly and then anteriorly, to squeeze out excess cement at the front.

Use the right-angled tibial impactor with a small mallet to complete the insertion. Ensure there is no soft tissue under the component. Remove excess cement with a Woodson cement currette

Figure 38

from the margins of the component. Insert the twin peg femoral trial component and pressurize cement by inserting the appropriate feeler gauge. With the feeler gauge inserted, hold the leg in 45 degrees of flexion while the cement sets. Do not fully extend or flex the leg, as this may rock the component.
Once the cement has set, remove the feeler gauge and twin peg femoral trial component and look carefully for cement that may have extruded. Slide the flat plastic probe along the tibial articular surface, feeling for cement at the edges and posteriorly.

The Femoral Component

From the second mix, force cement into the large femoral drill hole and fill the concave surface of the femoral component with cement. Apply the loaded component to the condyle and impact with the punch held at 45 degrees to the long axis of the femur. Remove excess cement from the margins with a Woodson cement currette. Pressurize the cement by inserting the appropriate feeler gauge with the knee at 45 degrees of flexion and holding the leg in this position. Do not fully extend or flex the knee or this may rock the components and may loosen them.

Once the cement has set, remove the feeler gauge. Clear the medial and lateral margins of the component of any extruded cement. The posterior margin cannot be seen but can be palpated with a curved dissector.

Reassess the gap by inserting a trial bearing(Figures 39 and 40). Occasionally a smaller size is needed due to gap closure from the cement mantle.

Complete the reconstruction by snapping the chosen bearing into place (Figure 41).

Close the wound in a routine manner.

Figure 39

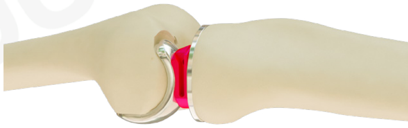


Figure 40

Figure 41

Radiographic Criteria

If all steps have been followed as described in this surgical technique, the postoperative appearances should be as shown (Figure 42).

Position and Size of Components

Femoral Component (Relative to the Femur)

A/A	Varus/valgus angle	< 10 degrees varus — < 10 degrees valgus
B/B	Flexion/extension angle	15 degrees flexion — < 0 degrees extension
C/C	Medial/lateral placement	Central
D	Posterior fit	Flush or < 4 mm overhang

Tibial Component (Relative to the Tibia)

E/E	Varus/valgus angle	< 5 degrees varus — < 5 degrees valgus
F/F	Posteroinferior tilt	7 degrees + or - 5 degrees
G	Medial fit	Flush or < 2 mm overhang
H	Posterior fit Flush or < 2 mm overhang	Flush or < 2 mm overhang
J	Anterior fit	Flush or < 5 mm short
K	Lateral fit	Flush — No gap

Meniscal Bearing
(Relative to the Tibial Component)

L	X-ray marker central and parallel with the tibial component

Bone Interfaces

M	Posterior femoral	Parallel surfaces: Cement OK
N	Tibial	Parallel surfaces: Cement OK

Other

O	Posterior osteophytes	None visible
P	Depth of tibial saw cuts	Minimal ingress of cement
Q	Intact posterior cortex	No extruded cement posteriorly
R	No anterior impingement	Adequate bone removed; no cement

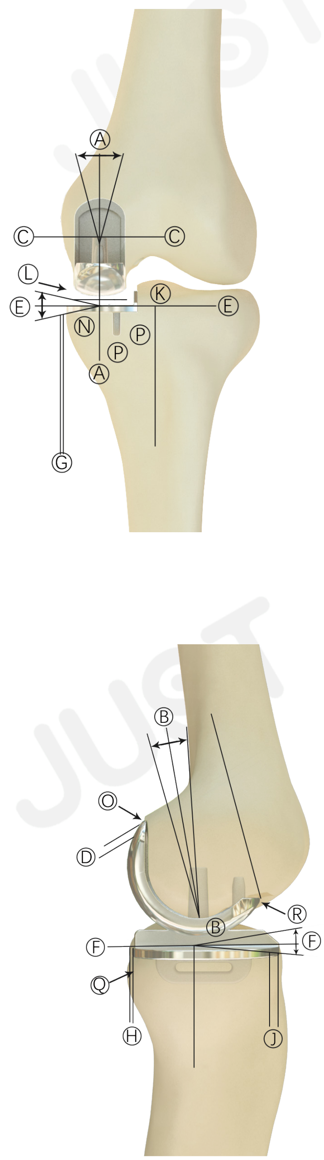


Figure 42

Appendix

Postoperative Treatment

Forcing flexion of the knee during the first postoperative week often causes pain and is unnecessary since movements are almost always recovered spontaneously.

Postoperative Radiographic Assessment

Postoperative radiographs can be used to measure the technical success of the operation. For this purpose, as well as to facilitate their comparison with follow-up radiographs, the films should be taken in a reproducible manner. Even small variations in the angle of incidence of the X-ray beam can distort the images of the components and make accurate assessment of their positions and bone/cement interfaces difficult.6

Radiographic Technique

Accurately aligned radiographs are best taken with an image intensifier (fluoroscope). If this is not available, a digital system can be used. Low dose images are taken and then adjusted until the optimal image is obtained.

Anterior Projection

The shape of the tibial component allows it to be used to center the X-ray beam and to align it in all three planes. Position the patient supine on a standard fluoroscopic screening table with an undercouch tube and an image intensifier. Before taking the film, adjust the position of the limb by flexing/extending the knee and internally/externally rotating the leg until the tibial component appears on the screen directly 'end-on.'

Lateral Projection

With the leg flexed 40 degrees, internally/externally rotate the thigh until the tibial component appears on the screen directly 'edge-on.'
The components ideally implanted are shown

Follow-up Radiographs

All subsequent radiographs should be taken in the same manner as the immediate postoperative films to allow comparison. Fluoroscopically centered films are particularly appropriate for demonstrating the state of the interface beneath the tibial plateau.

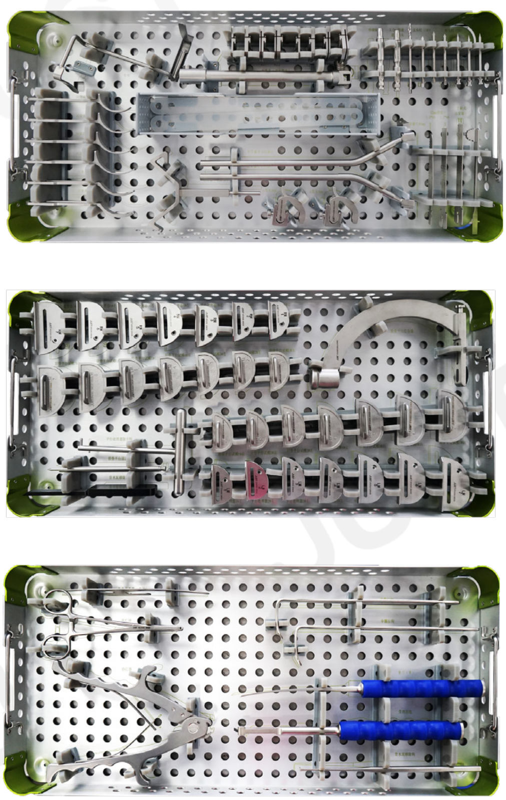
This interface changes gradually during the first year after implantation, after which it should remain unaltered. The typical appearance at one year and ten years is a thin radiolucent line (approximately 1 mm). Histologically, the radiolucent line represents a layer of fibrocartilage, with its collagen organized parallel with the plateau. The radiodense line represents a new ‘subchondral bone plate.’ The trabeculae, which were cut at the operation, attach to this plate and support it. The collagen fibers of the cartilage layer insert into its upper surface. There are some areas within the radiolucency in which there is direct contact between cement and bone.

The appearances under the femoral component are the same, but are not easily demonstrated because of the non-planar form of the femoral interface.

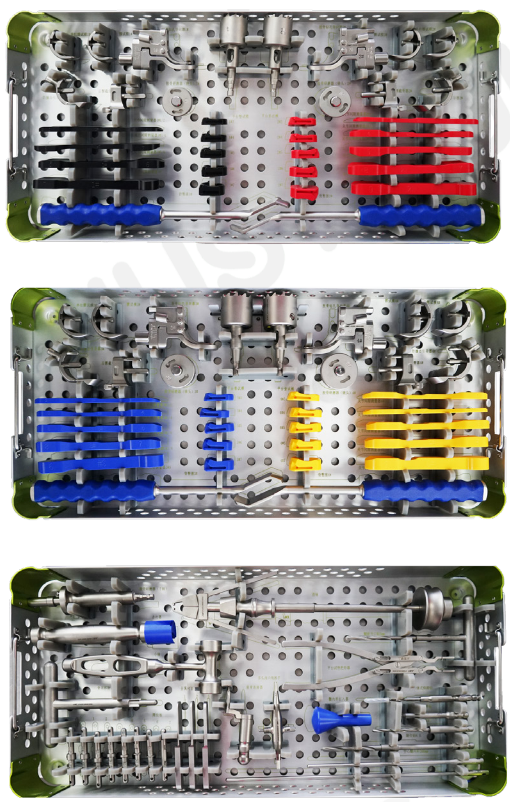
The radiographic changes which occur during the first postoperative year result from healing of the cut bone and its remodeling to sustain the new pattern of compressive load applied to it by the rigid implant.

A review of the mobile-bearing unicompartmental knee patients found no relationship between the presence of radiolucent lines and clinical outcomes. Therefore, it is important not to ascribe clinical symptoms to these ‘normal’ appearances or to interpret them as evidence of implant loosening, i.e. radiolucent line.

Instruments



Tibial Instruments



Femoral Instruments

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