PHYSIOTHERAPY IN SURGICAL CONDITIONS

[PT 300]

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LECTURE NOTES FOR 3rD GRADE BPT STUDENTS

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Physiotherapy in Surgical Conditions (Hip and Knee Replacement [Arthroplasty])

LECTURE OUTLINE

- Learning objectives
- History
- Principles and considerations
- Indications
- Prosthetic implant & types
- Types of incision techniques
- Contraindications
- Preoperative assessment and treatment
- Postoperative treatment/rehabilitation
- Discharge & home planning
- Complications
- Review
- Reading resources/additional materials

PHYSIOTHERAPY IN SURGICAL CONDITIONS

LEARNING OUTCOMES

At the end of this lecture, the students should be able to:

- Define and identify the indications for hip & knee replacement surgeries.
- Describe the preoperative physiotherapy for hip & knee replacement patients.
- Describe postoperative physiotherapy for hip & knee replacement patients.
- Recognize common postoperative complications & strategies to prevent them.

PHYSIOTHERAPY IN SURGICAL CONDITIONS

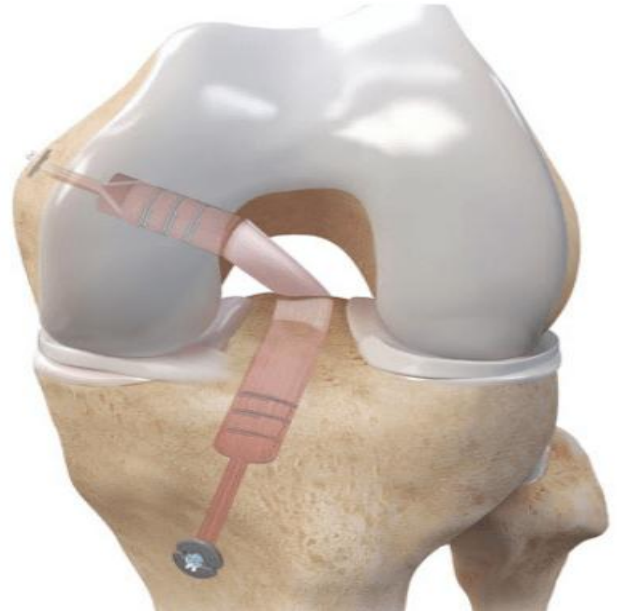
Hip and knee arthroplasty/replacement

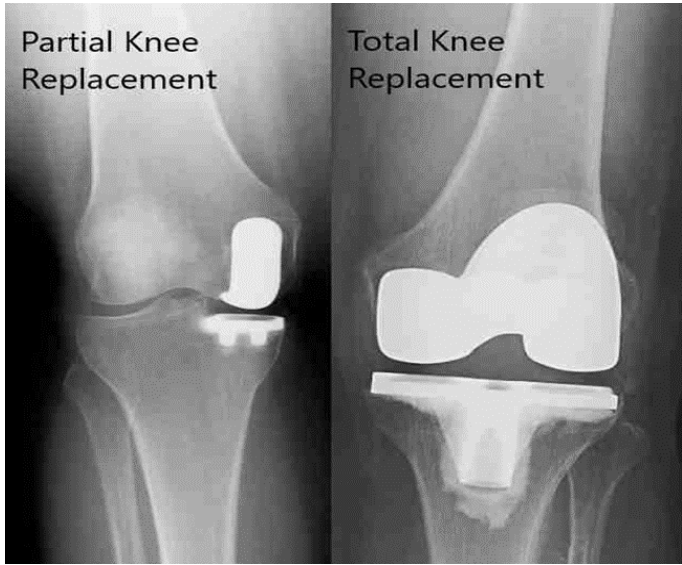
Definition

- **Arthroplasty** & **joint replacement surgery** are often used interchangeably

Arthroplasty surgery

- A broad term that refers to the surgical procedure aimed at **repairing, or reconstructing, or replacing** a joint to:
  - relieve pain
  - Improve function
  - Improve quality of life
- It can involve:
  - Partial arthroplasty/replacement/(hemiarthroplasty): resurfaces or replacement of only one area or part of the joint.
  - Total arthroplasty/replacement: resurfaces or replacement of the whole joint.



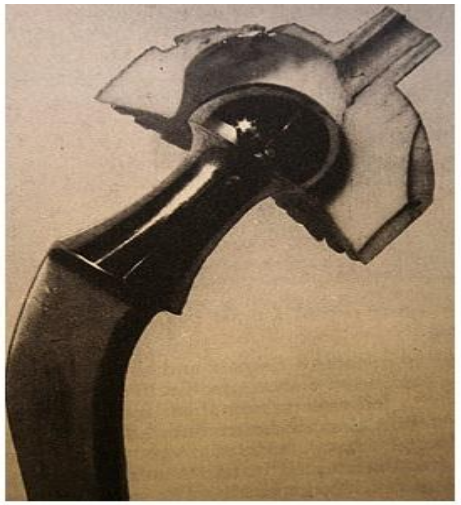


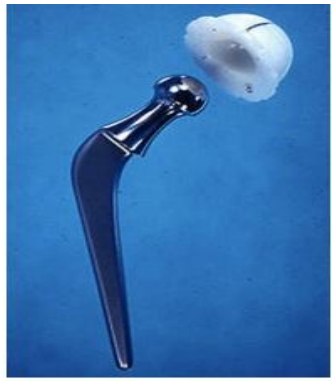
PHYSIOTHERAPY IN SURGICAL CONDITIONS

Hip arthroplasty/replacement

History

- Charnely (1979) revolutionized the management of the arthritic hip with the development of low-friction arthroplasty.
- His three major contribution to the evolution of hip replacement were:
  1. The concept of low-friction torque arthroplasty.
  2. The use of acryclic cement to fix the components.
  3. The introduction of high-density polyethylene as a bearing materials.





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Hip arthroplasty/replacement

Principles and considerations

- The prosthetic implant must be durable.
- Must permit extraordinary low-friction movement at the articulation.
- Must be firmly fixed to the skeleton.
- Must be inert & not provoke any unwanted reaction in the tissue.
- The prostheses are of various designs & may be fixed to the remaining bone by cement, press fit, or bone ingrowth.
- Selection of the prosthesis and fixation technique depends on patient's bone structure, joint stability, & other individual characteristics (e.g. age, weight, & activity level).

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Hip arthroplasty/replacement

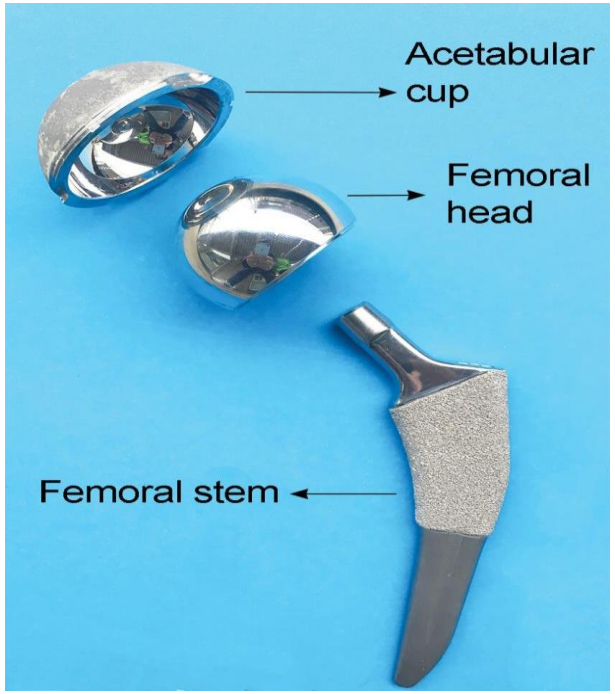
Indications

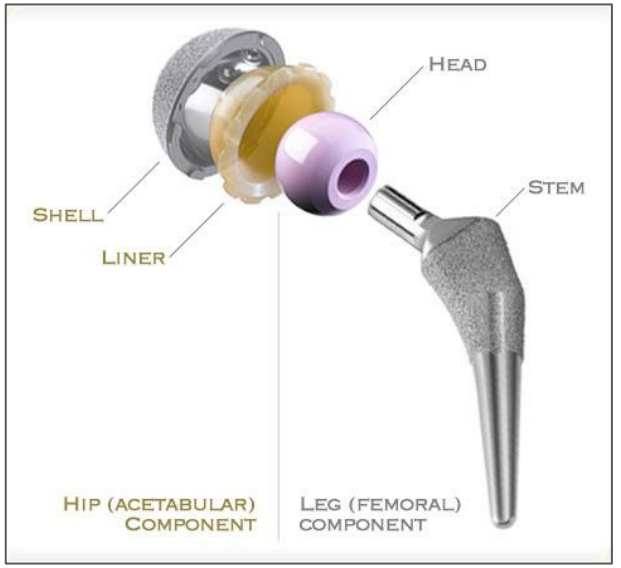
1. For patients with consistent pain & irreversibly damaged joints:
   - Severe osteoarthritis (most common), or rheumatoid arthritis
2. Selected fracture (femoral neck fracture).
3. Failure of previous reconstructive surgery (osteotomy, femoral neck fracture complication – nonunion)
4. Avascular necrosis [AVN])
5. Congenital hip diseases
6. Pathologic fractures from metastatic cancer
7. Joint instability

Hip arthroplasty/replacement

Prosthetic implant

- The prosthetic implant used in hip replacement consists of different parts:
  1. **Socket (cup):** often made up of 2 parts, an outer metalshell & inner smooth surface called a liner.
  2. **Ball (head):** made of stainless steel alloy or ceramic material
  3. **Stem:** made of stainless steel alloy & fixed into the femoral bone
- Options exist for different patients & indications.
- Correct selection of the prosthesis is important.





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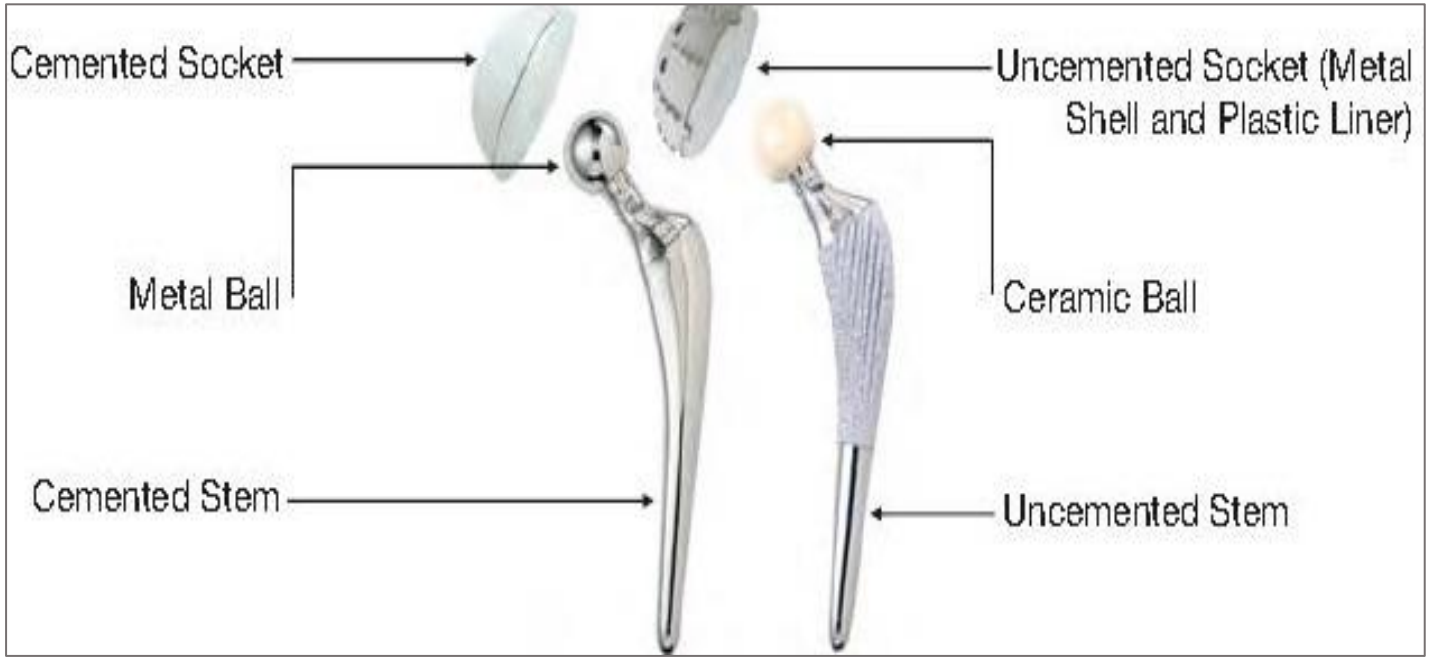
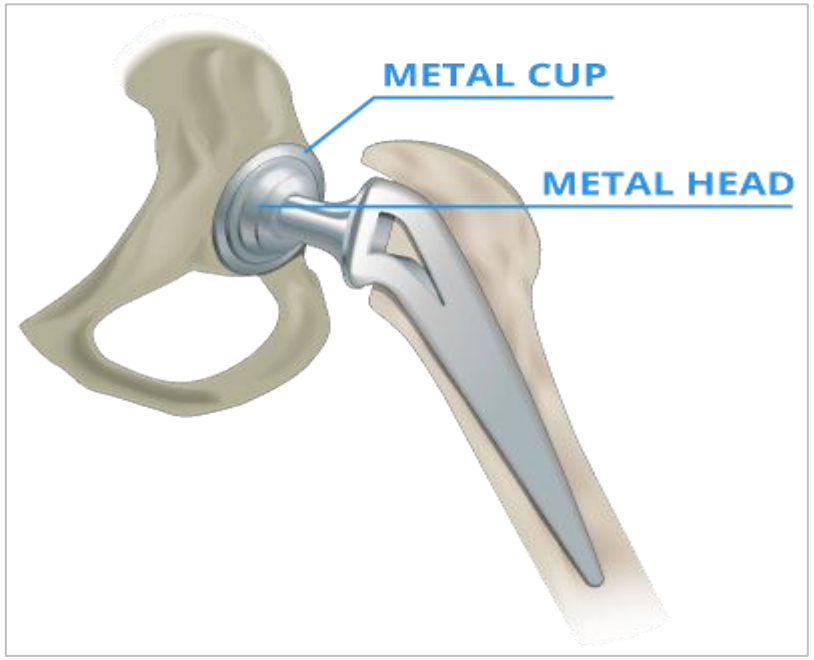
Hip arthroplasty/replacement

Types of implant /fixation

1. Cemented fixation: an implant fixed to the bone using acrylic bone cement.
2. Uncemented fixation: an implant fixed to the bone naturally by friction, shape & surface coating resulting in remodeling.
3. Metal-on-metal fixation: uses metal for both the femoral head and acetabular cup, offering durability but potentially causing metal wear & tissue damage over time.





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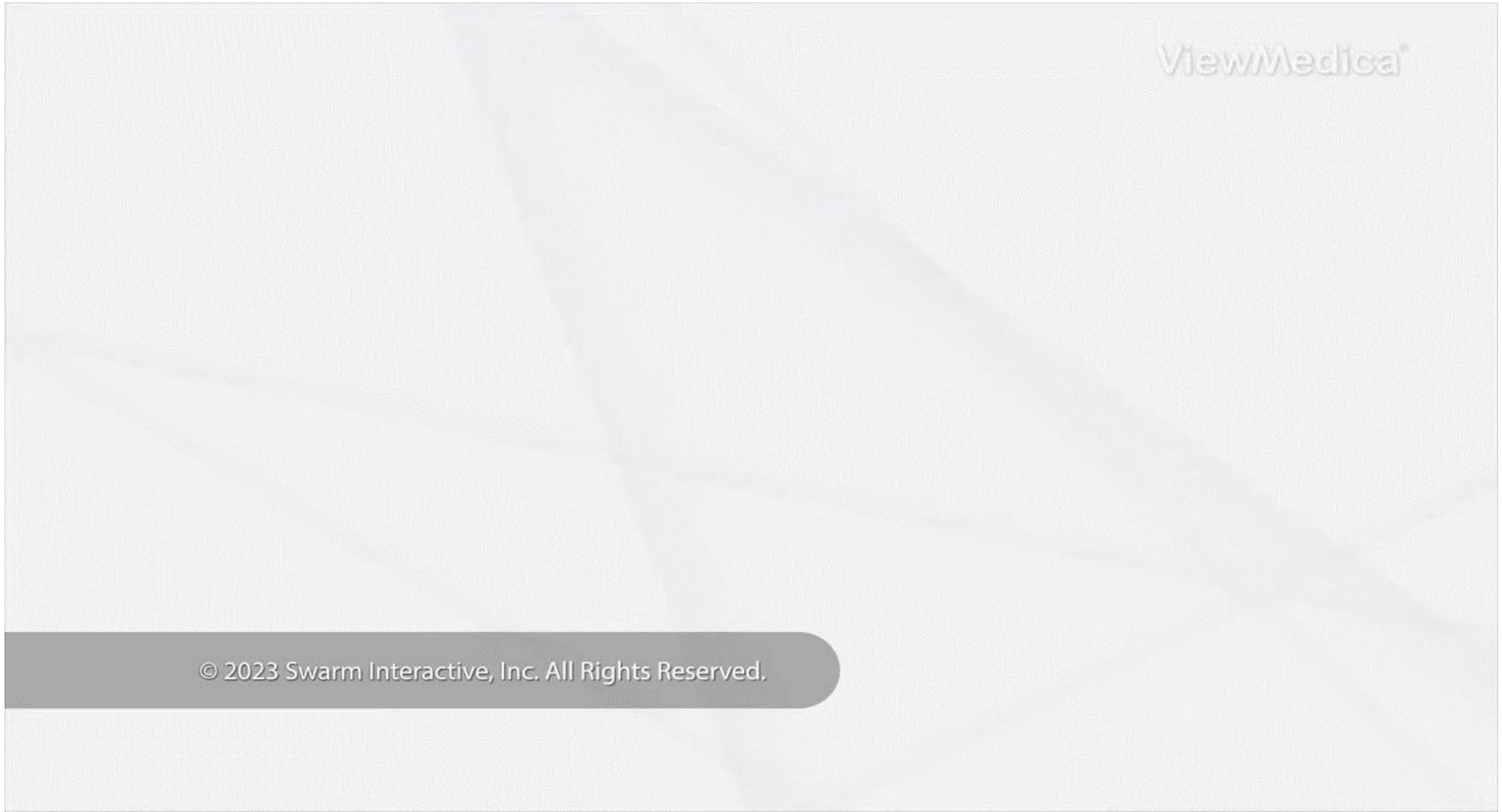
Hip arthroplasty/replacement

Surgical procedure



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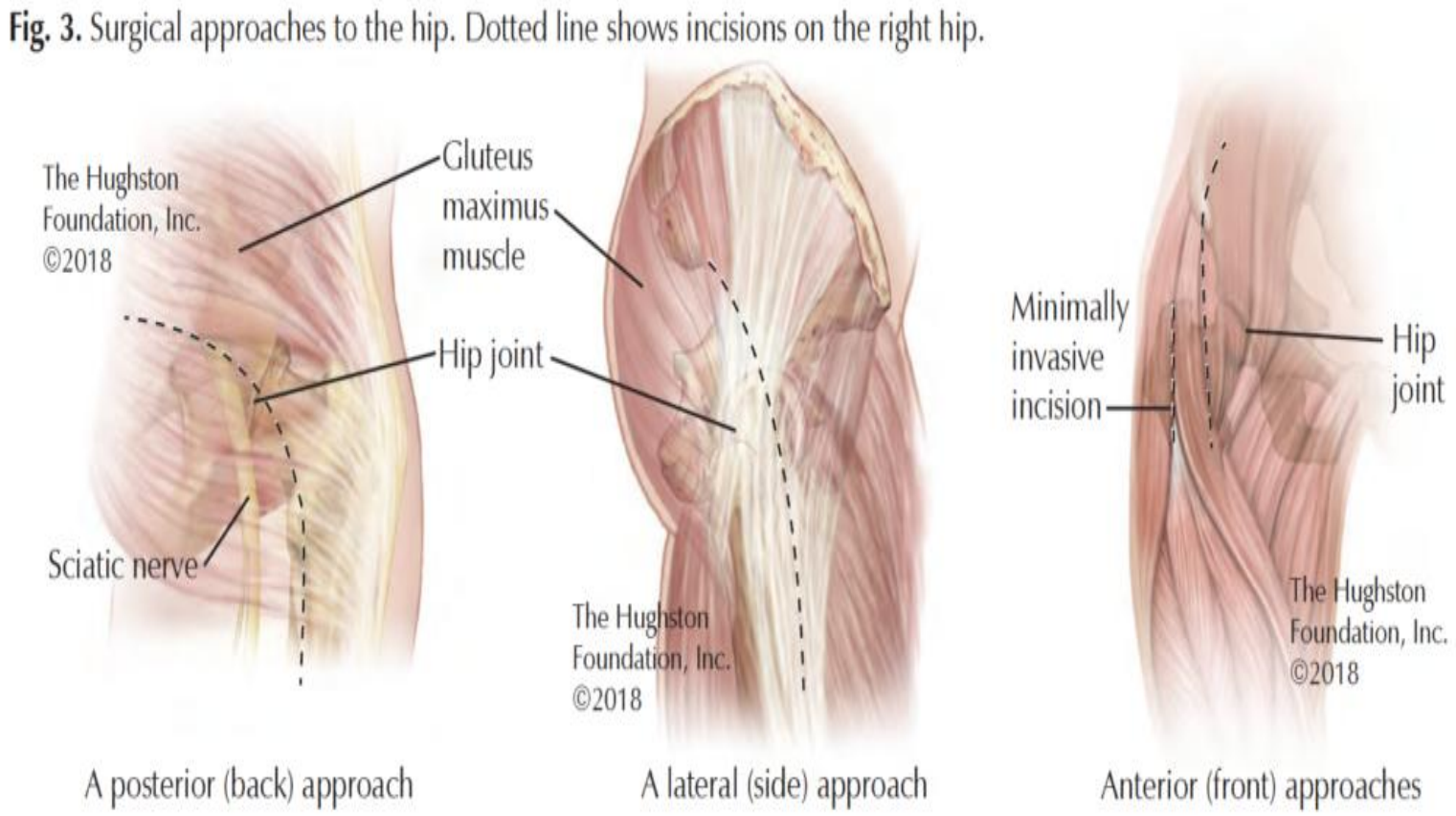
Hip arthroplasty/replacement

Surgical procedure

Hip arthroplasty/replacement

Types of incision techniques

1. Postero-lateral approach
2. Direct lateral approach
3. Anterior-lateral approach



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Hip arthroplasty/replacement

Contraindications

1. Recent or remote infection
2. Age < 60 years old, especially when alternative surgery is available
3. When pain is not severe
4. Severe arterial insufficiency
5. Severe obesity (morbid obesity)
6. Uncontrolled diabetes
7. Neurological disorders
8. Severe bone loss or deformity
9. Active cancer

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Hip joint partial/total replacement

Preoperative assessment

- Subjective history
- ROM
- Muscle power
- Mobility & function
- Cardiopulmonary endurance
- Psychosocial factors (e.g., anxiety, fear)

Preoperative treatment

- Education & advice: precaution, contraindications, rehabilitation process, goals & expectations, functional/ADL adaptions, safety principles, stop smoking
- Teaching bed exercises (transfer in & out of bed)
- Gait re-education with mobility assistive device (crutches vs walkers)
- Stair climbing and discharge planning.

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Hip joint partial/total replacement

Postoperative assessment

- Recheck preoperative assessment
- SEE DAY 1 OF SURGERY

Postoperative treatment

- Starts from day 1 with the aim reducing length of stay, reducing pain & improving function.
- Depends on the approach surgeon, specific protocol

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Hip joint partial/total replacement

DAY 0 OF SURGERY

1. Check postoperative instructions & Estimated Blood Loss (EBL) for impact on mobilization.
2. Ensure PCV is within the acceptable range (males = 38.3% 7 48.6%, females = 35.5% to 44.9%)
3. Monitor vital signs: Blood pressure, heart rate, SPO2, respiratory rate, temperature, & level of consciousness
4. Verify if an x-ray is needed for weight-bearing status.
5. Follow hip precautions based on surgical approach.
6. Assess hip wound & dressing
7. Observe for skin changes & swelling.
8. Alert the surgical team if there's significant bleeding.
9. Monitor for signs of pulmonary embolism, DVT, or nerve impairment; inform physician if neurological issues arise.
10. Watch for signs of hip dislocation (pain, leg length difference, rotation).
11. Assess pain level using NPRS or VAS before intervention.

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Hip joint partial/total replacement

DAY 1 POST SURGERY

1. Educate on muscular relaxation.
2. Review precautions/contraindications (based on pre-op physiotherapy session).
3. Bed exercises:
   - Circulation drills.
   - Upper limb exercises to improve CVS function.
   - Maintain ROM on non-operated leg for controlled hip mobilization.
   - Isometric quadriceps (progress to concentric VMO) & gluteal contractions.
   - Active-assisted (progress to active) heel slides, hip abduction/adduction.
   - Unilateral bridging on unaffected leg for bed mobilization.
4. Teach getting in/out of bed, on/off a chair, & sit-to-stand with a mobility assistive device.
5. Gait re-education with assistive device (as per weight-bearing status).
6. Sit in a chair for up to 1 hour.
7. Positioning when transferring back to bed.

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Hip joint partial/total replacement

DAY 2 AFTER SURGERY

1. Bed exercises as described above, progressing repetitions & decreasing assistance given to the patient.
2. Progression of distance mobilized and/or mobility assistive device.
3. Incorporate balance exercises if needed.
4. Sitting in chair

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Hip joint partial/total replacement

DAY 3 AFTER SURGERY

1. Bed exercises as described above, progressing repetitions & decreasing assistance given to the patient.

2. Progression of distance mobilised and/or mobility assistive device.
3. Stair climbing (at least 3, or as per home requirements)
4. Sitting in chair
5. Revision of precautions, contraindications & functional adaptions
6. Provide 6-week progressive resistive strengthening exercises (including stationary cycling) within surgical precautions).

NOTE:

- After 3 days, clients are discharged if they meet criteria.
- Physiotherapist & nurse assist with transfer to car, maintaining hip precautions.

PHYSIOTHERAPY IN SURGICAL CONDITIONS

Hip joint partial/total replacement

Discharge home criteria

1. Independent ambulation with an assistive device
2. Independent transfers
3. Independent ADLs
4. Stairs climbing without supervision
5. Appropriate home assistance (spouse, family, visiting nurses)

PHYSIOTHERAPY IN SURGICAL CONDITIONS

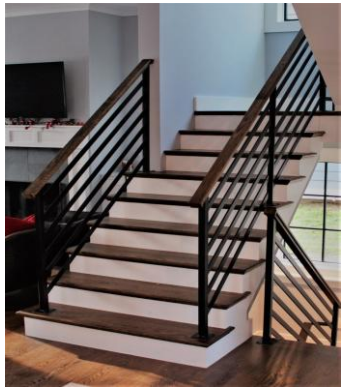
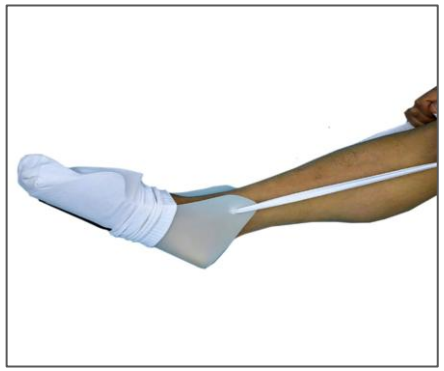
Hip joint partial/total replacement

Home planning

Home modifications & safety recommendations include:

1. Install safety bars/handrails in the shower, bath, and stairways.
2. Provide a stable chair with a firm seat and back for early recovery.
3. Use a raised toilet seat & stable shower bench/chair.
4. Supply a long-handled sponge, shower hose, dressing stick, sock aid, & long-handled shoehorn.
5. Provide a reacher for grasping objects without excessive hip bending.
6. Use firm pillows for sitting with knees lower than hips.
7. Remove loose carpets & electrical cords from walking areas.



PHYSIOTHERAPY IN SURGICAL CONDITIONS

Hip joint partial/total replacement

Complications

1. Infection (at the surgical site or deep infection)
2. Blood clots (DVT, pulmonary embolism)
3. Dislocation of the hip implant
4. Fractures (bone fractures during or after surgery)
5. Nerve damage (e.g., sciatic nerve injury)
6. Blood loss (excessive bleeding during or after surgery)
7. Joint stiffness (reduced ROM)
8. Wear & tear of the implant (implant failure or loosening)
9. Hip implant misalignment (malpositioning of the implant)
10. Anesthesia complications (e.g., allergic reactions, breathing problems).
11. Pressure sores (due to immobility post-surgery).
12. Leg length discrepancy (uneven length of the operated leg).
13. Muscle weakness (due to prolonged immobility).
14. Cardiovascular complications (heart-related issues).
15. Delayed wound healing or poor wound closure.

QUESTIONS AND COMMENTS

REVIEW

OTHER READING SOURCES

TEXT

1. *O'Shea, J. (2019). Principles of physiotherapy in surgery and rehabilitation. Cambridge University Press.*
2. *Dutton, M. (2017). Orthopaedic examination, evaluation, and intervention (3rd ed.). McGraw-Hill Education.*

THANKS FOR LISTENING