PHYSIOTHERAPY IN SURGICAL CONDITIONS

[PT 300]

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LECTURE NOTES FOR 3rD GRADE BPT STUDENTS

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TISHK INTERNATIONAL UNIVERSITY

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Physiotherapy in Surgical Conditions (Total Knee Replacement [TKR])

LECTURE OUTLINE

- Learning objectives
- Definitions/indications/goals
- Survival rates
- Brief anatomy of the knee
- Surgical procedures/ 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 and contraindications of TKR.
- Know the procedure and types of fixation involved in TKR
- Describe the preoperative & postoperative physiotherapy assessment for TKR
- Describe preoperative & postoperative physiotherapy treatment for TKR
- Recognize common early & late postoperative complications of TKR

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Total knee replacement/arthroplasty

Definition:

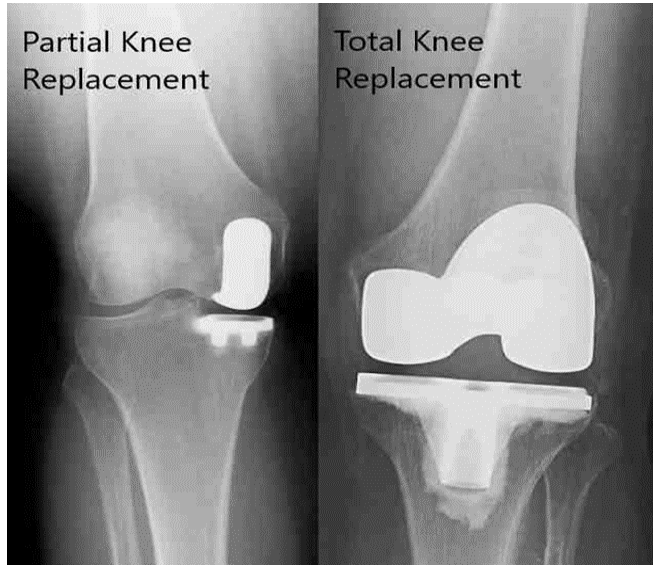
- TKR involves replacing damaged knee joint surfaces (femur, tibia, patella) with prosthetic components to relieve pain & restore function.

Indications:

- Common indications include:
  - Severe osteoarthritis (80% of cases)
  - Rheumatoid arthritis
  - Post-traumatic arthritis, or avascular necrosis

Goals of TKR:

  - Pain relief
  - Correction of deformities (e.g., varus/valgus), and
  - Restoration of mobility



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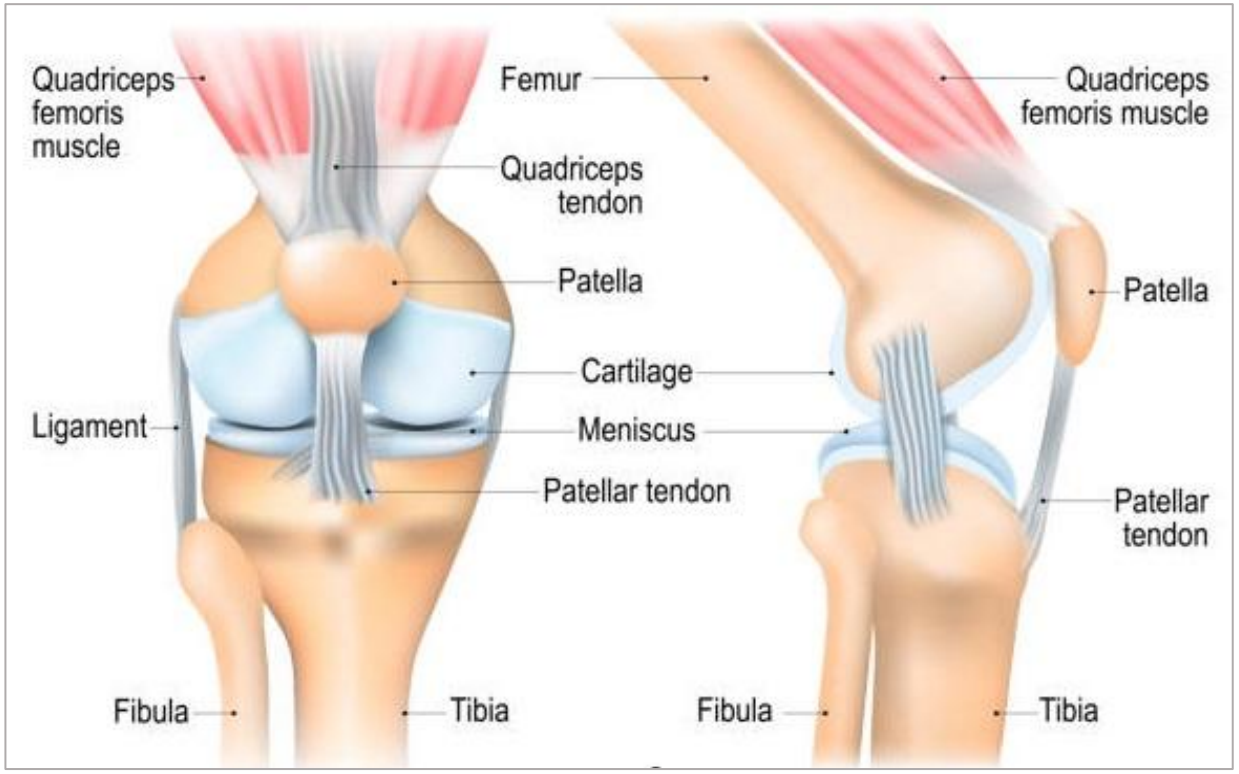
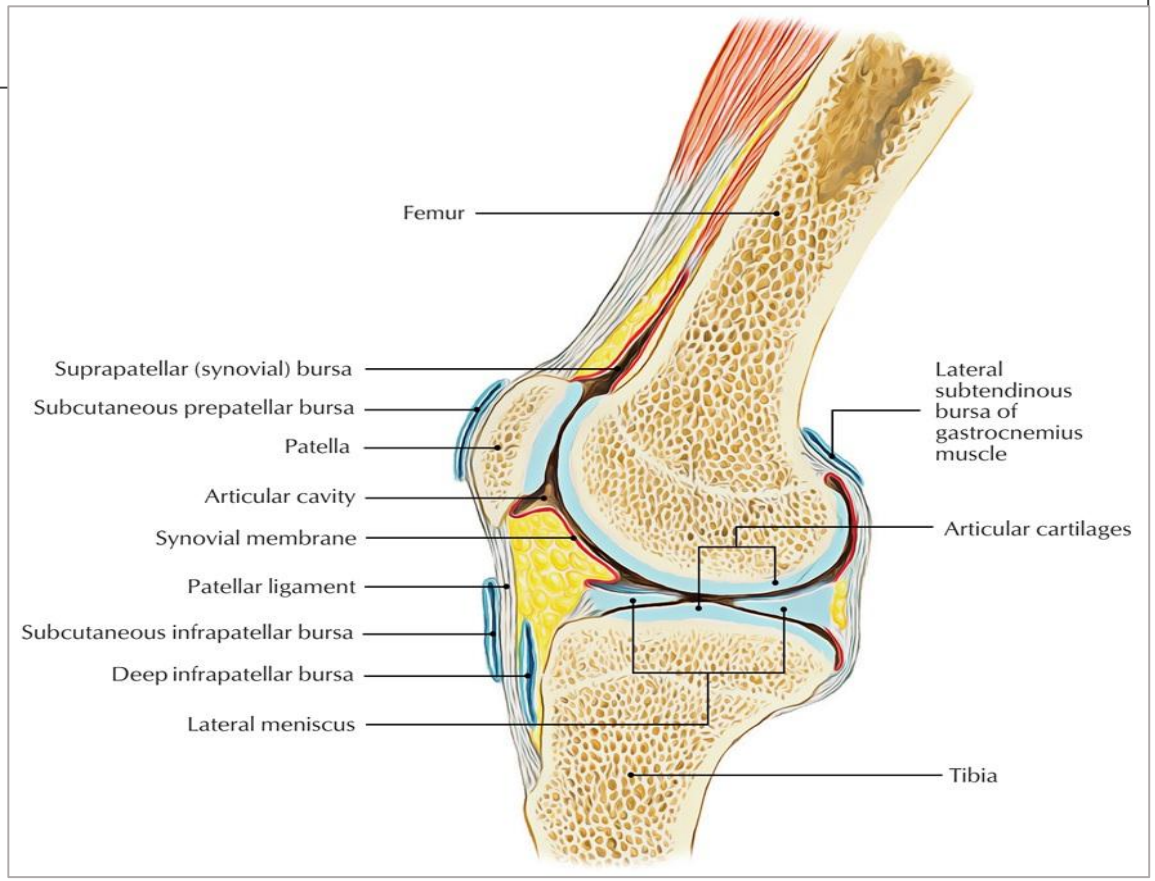
Total knee replacement/arthroplasty

Survival rates of TKR

- Prosthesis survival rates are:
  - ~95% at 15 years, declining to ~82% by 23 years.

Brief anatomy of the knee





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Total knee replacement/arthroplasty

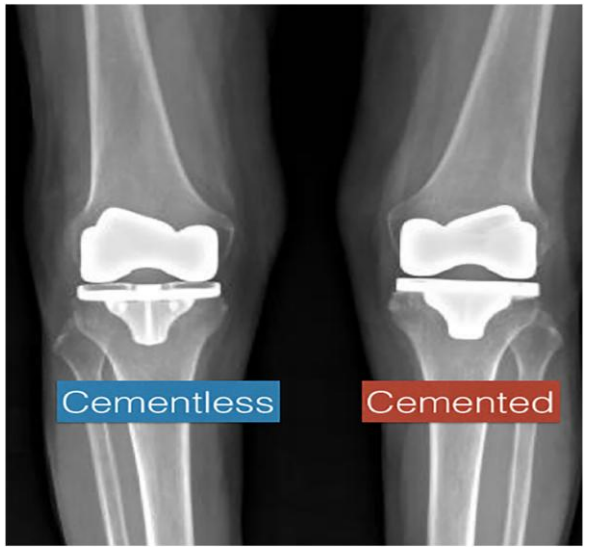
Surgical procedure

Steps:

1. Incision (8–12 inches) & exposure of the knee joint
2. Resection of damaged bone/cartilage
3. Implantation of femoral (metal), tibial (metal/plastic), & patellar (plastic) components.

Fixation:

1. **Cemented**:
   - Bone cement is used to bond the prosthetic components to the bone.
   - Immediate stability (90–95% success at 10 years) & suitable for patients with weaker bones.
2. **Non-cemented**:
   - Implant fixed to the bone naturally by friction.
   - Long-term durability & ideal for younger or active individuals.



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Total knee replacement/arthroplasty

Surgical procedure

Special consideration:

- **Ligament balancing**:
  - Process of adjusting the soft tissues (ligaments & tendons) around the knee to achieve equal tension on both the medial & lateral sides of the joint.
  - Critical for restoring joint stability & alignment

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Surgical procedure

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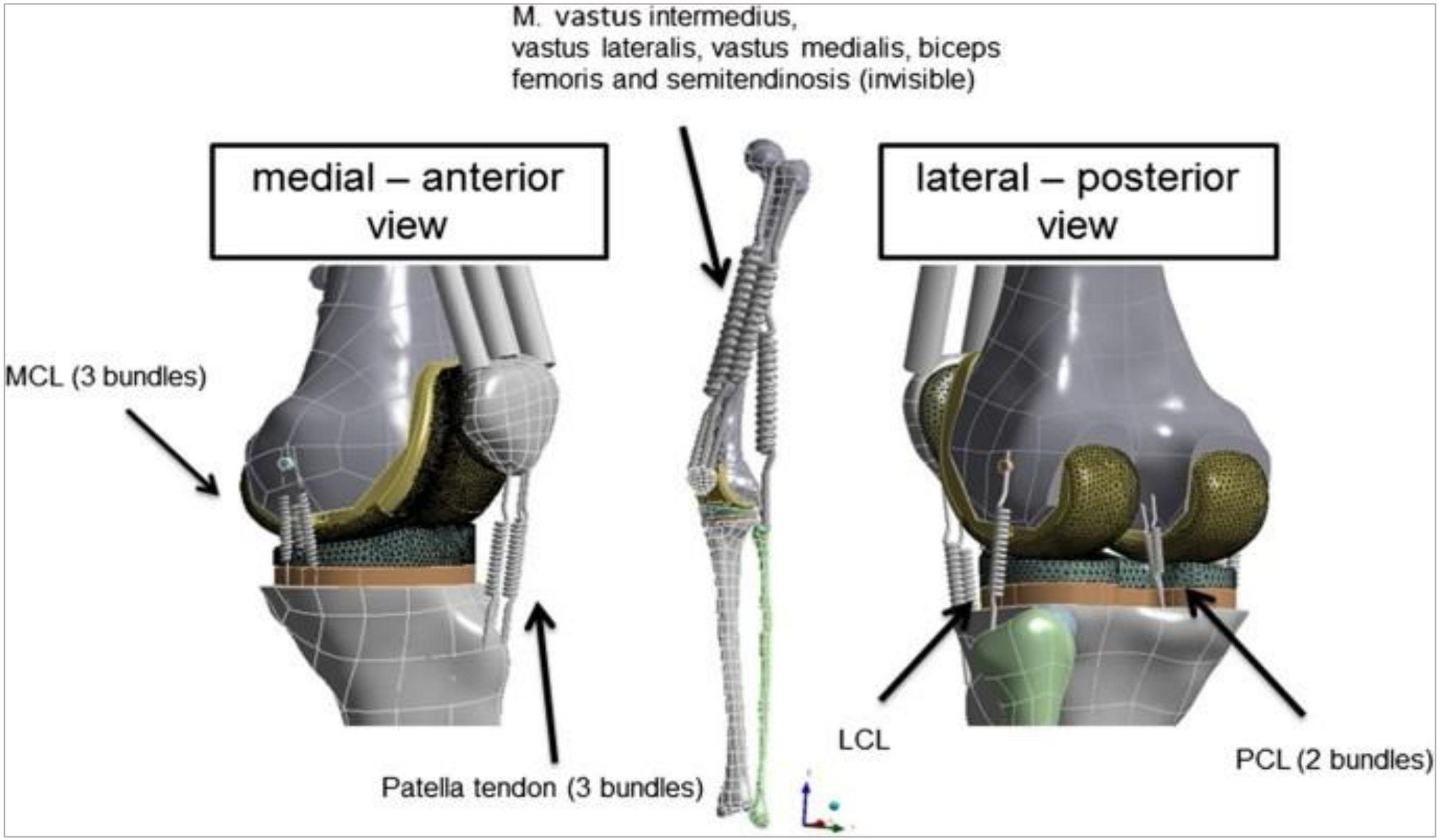

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Total knee replacement/arthroplasty

Contraindications

1. Active or chronic 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

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Total knee replacement/arthroplasty

Preoperative assessment

- Subjective history
- ROM
- Muscle power (quadriceps & hamstrings)
- 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)
- Quadriceps/hamstring strengthening
- Gait re-education with mobility assistive device (crutches vs walkers)
- Stair climbing and discharge planning.

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Postoperative assessment

- Recheck preoperative assessment

Postoperative treatment

NB: Depends on the approach surgeon, specific protocol

Phase 1 (Days 1–7):

- Pain/swelling control (ice, compression, elevation).
- Bed exercises: heel slides, SLR, ankle pumps, quad, adductor, & gluteal sets.
- Weight bearing (based on the surgeon instructions): toe-touch, partial, or full.
- Gait training with assisted devices e.g. walker, crutches, progress to cane.

Pneumatic compression device

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Total knee replacement/arthroplasty

Phase 2 (Week 2–6):

- Target ROM: 90° flexion by week 2, 105° by week 6.
- Strengthening: Mini-squats, step-ups, resistance bands.

Phase 3 (Week 6–12):

- Advanced balance/proprioception (BAPS board, single-leg stands).
- Transition to unaided walking

Long-term rehabilitation (>12 weeks):

- Exercise:
  - Low-impact activities (swimming, cycling), avoid running/jumping
- Patient education:
  - Weight management,
  - Adherence to home exercises, &
  - Annual follow-ups .

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Discharge home criteria

1. Weight-bearing as tolerated
2. Adequate/functional ROM:
3. Independent ambulation with an assistive device
4. Independent transfers
5. Independent ADLs
6. Stairs climbing without supervision
7. Appropriate home assistance (spouse, family, visiting nurses)

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Complications

Early complications:

1. Infection (<1%),
2. DVT (15%)
3. Nerve injury (1–2%).
4. Wound dehiscence (opening of the surgical site) or delayed wound healing.
5. Dislocation of prosthesis
6. Instability (a sensation of the knee buckling or giving way, often due to incorrect alignment of implant)

Late complications:

1. Prosthesis loosening (2% at 5 years)
2. Knee stiffness or scar tissue formation
3. Osteolysis (bone degradation from wear particles)

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