

TREATMENT OF ARTICULAR DAMAGE TO THE KNEE

LIMITED HEALING CAPACITY

The lack of blood vessels and nerves in articular cartilage hinders its ability to self-repair effectively

COMPLEX BIOMECHANICS

The knee joint experiences significant biomechanical forces, making it hard for repair processes to succeed fully

CURRENT TREATMENT LIMITATIONS

Existing surgical treatments like microfracture surgery, Autologous Chondrocyte Implantation (ACI), and osteochondral grafting have their own limitations

DEGENERATIVE NATURE OF DAMAGE

Cartilage damage often occurs as part of degenerative processes like osteoarthritis, complicating repair efforts

TECHNOLOGICAL AND BIOLOGICAL HURDLES

Advancements in areas like PRP injections, stem cell therapy, and tissue engineering show promise but come with challenges

PATIENT FACTORS

Individual factors such as age, weight, and activity level can impact treatment outcomes

REHABILITATION CHALLENGES

Post-treatment rehabilitation is vital for success and involves a tailored program to restore function without stressing the healing cartilage excessively

CONCLUSION

A comprehensive management plan tailored to individual needs is essential for effectively addressing knee articular cartilage damage. Those seeking expertise in this area can benefit from specialized guidance and treatment options

HIP REPLACEMENT

PRIMARY REASONS FOR JOINT REPLACEMENT

- Relieve symptoms impacting daily activities
- Address pain and loss of function
- Pain often stems from osteoarthritis (degenerative wear-and-tear condition)
- Well-performed hip replacement typically lasts many years and provides high patient satisfaction

SURGICAL PROCEDURE DETAILS

- Performed exclusively at Southern Cross Hospital in Christchurch
- Preoperative anaesthetic assessment includes necessary investigations and tests
- Patients often visit the hospital on the day of surgery to reduce anxiety
- Anaesthesia administered within the operating theatre
- Anaesthetist will discuss options, typically including:
 - General anaesthesia
 - Local/spinal anaesthesia

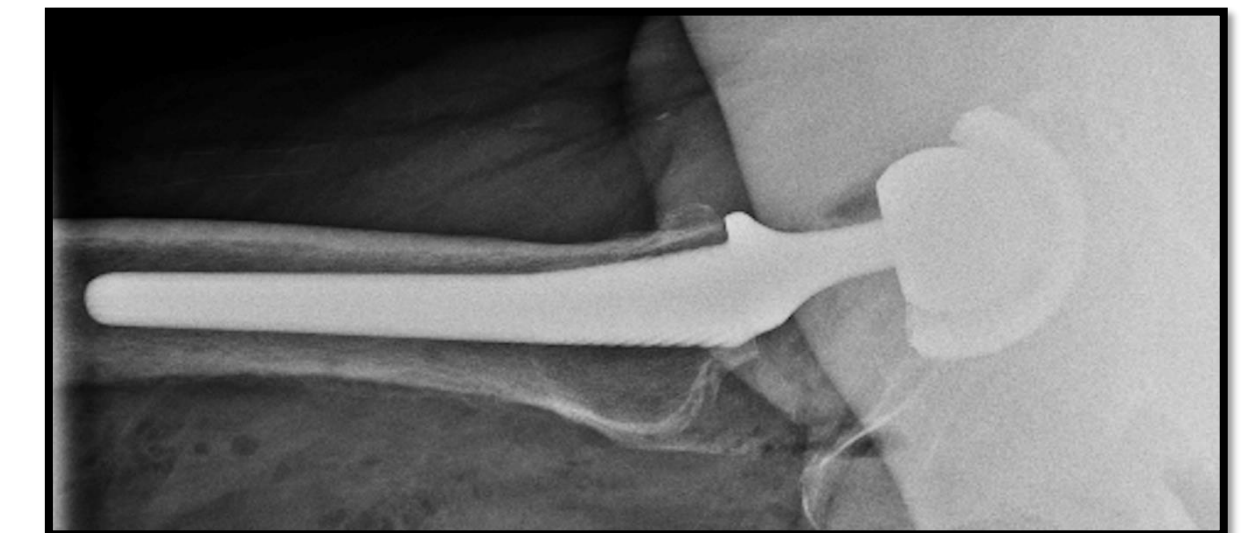
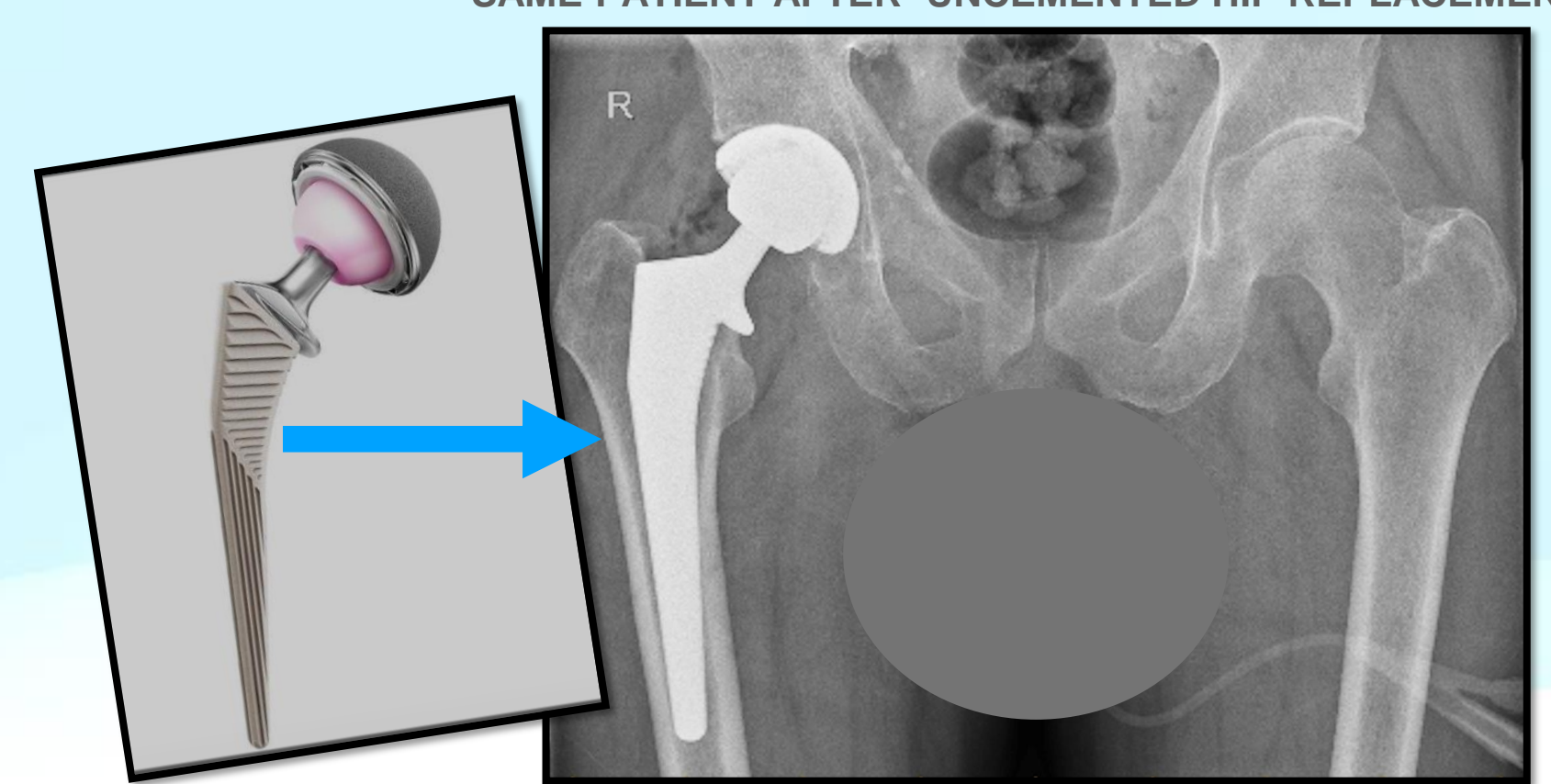
INITIAL VISIT AT DUDLEY CREEK HEALTH

- Thorough discussion of your condition and past medical history
- Opportunity to address your questions
- Detailed assessment of your condition
- Possible additional investigations, such as X-rays or scans
- Presentation of various treatment options, which may include:
 - Medication
 - Physiotherapy
 - Injections
 - Surgery

RIGHT HIP OA WITH AVN COLLAPSE OF FEMORAL HEAD



SAME PATIENT AFTER UNCEMENTED HIP REPLACEMENT



HIP ARTHROSCOPY

1. To perform hip arthroscopy, surgeons begin by applying traction to the leg using a specialized distractor to create a small separation in the hip joint. This initial gap allows for insertion of a needle to equalize the joint's internal pressure with atmospheric pressure. Once achieved, the hip joint opens up. This said, accessing the hip joint can still be a challenge and sometimes impossible, even for seasoned surgeons.
2. After opening the hip, an arthroscope, about 5mm in diameter, is inserted. With a camera attached, the arthroscope provides a visual feed to a screen, which the surgeon primarily watches during the procedure.
3. Operating instruments are introduced through separate adjacent portals. These instruments vary in design and function, including manual cutters, powered shavers, burrs, and radiofrequency probes.
4. Traction applied across the hip permits access to the hip's central compartment, located between the femoral head (ball) and acetabulum (socket). This area contains the labrum, ligamentum teres, and much of the cartilage covering the ball and socket. After addressing the central compartment, the surgeon may access the peripheral compartment, which does not require traction. The ball is repositioned in the socket, and the hip is slightly bent to about 25 degrees, creating space for the arthroscope and instruments to enter and operate.
5. Hip arthroscopic procedures often involve both the central and peripheral compartments. Although these procedures can take longer than total hip replacement surgeries, they result in only a few small incisions. Despite the minimal external evidence of surgery, extensive work can be accomplished via hip arthroscopy.

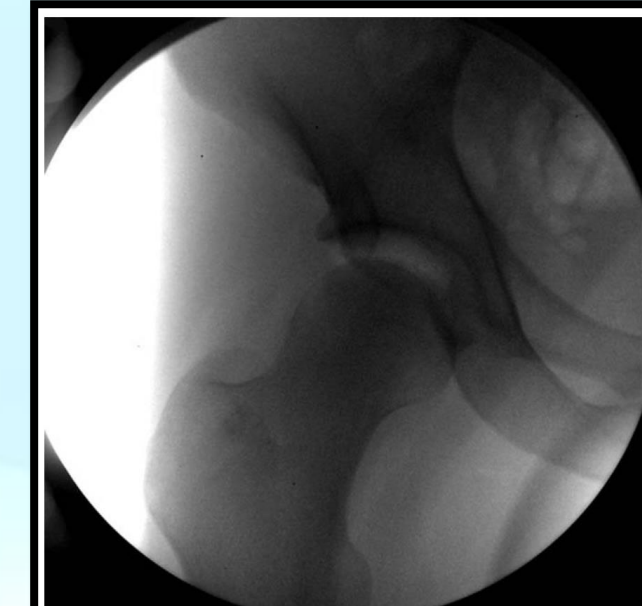


Figure 5 A vacuum sign in a distracted right hip.

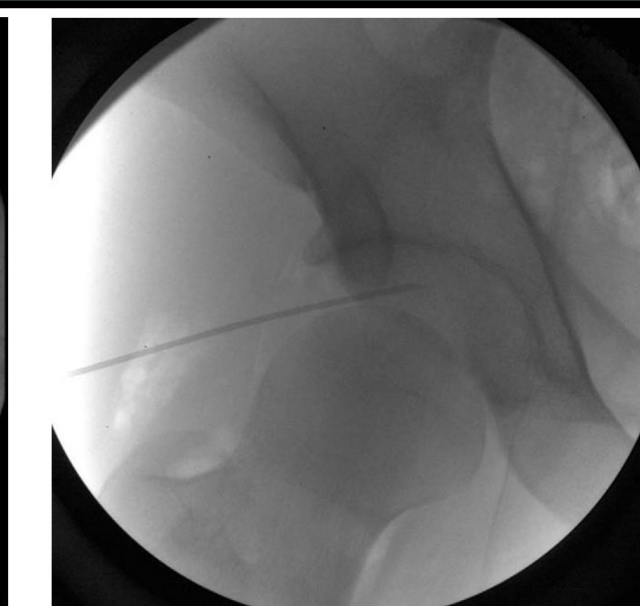


Figure 7 Capsular distension and further distraction using normal saline solution introduced under manual pressure.



Figure 21 Debridement and thermal shrinkage of the ligamentum teres under way using a flexible RF probe (Dyonics Eflex Ablator, Smith & Nephew, Andover, Massachusetts, USA).

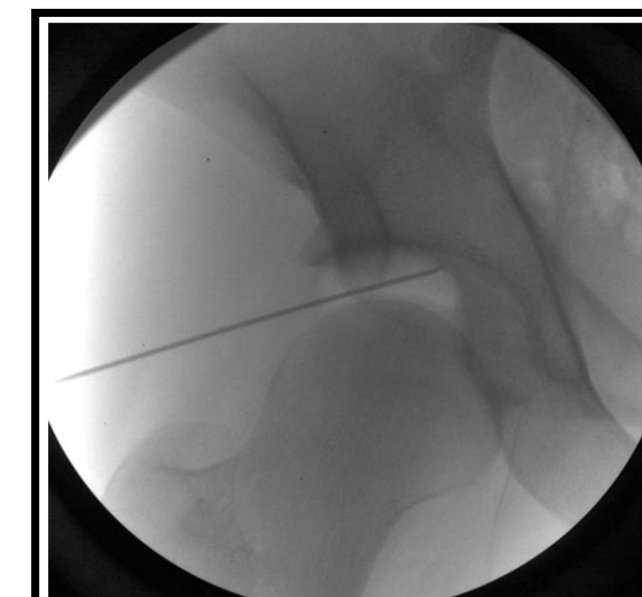
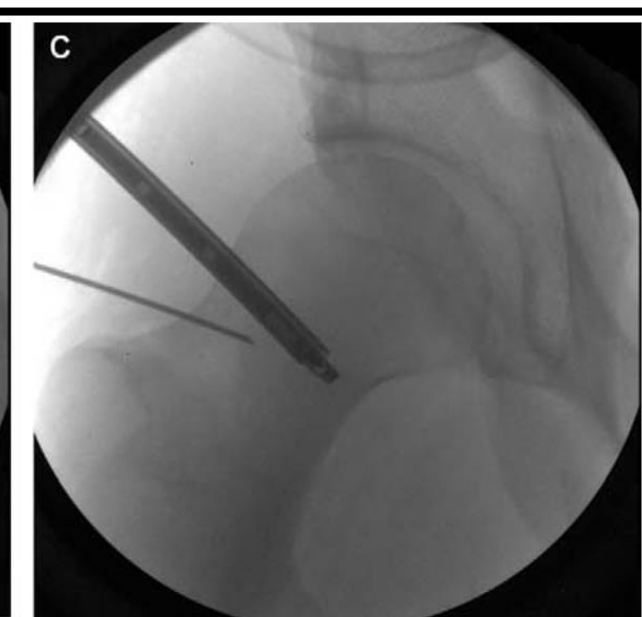
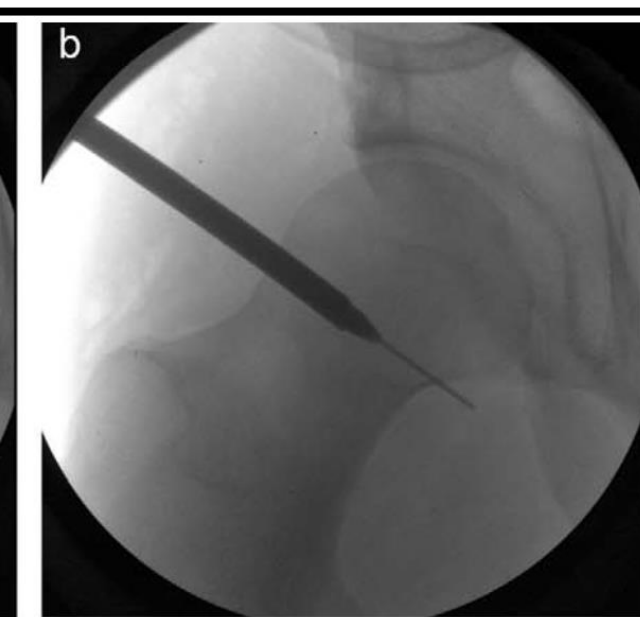
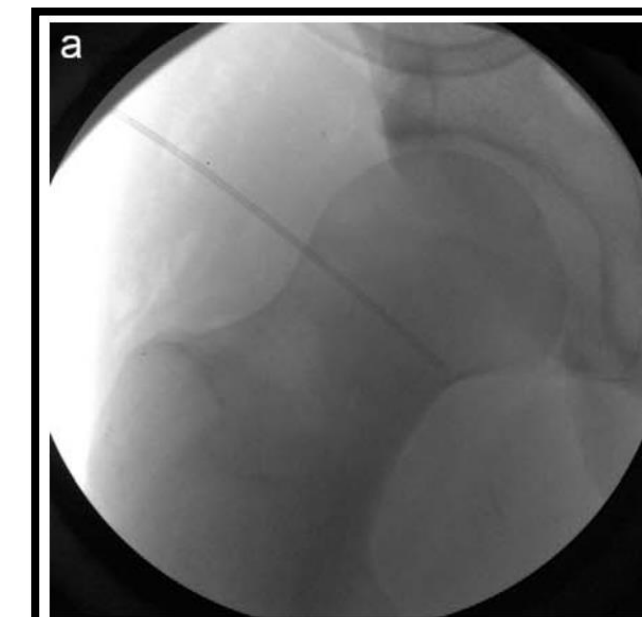


Figure 6 Loss of the vacuum seal allows further distraction without an increase in the traction force.

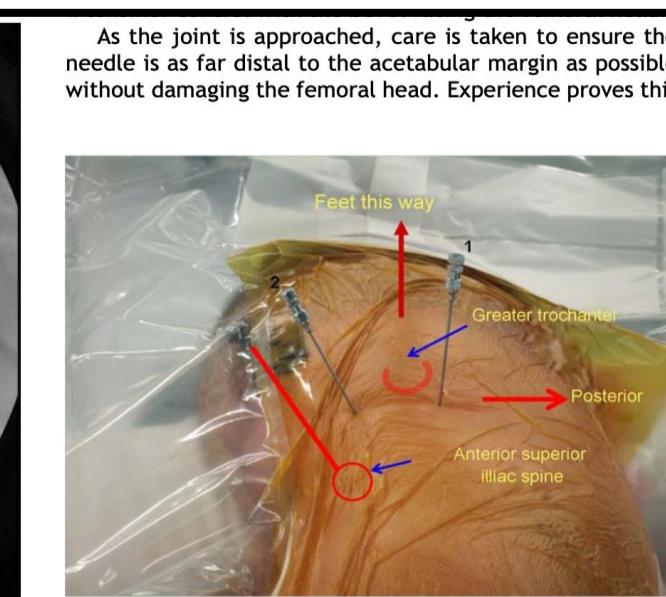


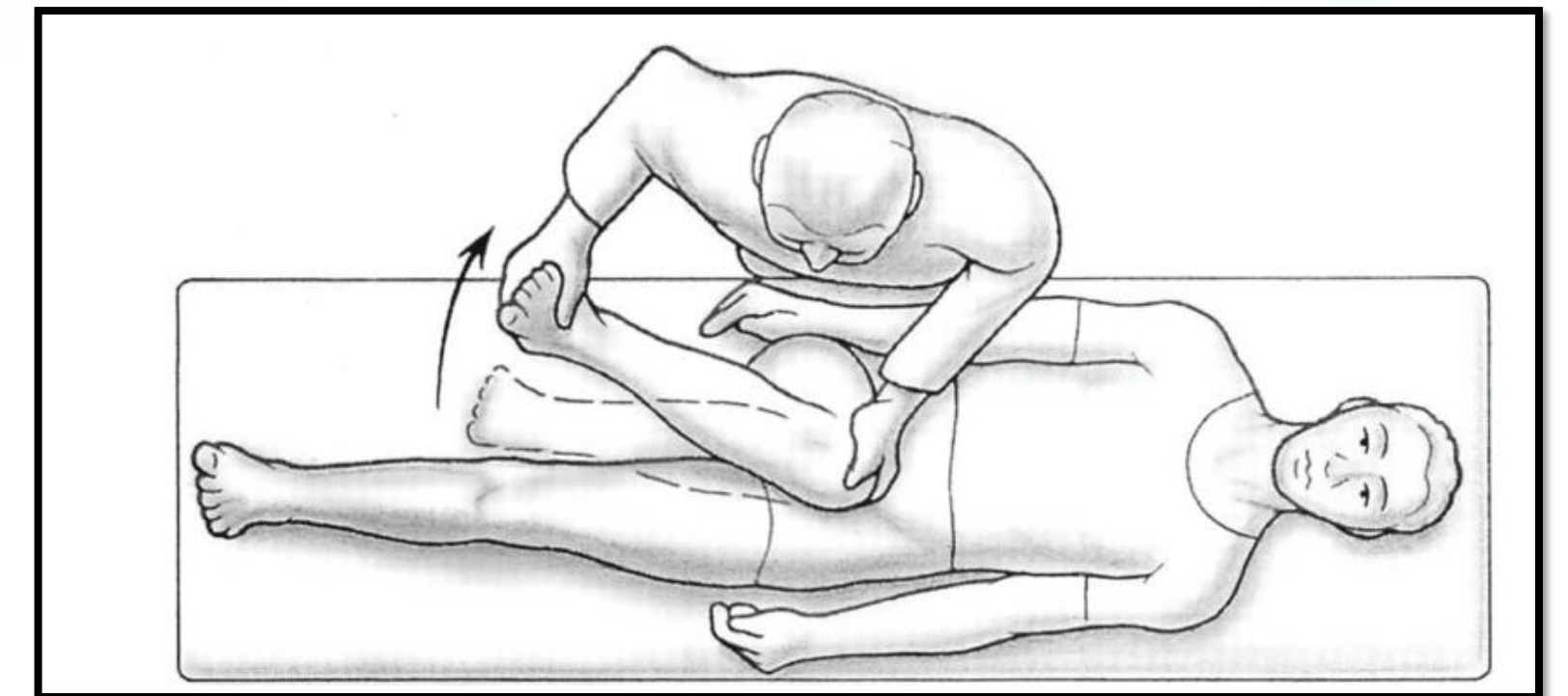
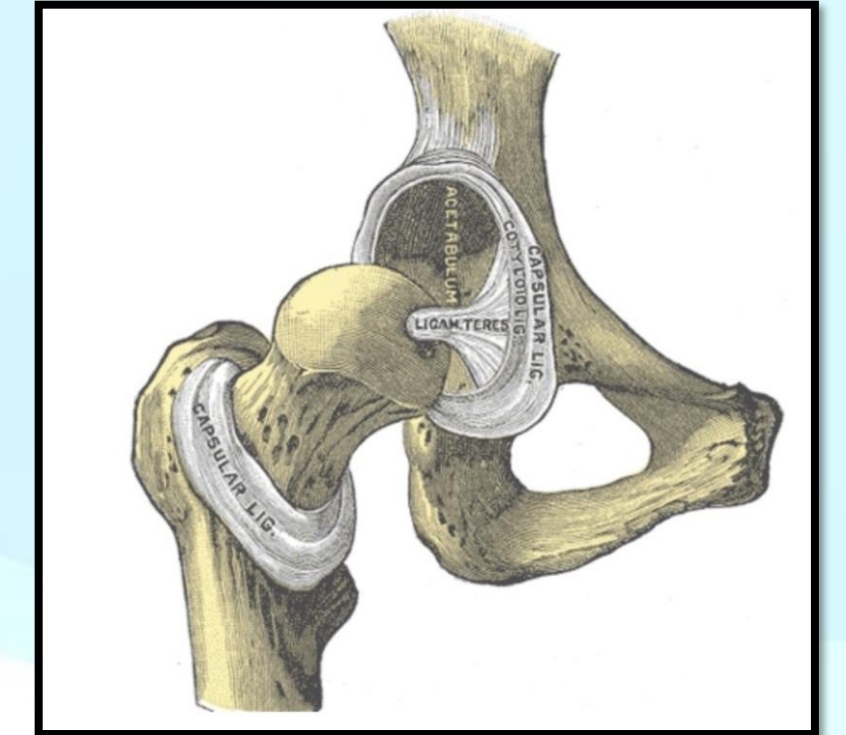
Figure 8 Surface markings together with the posterolateral (1) and anterolateral (2) entry points.

HIP ARTHROSCOPY-INDICATIONS

1. Impingement
2. Articular cartilage (gristle) problems
3. Labral injuries
4. Loose body retrieval
5. Synovitis (inflamed hip lining)
6. Torn ligamentum teres (major hip ligament tear)
7. Hip instability
8. Infection
9. Painful joint replacement or resurfacing
10. Avascular necrosis (blood supply problem to ball of hip joint)
11. Muscle injuries around the hip
12. Trochanteric bursitis (pain on the outside of the hip – usually in females)
13. Nerve release around the hip
14. Snapping hip
15. Iliopsoas tendonitis
16. Hip tumours
17. Hip fracture or hip dislocation
18. Foreign body retrieval (e.g. bullet)
19. Osteoarthritis
20. Diagnostic hip arthroscopy



C-Sign



Positive Flexion+ Adduction + Internal rotation (FADIR)Test

HIP ARTHROSCOPY- WHAT IS IMPINGEMENT (FAI)

HIP JOINT ANATOMY

- Ball and socket joint: acetabulum (socket) and femoral head (ball)
- Articular cartilage lines the surfaces for smooth movement
- Labrum: fibrocartilage rim providing stability and a seal

FAI CHARACTERISTICS

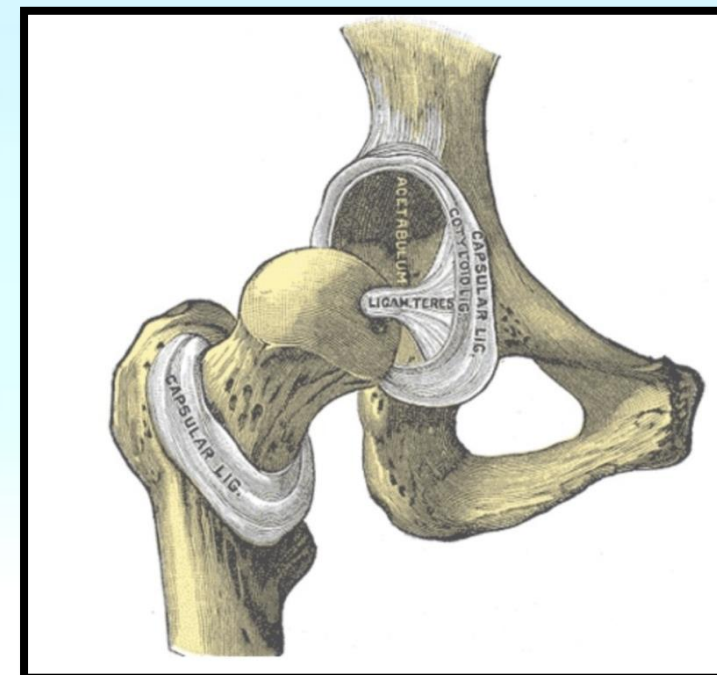
- Bone spurs develop around the femoral head and/or acetabulum, causing friction
- Can wear down cartilage and tear the labrum
- May lead to osteoarthritis (OA) over time

CAUSES AND SYMPTOMS

- Abnormal hip bone formation during childhood
- Symptoms include pain, stiffness, and limping
- Pain may be sharp or dull, mainly in the groin or outside the hip
- Pain often worsens with twisting, turning, and squatting



C-Sign



DIAGNOSIS

- X-rays confirm abnormal bone shapes and signs of OA
- MRI assesses damage to the labrum and cartilage

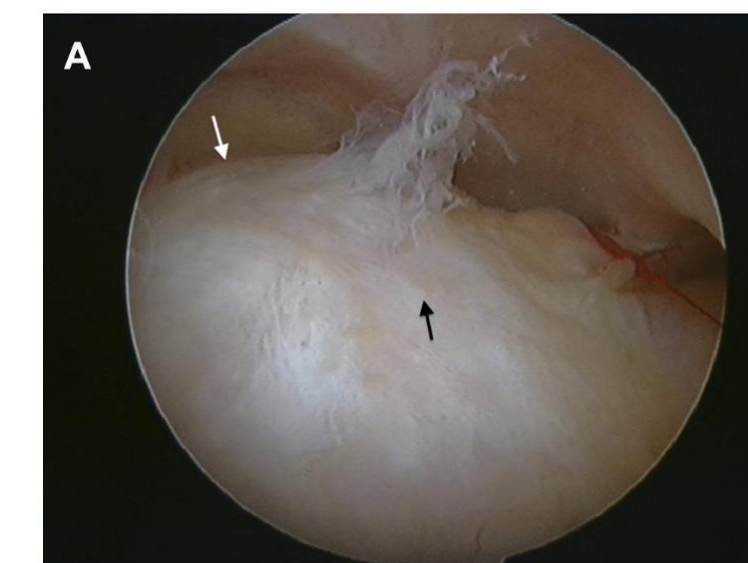
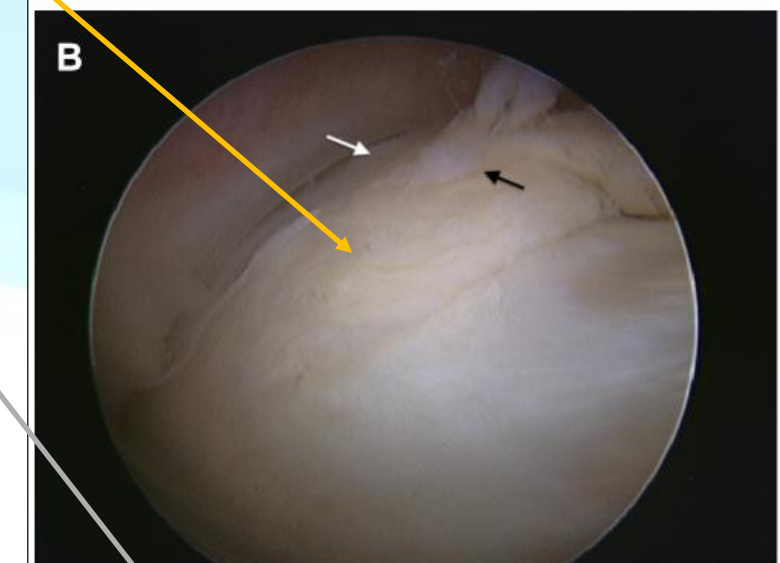
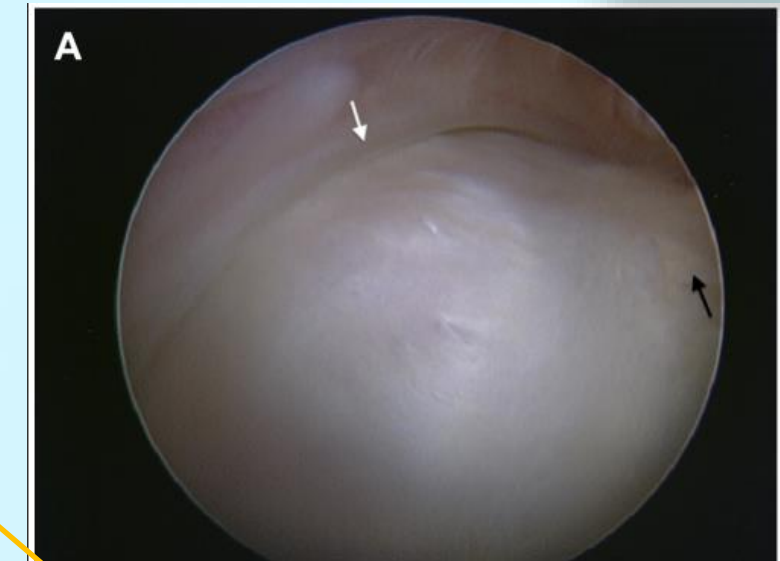
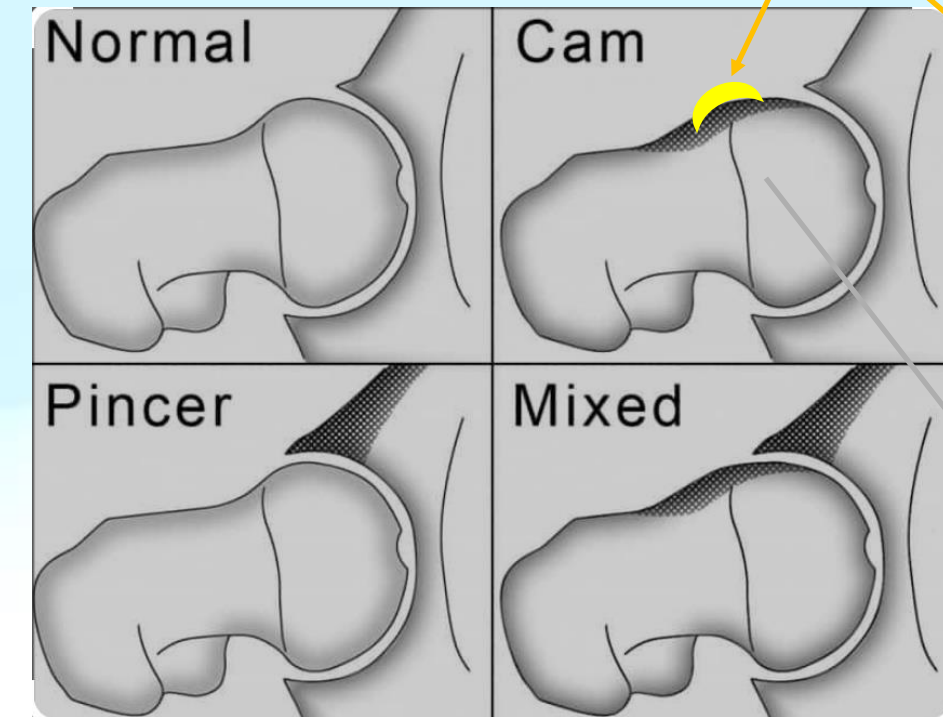
NON-SURGICAL TREATMENTS

- Non-steroidal anti-inflammatory drugs (NSAIDs)
- Activity modifications to avoid impingement
- Physiotherapy to improve hip motion and strengthen supporting muscles

SURGICAL TREATMENT

- Considered if conservative methods fail
- Involves repairing labrum/cartilage damage and removing bone spurs

Fatpad overlying head-neck junction



REFERENCE
HIPSCOPE IMAGES

PLOS ONE

OPEN ACCESS PEER-REVIEWED
RESEARCH ARTICLE
Fat Pad Entrapment at the Hip: A New Diagnosis
Naraka Jayasekera, Alessandro Aprato, Richard N. Villar
Published: February 26, 2014 • <https://doi.org/10.1371/journal.pone.0083503>

KNEE REPLACEMENT

Total knee replacement (TKR) is a surgical intervention in which the damaged or worn surfaces of the knee joint are surgically excised and substituted with artificial components.

The knee joint consists of three primary bones: the femur (thigh bone), the tibia (shin bone), and the patella (kneecap). Interposed between the femur and tibia are two menisci, which are soft cartilage structures that provide cushioning to absorb shock during movement. Conditions such as arthritis, injuries, or other joint ailments can deteriorate this cartilage, leading to severe pain, stiffness, instability, and challenges in daily activities. If non-surgical treatments do not alleviate knee symptoms, a doctor may suggest TKR.



SURGICAL PROCEDURE

- The primary aim of TKR surgery is to relieve discomfort and restore the knee's alignment and functionality.
- TKR is conducted under anaesthesia.
- The surgeon makes an incision in front of the affected knee or utilizes existing scars to access the knee joint.
- Damaged sections of the femur and tibia are excised using specialized instruments. Techniques such as standard jigs, computer navigation, patient-matched guides, and robotics may enhance the accuracy of the cuts.
- The femoral and tibial components are affixed to the femur, with or without the use of bone cement.
- A polyethylene insert, referred to as a spacer, is positioned between the new implants to facilitate smooth movement. This insert bears the body's weight and allows the femur to glide over the tibia, mimicking the function of original cartilage (meniscus).
- The new components for the femur and tibia are joined to create the new knee joint.
- To ensure smooth patellar movement over the new joint, the backside of the patella is typically modified to accommodate a plastic component, usually cemented in place.
- Following placement of all components, the surgeon tests the knee joint's range of motion.
- The aim is to achieve an aligned, stable, and balanced knee that allows for good movement and proper tracking of the patella.
- The entire joint is irrigated with a sterile saline solution before the knee is carefully closed in layers. A suction drain may be positioned, and the wound is subsequently dressed and bandaged.

GOALS AND OUTCOMES

- When executed effectively, TKR can achieve significant success. The objectives include pain elimination, restoration of pain-free movement, and a stable, aligned knee. Nevertheless, results can be less predictable compared to hip replacements. Current studies indicate that about 80% of TKR patients experience good to excellent outcomes, often referred to as the "forgotten knee." Approximately 15% may have moderate outcomes with some lingering issues like pain, stiffness, or swelling that remind them of the knee. Unfortunately, around 5% of individuals may have poor outcomes despite a technically successful surgery and favourable X-ray results.
- To maximize the likelihood of a successful outcome, thorough pre-surgery preparation and information for the patient are essential. Signing an informed consent form is a critical step, and attending a pre-admission clinic is necessary. Various measures are taken to minimize surgical risks and facilitate an uncomplicated post-operative recovery.

POST-OPERATIVE CARE

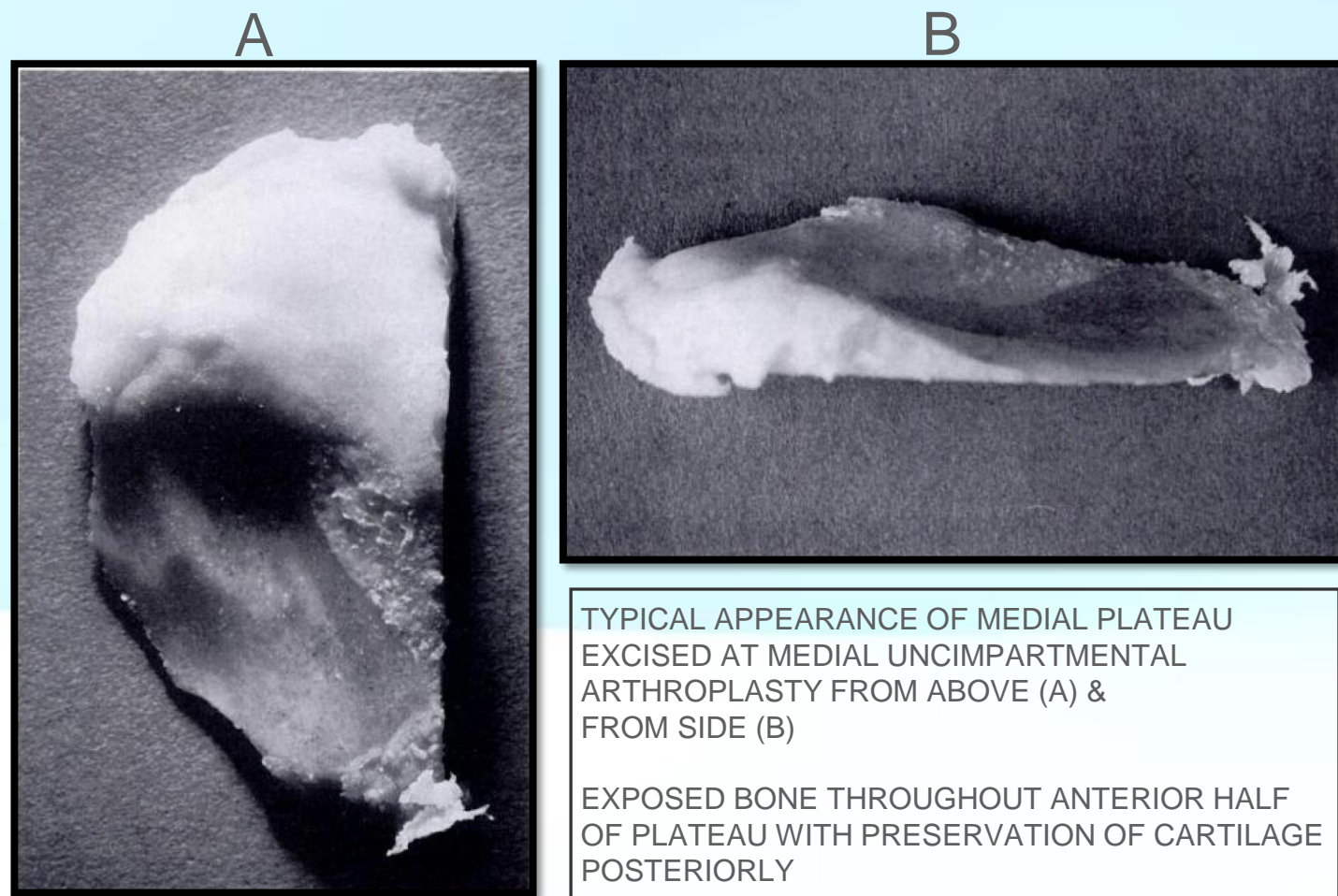
- The usual post-operative pathway includes:
- Regular monitoring of the patient.
- Management of pain using a multimodal approach.
- Administration of medications to prevent blood clots, infections, and excessive bleeding.
- Urinary catheters are typically retained for 1-2 days.
- Patients often remain in the acute care ward for 3-5 days.
- Specific guidelines regarding exercises and activities will be provided, starting on the surgery day, with physiotherapy support.
- Swelling in the knee and leg is common post-surgery; the use of ice and leg elevation is advised to alleviate swelling and discomfort.
- Measures like foot or calf pumps, early mobilization, and hydration will be employed to minimize the risk of blood clots.
- If progress is insufficient, additional rehabilitation may be arranged, either in an outpatient or inpatient setting.
- Adopting a healthy diet and refraining from smoking can foster healing.
- ***The patient plays a pivotal role in both pre-operative and post-operative care. Individuals must take responsibility for their health by adhering to guidelines provided and reporting any concerns to their healthcare provider. Early identification and treatment of complications can significantly enhance treatment success.***

RISKS AND COMPLICATIONS

- As with any significant surgical procedure, total knee replacement carries various risks and potential complications, including but not limited to:
- Knee pain
- Wound issues such as breakdown or oozing
- Stiffness in the knee
- Infections, both superficial and deep
- Blood clots (deep vein thrombosis or pulmonary embolism)
- Fractures around the knee joint
- Nerve and blood vessel injuries
- Numbness near the incision site
- Joint instability
- Clicking sensations
- Dislocation of the patella
- Wear of the plastic liner
- Loosening of the implant
- Bone loss due to wear debris

PARTIAL KNEE REPLACEMENT

Uni-compartmental knee replacement, also known as partial knee replacement, is a surgical procedure that involves replacing only the damaged compartment of the knee with an implant. The knee joint is divided into three compartments: the patellofemoral compartment (located at the front of the knee between the kneecap and the thigh bone), the medial compartment (on the inner side of the knee), and the lateral compartment (on the outer side of the knee joint). Typically, uni-compartmental replacements focus on either the inner or outer side of the knee, excluding the patellofemoral joint. A surgeon may suggest this surgery if non-surgical treatments such as medications, injections, and physical therapy have not alleviated the symptoms.



REFERENCE
White, S. et al. Anteromedial Osteoarthritis of the Knee. *The Journal of Bone and Joint Surgery [Br]*. 73-B:582-86, 1991.



OXFORD MEDIAL KNEE

OXFORD LATERAL KNEE

SELECTION CRITERIA

- Certain criteria must be met for a patient to qualify for uni-compartmental knee replacement, in addition to the standard contraindications for total joint replacement:
- Only one compartment is affected by arthritis (minor and painless patellofemoral arthritis is not a contraindication).
- The knee must be stable, with intact cruciate and collateral ligaments.
- There should be a good range of movement, allowing for no more than a 10-degree fixed flexion deformity and the ability to bend the knee beyond 100 degrees.
- The patient should have non-inflammatory arthritis (non-rheumatoid types).
- Candidates should not be obese.
- Pain should be localized to the arthritic compartment.
- There should be no extreme angular deformities.

PROCEDURE

- The procedure is conducted under anesthesia, with or without the use of a tourniquet. The steps include:
- A modest incision is made over the knee to access the joint.
- The knee is examined to determine if a partial replacement is appropriate.
- Only the damaged side of the knee joint is prepared by removing the meniscus and contouring the tibia and femur to fit the specifically sized implants.
- Special instruments are used to make precise cuts; in some cases, computer navigation may assist in assessing alignment.
- The knee is evaluated for balance, alignment, stability, and range of motion.
- The implants are either cemented or non-cemented, depending on the surgical plan.
- The incision is closed in layers.

GOALS AND OUTCOMES

- The main objectives of the surgery are to alleviate knee pain, realign or straighten the joint, and restore a functional range of motion, ultimately improving the patient's quality of life. Long-term outcomes following partial knee replacement are favorable, often comparable to those of total knee replacement surgeries.
- Thorough preparation for surgery, including informed consent and attendance at a pre-admission clinic, can significantly enhance patient outcomes. Various measures are taken to minimize surgical risks and facilitate a smooth post-operative recovery.
- Advantages
- Uni-compartmental knee replacement offers several benefits, including:
- Less soft tissue and bone removal, leading to quicker recovery.
- Shorter hospital stays.
- Reduced blood loss during surgery.
- Less postoperative pain and a lower requirement for pain medication.
- A better range of motion compared to total knee replacement.
- A more natural feeling in the knee joint.

POST-OPERATIVE CARE

- The post-operative care pathway generally involves:
- Ongoing monitoring of the patient.
- Pain management using a multimodal approach.
- Administration of medications to prevent blood clots, infections, and excessive bleeding.
- Urinary catheters typically remain in place for 1-2 days.
- Patients usually spend 3-4 days in the acute care ward.
- Specific guidance on exercises and activities will be provided, starting on the day of surgery, with physiotherapist assistance.
- Swelling in the knee and leg is common following surgery; ice application and leg elevation are recommended to minimize discomfort.
- Measures such as calf pumps, early mobilization, and adequate hydration will be utilized to mitigate the risk of clots.
- If recovery progresses slowly, additional rehabilitation options may be arranged, either in an outpatient or inpatient setting.
- Maintaining a healthy diet and avoiding smoking can promote healing.
- **Patients play a crucial role in their pre-operative and post-operative pathways. It is essential for them to take responsibility for their health by adhering to medical advice and communicating any concerns to their healthcare providers. Early detection and management of complications can enhance the success of the treatment.**

RISKS AND COMPLICATIONS

- As with any significant surgical procedure, uni-compartmental knee replacement carries potential risks and complications, including but not limited to:
- Progression of arthritis in untreated areas of the joint, leading to further pain.
- Ongoing knee pain.
- Wound complications, including breakdown or oozing.
- Stiffness in the knee joint.
- Infection (both superficial and deep).
- Blood clots (such as deep vein thrombosis or pulmonary embolism).
- Fractures around the knee joint.
- Nerve and blood vessel injuries.
- Numbness around the surgical scar.
- Joint instability.
- Clicking sensations.
- Dislocation of the patella.
- Wear of the plastic liner.
- Loosening of the implant.
- Bone loss due to detritus from wear.