JUST®
MEDICAL

JKnee®

PATELLAR PROSTHESIS REPLACEMENT

Surgical technique

Specification (mm)

REF	Specification
548955	28×8 (PE)
548956	30×9 (PE)
548957	34×9 (PE)

Features

- 100%——The dome-shaped design meets all anatomical forms of the Wiberg I, II, and III types of patella.
- 10%——Reduces surgical time by 10%; the axis-symmetric design makes alignment and soft tissue balancing easier.
- Three pillars—The prosthesis features a three-pillar fixation design for more secure fixation to the bone.
- Axis-symmetric—The axis-symmetric dome design easily matches the femoral component, leading to greater clinical satisfaction; it also reduces the likelihood of alignment issues during surgery.
- Low wear—Manufactured from German UHMWPE for lower wear.

In the 1970s, Kanfer and others reported on the biomechanical mechanisms of the patella, highlighting its increasingly recognized role in knee function. To reduce the incidence of anterior knee pain after total knee arthroplasty (TKA), patellar resurfacing has been developed.

Indications

- Patellofemoral osteoarthritis (including bone deformities).
- Severe patellofemoral joint symptoms affecting daily activities, with ineffective non-surgical treatment for 3 months.
- Post-traumatic osteoarthritis.
- Grade 3 or higher cartilage lesions, especially in the femoral trochlea, medial patellar surface, and distal cartilage lesions.
- Failure of patellofemoral joint decompression surgery.
- Osteoarthritis induced by malalignment and deformities of the patellofemoral joint (with or without instability).

The prevalence of patellofemoral osteoarthritis in the population is approximately 5%.

Anatomical Structure of the Human Patella

Structural Composition

The patella is the largest sesamoid bone in the human body, with an irregular shape. Its articular surface consists of a central ridge and a medial ridge, divided into the medial and lateral facets, as well as the odd facet. The medial and lateral facets are further divided into upper, middle, and lower sections, totaling seven surfaces (Figure 1).

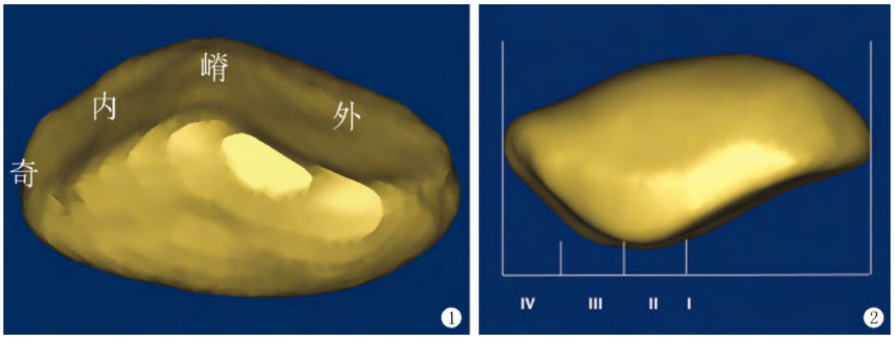

Figure 1: Patellar articular surfaces; Odd: Odd facet; Medial: Medial facet; Central: Lateral facet.
Figure 2: Schematic diagram of Wiberg and Baamgmls classification of bone.

Patellar Classification

According to the Wiberg and Baumgartl patellar cartilage surface classification system (Figure 2), Types I and II are categorized as stable types, while the remaining types are considered unstable. The patellar ridge is generally located at approximately 42.8% of the overall width of the patella. Due to mechanical imbalance, this can lead to issues such as patellar subluxation or dislocation, cartilage damage in the patellofemoral joint, and severe destruction of the patellofemoral joint.

Abnormal morphology of the patella and its corresponding femoral trochlea is one of the significant causes of abnormal patellar tracking and anterior knee pain. In unstable types of patellae, the lateral cartilage surface is elongated while the medial facet is shortened, with the central ridge of the patella shifted medially. During knee extension, the extension mechanism may easily lead to patellar dislocation or subluxation due to injury or even atrophy of the medial head of the quadriceps muscle. Furthermore, the abnormal pressure and shear forces on the cartilage surface of unstable patellae can lead to cartilage softening, resulting in anterior knee pain.

Surgical Technique

Step 1: Preoperative Assessment

Preoperatively, a lateral X-ray of the knee joint at 30° of flexion is used to evaluate the alignment of the medial and lateral femoral condyles, helping to classify the patellar position as high or low, as well as assessing femoral trochlear dysplasia.
Preoperatively, axial X-rays of the patella taken at 30° or 45° of knee flexion are used to assess the presence of patellar subluxation.
Preoperatively, a CT scan of the knee joint is performed to measure the TT-TG (tibial tubercle-trochlear groove) distance, which helps assess the lateralization of the tibial tubercle in relation to the patellofemoral joint.
These assessments provide valuable guidance for addressing patellofemoral joint abnormalities during surgery.

Step 2: Measurement of Patellar Thickness

Patellar osteotomy and preparation can be performed sequentially or independently as needed, and they can be carried out at any time during the surgery.

Rotate the patella approximately 90° and move the osteophytes and surrounding patellar tissue to the level of the quadriceps tendon insertion and the patellar ligament.

Use a patellar caliper to determine and record the total thickness of the patella, ensuring that the reconstructed patella has the same thickness as the natural patella.

Note: When calculating whether there is sufficient thickness for patellar resurfacing based on the size of the patellar prosthesis, a minimum residual thickness of 13 mm should be maintained to avoid the risk of fracture.

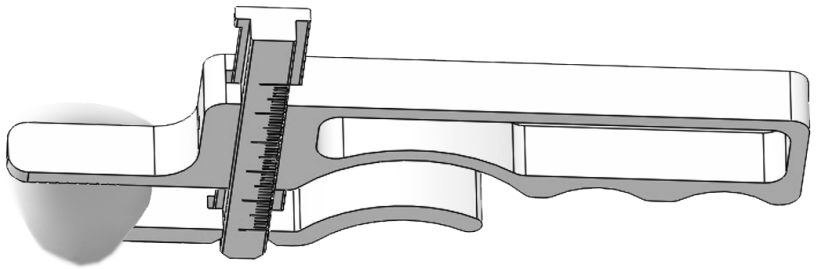

Figure 3: Patellar thickness measurement.

Step 3: Patellar Osteotomy

In the knee joint extension position, place the positioning end of the patellar holder against the posterior cortex of the patella. The serrated clamps should grip the upper and lower edges of the joint surface. Once securely fixed, the positioning end can be rotated away from the posterior patella. Use a reciprocating saw blade to perform a parallel osteotomy through the groove of the patellar holder.

Note: A patellar rasp can be used to refine and smooth the osteotomy surface.

Figure 4: Patellar Osteotomy.

Step 4: Patellar Preparation

Place the patellar prosthesis trial instrument on the prepared surface of the patella, ensuring it fully covers the resected area without overhanging. This indicates that the size is appropriate.

Note: If the larger size is too big and the smaller size is too small, choose the smaller size to ensure that the prosthesis does not exceed the original patellar bone bed limits.

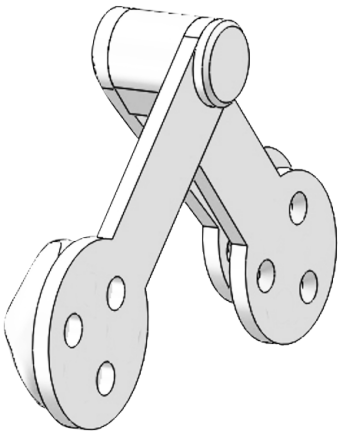

Figure 5: Patellar Preparation

Place the appropriately sized patellar prosthesis trial instrument on the externally rotated patellar osteotomy surface, slightly offset medially so that it is positioned directly beneath the upper edge of the patella. If the trial prosthesis is positioned laterally, it will be difficult to fit into the patellar groove of the femoral prosthesis.

Secure the three pins on the trial instrument firmly to the osteotomy surface, and then drill holes into the patella.

Step 5: Trial Reduction

Select the appropriately sized patellar trial and perform the reduction. Use a patellar caliper to measure the thickness, aiming to restore it but not exceed the pre-osteotomy thickness to prevent overstuffing of the patellofemoral joint. After the trial reduction, conduct a "no thumb test" and a "mid-clamp test." If the tests are positive, assess whether to perform a release of the patellar support structures.

Step 6: Bone Cement Fixation and Prosthesis Implantation

Thoroughly clean and dry the bone surface, then apply bone cement and implant the corresponding size patellar prosthesis. Use a patellar clamp, positioning the plastic end at the center of the joint surface and the metal end against the anterior aspect of the patella, taking care to avoid pinching the skin. Tighten the patellar clamp to adequately compress the bone cement, and wait for the cement to cure to fully secure and stabilize the prosthesis. Use a curette to remove any excess bone cement that has been extruded. Reduce the patella and assess the patellar implant to ensure that the range of motion is not restricted, allowing for free movement of the prosthesis and proper patellar tracking.

Note: During the implantation process, care should be taken to avoid flexing the femoral prosthesis, as this can increase pressure on the patellofemoral joint and raise the risk of patellar fracture.

Accurate placement of the prosthesis and careful cleaning of the soft tissues can minimize soft tissue damage, thereby avoiding the occurrence of patellar crepitus.

Throughout the patellar resurfacing process, the following principles can be adhered to:

Thinner rather than thicker (do not exceed the original thickness).

Smaller rather than larger (do not exceed the original limits of the patellar bone bed).

Medial rather than lateral (when complete coverage cannot be achieved, place the implant as close to the medial edge as possible).

Superior rather than inferior (avoid downward displacement of the patellar center).

JUST MEDICAL DEVICE (TIANJIN) CO.,LTD

Add: No. 27, Ziyang Road, Nankai District, Tianjin, China
Tel: +86 22 2339 9501 Mobile: +86 178 2201 3519 (WhatsApp)
Web: www. just-ortho. com
E-mail: sales@justmedical. cn
Version: 202411-01