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Knee Replacement *Surgery*

Partial (Unicompartmental) vs. Total Knee Arthroplasty — perioperative nursing care, complication recognition, and patient teaching for clinical judgment.

MUSCULOSKELETAL

PERIOPERATIVE

ORTHOPEDIC

ADULT HEALTH

TKA · Total Knee

Replaces **all three compartments** (medial, lateral, patellofemoral). Indicated for advanced OA/RA affecting the whole joint. Longer recovery, larger incision, greater blood loss.

VS

UKA · Partial Knee

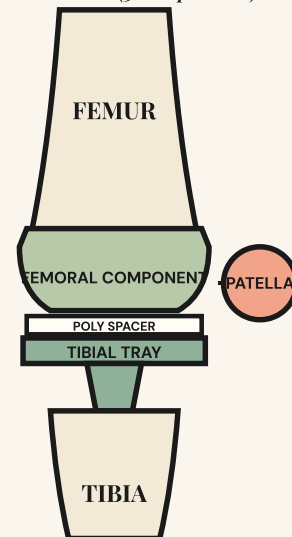
Replaces **only the damaged compartment** (usually medial). Preserves ligaments & healthy bone. Smaller incision, faster recovery, less blood loss — but limited to localized disease.

1 Definition & Overview

What it is

- ◆ **Knee arthroplasty** = surgical replacement of arthritic knee joint surfaces with metal & polyethylene prosthetic components.
- ◆ **TKA (Total)**: resurfaces distal femur, proximal tibia, and often patella — the gold standard for end-stage tri-compartmental disease.
- ◆ **UKA (Partial)**: resurfaces only the diseased compartment; cruciate & collateral ligaments preserved.
- ◆ **Indications**: end-stage osteoarthritis (OA), rheumatoid arthritis (RA), post-traumatic arthritis, severe pain unrelieved by conservative therapy, & deformity (varus/valgus).
- ◆ **Why it matters**: one of the most common elective surgeries in older adults — perioperative DVT, infection, and bleeding are leading test-plan complications.

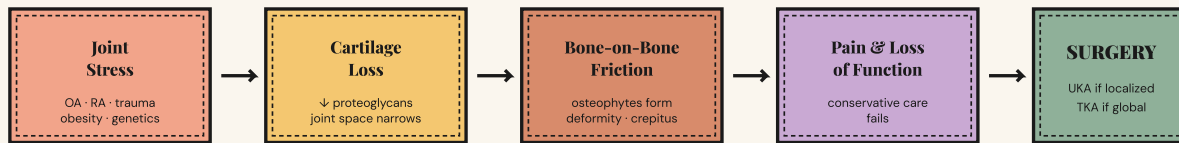
TKA Prosthesis (3 components)



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Pathophysiology

From cartilage erosion → bone friction → prosthetic replacement



Goal of surgery: relieve pain · restore alignment · improve ROM & function

Conservative therapy must be exhausted first (NSAIDs, PT, weight loss, injections)

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Signs & Symptoms

Pre-Op Indications

- ◆ **Severe chronic knee pain** unrelieved by NSAIDs, PT, weight loss, or steroid injections
- ◆ **Limited ROM** & stiffness (esp. morning stiffness)
- ◆ **Joint deformity** — varus (bow-leg) or valgus (knock-knee)
- ◆ **Crepitus** on movement; grinding sensation
- ◆ **Impaired ADLs** — climbing stairs, rising from a chair, walking distances
- ◆ **Imaging:** joint-space narrowing, osteophytes, subchondral sclerosis on X-ray

Normal Post-Op Expected

- ◆ Surgical pain (controlled by PCA/multimodal)
- ◆ Mild swelling & warmth at incision
- ◆ Serosanguinous drain output (Hemovac/JP)
- ◆ Low-grade temp $\leq 100.4^{\circ}\text{F}$ (atelectasis early)
- ◆ Bruising along thigh/calf (gravity)
- ◆ Limited active flexion (CPM advances ROM)

RED FLAG

Post-Op Complications — recognize early:

- **DVT/PE** — sudden unilateral calf pain, swelling, warmth; *dyspnea, chest pain, $\downarrow\text{SpO}_2$, tachycardia* = PE
- **Infection** — fever $>101^{\circ}\text{F}$, purulent drainage, increasing erythema/warmth, $\uparrow$ WBC
- **Hemorrhage** — drain $>100\text{ mL/hr}$, $\downarrow$ BP, $\uparrow$ HR, pallor, falling H&H
- **Compartment syndrome** — *pain out of proportion*, pallor, paresthesia, pulselessness, paralysis (5 P's)
- **Fat embolism** (first 72 hr) — dyspnea, confusion, petechiae on chest/axilla
- **Prosthetic dislocation** — sudden pain, deformity, inability to move joint
- **Peroneal nerve injury** — foot drop, $\downarrow$ sensation on dorsum of foot

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Priority Nursing Interventions

Pre-Op

- ◆ **Assess baseline:** ROM, gait, neurovascular status of both legs, skin integrity
- ◆ **Screen for infection** — dental, UTI, skin lesions delay surgery
- ◆ **Hold anticoagulants/NSAIDs** per protocol (warfarin, ASA usually held 5–7 days)
- ◆ **Teach** incentive spirometry, ankle pumps, quad sets, log-rolling
- ◆ **Type & crossmatch** — TKA blood loss can be significant
- ◆ **Mark surgical site** with client; verify consent & allergies

Immediate Post-Op (ABCs first)

- ◆ **Airway/Breathing:** O₂, IS q1h, monitor SpO₂ — fat embolism risk
- ◆ **Circulation:** VS q15min × 4, then q30min × 2, then q1h
- ◆ **Neurovascular checks q1–2h** — 5 P's distal to surgical site
- ◆ **Pain** — PCA, multimodal (acetaminophen + opioid + nerve block)
- ◆ **Drain** — assess output q4h, empty when ½ full, maintain suction
- ◆ **Positioning:** operative leg in *neutral extension* — **NO pillow under knee**

VTE Prophylaxis (Critical)

- ◆ **Anticoagulation** — enoxaparin, apixaban, rivaroxaban, or warfarin per protocol
- ◆ **SCDs** on bilateral lower extremities when in bed
- ◆ **Early ambulation** — often day of surgery or POD #1
- ◆ **Ankle pumps** & foot circles q1h while awake
- ◆ **NEVER massage** calves — can dislodge clot
- ◆ Monitor for sudden calf pain, asymmetric swelling, +Homan's sign (unreliable but documented)

Mobility & Recovery

- ◆ **PT consult** POD #1 — gait training with walker
- ◆ **CPM machine** (if ordered) — passive ROM, start low & advance
- ◆ **Weight bearing** — typically WBAT (weight-bearing as tolerated) for both UKA & cemented TKA
- ◆ **Quad sets, heel slides, straight-leg raises** hourly while awake
- ◆ **Ice** 20 min on / 20 min off for swelling
- ◆ **Avoid prolonged sitting** >1 hour — promotes stasis & stiffness

★ RED FLAG

Priority Order if Post-Op Calf Pain Reported:

- 1 **STOP** — don't massage. 2 **Assess** — measure calf circumference, check distal pulses, SpO₂, RR. 3 **Notify HCP immediately.** 4 **Anticipate** Doppler ultrasound, ↑ anticoagulation, possible CT-PA if PE suspected. 5 **Bed rest** with extremity NOT elevated unless ordered.

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Pharmacology

DRUG / CLASS	PURPOSE	KEY SIDE EFFECTS	NURSING CONSIDERATIONS
Enoxaparin (Lovenox) <i>LMWH</i>	VTE prophylaxis 10–35 days post-op	Bleeding, thrombocytopenia, injection-site hematoma	SQ in abdomen, do NOT aspirate or rub; monitor platelets; antidote = protamine sulfate
Apixaban (Eliquis) / Rivaroxaban (Xarelto) <i>DOAC</i>	Oral VTE prophylaxis	Bleeding (no routine monitoring needed)	Take with food (Xarelto); reversal = andexanet alfa; teach bleeding precautions
Warfarin (Coumadin) <i>Vit K antagonist</i>	VTE prophylaxis (alternative)	Bleeding, skin necrosis	Goal INR 2–3; antidote = Vitamin K; teach consistent green-leafy intake
Acetaminophen	Multimodal pain control (scheduled)	Hepatotoxicity	Max 4 g/day (3 g if hepatic disease/alcohol); foundation of post-op pain regimen
Opioids (oxycodone, morphine, hydromorphone)	Acute post-op pain, often via PCA	Respiratory depression, constipation, sedation, N/V	Monitor RR & LOC; bowel regimen mandatory; PCA — only the client presses button
NSAIDs (ketorolac, celecoxib)	Anti-inflammatory pain control	GI bleed, renal toxicity, ↑ bleeding	Caution with anticoagulants; ketorolac max 5 days; assess renal function
Cefazolin (Ancef) <i>1st gen cephalosporin</i>	Prophylactic antibiotic — given within 60 min of incision	Rash, GI upset, C. difficile	Ask about PCN allergy (cross-sensitivity); redose if surgery >4 hr or large blood loss
Ondansetron (Zofran)	Post-op N/V	QT prolongation, headache, constipation	Assess baseline ECG in at-risk clients; can mask underlying issues
Tranexamic Acid (TXA) <i>Antifibrinolytic</i>	Reduces intra-op blood loss	Thrombosis risk (rare), hypotension	Given IV or topical at surgical site; contraindicated in active thrombosis

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NCLEX Test Traps

✗ WRONG

Place a pillow under the operative knee to elevate it and relieve swelling.

✓ RIGHT

Keep the knee in **neutral extension**. A pillow under the knee causes **flexion contracture**. Elevate the entire leg (heel on pillow) instead.

✗ WRONG

Massage the calf when the client reports a "cramp" to relieve the pain.

✓ RIGHT

Never massage a calf in a post-op orthopedic client — can dislodge a clot. Assess for unilateral swelling, warmth, pain → notify HCP, prepare for Doppler.

✗ WRONG

Family member presses the PCA button when the sleeping client moans in pain.

✓ RIGHT

Only the client presses the PCA. Family/nurse dosing = "PCA by proxy" = respiratory depression risk. Teach this pre-op & reinforce post-op.

✗ WRONG

Bed rest for 48 hours post-op to "protect" the new joint.

✓ RIGHT

Early ambulation — often POD #0 or #1. Immobility = DVT, pneumonia, ileus, contractures. The new joint *needs* motion.

✗ WRONG

"My low-grade temperature on POD #2 must mean an infection — call the surgeon."

✓ RIGHT

Temp ≤ 100.4°F in first 48 hr is usually **atelectasis** → IS, cough & deep breathe, early ambulation. Worry about infection at **>101°F, purulent drainage, increasing erythema, or after POD #3**.

✗ WRONG

UKA & TKA have the same activity restrictions and recovery timeline.

✓ RIGHT

UKA = faster recovery (smaller incision, ligaments preserved, less blood loss, shorter LOS). TKA = longer rehab (typically 3–6 months to full function). Both = lifelong avoidance of high-impact activity & kneeling.

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Patient & Family Education

Activity & Home Safety

- ◆ **Use walker** for 2–6 weeks; cane until cleared by PT
- ◆ **Avoid kneeling, squatting, twisting,** and pivoting on operative leg
- ◆ No high-impact activity (running, jumping, contact sports) — choose **walking, swimming, biking, elliptical**
- ◆ **Remove throw rugs**, install grab bars, use elevated toilet seat, avoid stairs initially
- ◆ Sleep on back with heel on pillow (NOT pillow under knee)
- ◆ Don't drive until cleared (typically 4–6 wk for right knee, 1–2 wk for left if automatic transmission)

Wound, Pain & Exercise

- ◆ Inspect incision daily — report redness, warmth, drainage, separation, fever $>101^{\circ}\text{F}$
- ◆ Keep incision **clean & dry** — typically no soaking baths/pools $\times$ 4–6 wk
- ◆ **Ice** 20 min several times daily for swelling
- ◆ Take pain meds **before** PT sessions for best participation
- ◆ Perform **quad sets, heel slides, ankle pumps, SLRs** as prescribed
- ◆ Stool softeners while on opioids — opioid constipation is universal

Lifelong Precautions

- ◆ **Antibiotic prophylaxis** before dental work, invasive procedures, or surgeries (lifetime for many — confirms with surgeon)
- ◆ Carry **medical alert card** identifying the prosthesis
- ◆ Inform TSA — implant may trigger metal detectors
- ◆ Report any new joint pain, swelling, or warmth — could indicate **late infection** (can occur years later)
- ◆ Notify surgeon before any future surgical/dental procedures

When to Call the Surgeon

- ◆ Fever $>101^{\circ}\text{F}$ (38.3°C)
- ◆ Increasing or purulent wound drainage
- ◆ Spreading redness/warmth at incision
- ◆ Calf pain, swelling, or warmth (DVT)
- ◆ Chest pain, dyspnea, $\downarrow$ SpO_2 (PE) — **call 911**
- ◆ Sudden inability to bear weight or new severe pain
- ◆ Numbness/tingling distal to surgical site that won't resolve

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Memory Boosters

5P's

Neurovascular check — distal to operative knee

- P** — **Pain** (out of proportion = compartment syndrome)
- P** — **Pallor** (color, capillary refill)
- P** — **Pulses** (dorsalis pedis, posterior tibial)
- P** — **Paresthesia** (numbness, tingling)
- P** — **Paralysis** (movement of toes/foot)

HIP / KNEE

Don't confuse hip & knee positioning rules!

HIP = abduction pillow, no crossing legs, no flexion >90°

KNEE = *extension* is the rule — NO pillow under knee!

Pillow under knee → flexion contracture → can't straighten leg → can't walk.

"AVOID"

Lifelong knee replacement teaching

- A** — **Antibiotics** before dental/invasive procedures
- V** — **Voiding** attention to UTIs (infection seeds prosthesis)
- O** — **Obesity** — weight loss prolongs prosthesis life
- I** — **Impact** activities (running, jumping) banned
- D** — **Dental** hygiene to prevent bacteremia

TKA vs UKA

Quick clinical contrast

T otal = **T** hree compartments, **T** ougher recovery

U ni = **U** p & walking faster, **U** ses less bone

Both share the same DVT, infection, & positioning rules — only the *scope & speed of recovery* differ.

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NCJMM • Clinical Judgment Scenario

NEXT GENERATION SCENARIO

A 68-year-old client is on **POD #2 after a right total knee arthroplasty**. The nurse enters the room to find the client diaphoretic and anxious, complaining of "a deep ache in my right calf" rated 8/10 and new-onset shortness of breath. Vital signs: **T 100.6°F, HR 118 (sinus tach), RR 28, BP 138/86, SpO₂ 89% on RA**. The right calf is firm, warm, and 3 cm larger than the left in circumference. The client took enoxaparin this morning. Lungs are clear bilaterally.

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RECOGNIZE CUES

Unilateral calf pain · warmth · swelling
· firm calf · dyspnea · ↓SpO₂ 89% · tachycardia (118) · tachypnea (28) · low-grade fever · diaphoresis · anxiety · POD #2 ortho surgery.

2

ANALYZE CUES

Pattern = **DVT with high suspicion for PE**. Calf findings → DVT. Dyspnea + ↓SpO₂ + tachycardia + tachypnea + clear lungs = classic PE pattern. Post-op ortho = highest VTE-risk population.

3

PRIORITIZE HYPOTHESES

1 Pulmonary embolism (life-threatening — airway/breathing). **2 DVT** (source). **3 Post-op pain**. **4 Anxiety**. PE takes priority — kills within hours if untreated.

4

GENERATE SOLUTIONS

Apply O₂ to keep SpO₂ ≥ 94% · place client on bed rest (do NOT massage) · elevate HOB · obtain IV access · notify HCP *now* · anticipate D-dimer, CT-PA, venous Doppler · prepare for therapeutic heparin drip.

5

TAKE ACTION

Apply O₂ 4 L NC → titrate. Rapid Response activated. Stat ABG, troponin, D-dimer, CMP, CBC. Continuous SpO₂, telemetry. Heparin bolus per protocol once PE confirmed. NPO pending CT-PA. Reassure client.

6

EVALUATE OUTCOMES

Effective: SpO₂ ≥ 94%, RR < 22, HR < 100, pain controlled, no hemoptysis. CT-PA confirmed PE; therapeutic anticoagulation initiated. Hemodynamically stable. Reinforce **no calf massage** & teach long-term anticoagulation plan.