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Knee Replacement Rehabilitation Protocol

The intent of this physical therapy protocol is to provide a guideline of postoperative rehabilitation for the clinician to help treat a patient who us undergone a **Total Knee Replacement**. It is not intended to be a substitute for clinical decision making. Clinical decision making on a postoperative course include physical exam and findings, individualized progress, and presence of any complications. If a clinician requires assistance with progression of a postoperative patient, please consult the referring surgeon.

In Revision Total Knee Arthroplasty or cases where there may be soft-tissue or bone compromise - there may be alterations to phase I and II

Pain Management:
Appropriate pain management includes an attempt at reducing the amount of narcotics and side effects of various pain medications by using various treatment protocols.Adequate preoperative pain measures include:

- **Anesthetic Blocks** - These are provided by an anesthesiologist preoperatively if clinically indicated
- **Local Analgesics** - Soft-tissue anesthetic injections may be used towards the end of the procedure to reduce post-operative pain
- **IV analgesics** - Postoperative pain medications in the acute postoperative phase may be provided with IV analgesics prior to discharge.
- **Oral analgesics** - Postoperative pain medications include opioids (oxycodone and norco), centrally-acting analgesics (acetaminophen or Tylenol), anti-inflammatory medications (NSAIDs such as meloxicam, celebrex, ibuprofen, or naproxen), and alpha-agonists (Tramadol).
- **Aspirin**: If prescribed may be used as a prophylaxis for deep vein thrombosis or pulmonary embolism as well as pain medication.
- **Cryotherapy -** Ice and cryotherapy may be applied to the affected extremity allows for improvement in pain control.
- **Elevation -** Keeping the affected extremity elevated above the heart while at rest.
- **Compression -** Applying an ace-wrap or other compressive device to the operated extremity can reduce swelling and improve swelling

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Deep Vein Thrombosis Prophylaxis

Deep vein thrombosis and pulmonary embolisms are serious complications following lower extremity surgery. In an effort to avoid deep vein thrombosis or pulmonary embolisms, the following protocol is implemented:

- Low-risk patients: Aspirin 325mg twice daily for 30 days
- High-risk Patients: Arixtra 2.5mg daily for 14 days, followed by 30 days of aspirin
- Alternatives may be provided depending on history of trauma, patient medical comorbidities, or history of thromboprophylaxis morphine. Alternatives include medications such as lovenox, heparin, or warfarin.

PHASE I - IMMEDIATE SURGICAL POST-OPERATIVE PHASE (0 - 2 days)

Goals:

- Weight-bearing as tolerated
- Reduce swelling and manage pain
- Perform bed mobility and transfers with minimal assistance
- Ambulate with assistive device for 25-100 feet. Ascend and descend stairs to allow for household independence
- Regain 80 degrees of passive and active range of motion to perform sit-to-stand transfers
- Gain knee extension to equal or less than -10 degrees
- Perform straight leg exercises
- Verbalize understanding of postoperative activity recommendations and precautions

Precautions:

- Weight-bearing as tolerated with assistive device
- Please keep leg extended while in bed, do not place pillows under knee.
- May place pillow under ankle to help in knee extension while in bed.
- May place a bump under the operative hip to maintain neutral hip rotation and promote knee extension
- No exercises with weights or resistance
- Avoid torque or twisting forces

Evaluation:

- Avoid falls
- Monitor wound healing and drainage - please contact the MD if there is more than a Quarter size of drainage on the dressing
- Monitor for loss of peripheral nerve integrity. Contact Dr. Morton if there are any issues.
- If there is a significant amount of wound drainage, severe pain, or redness to the incision - please return to the orthopaedic surgeon's office for an immediate evaluation
- Maintain appropriate pain control postoperatively

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Pain Regimen

- Continuous cryotherapy for 48 hours after surgery, or for at least 5 times daily.
- Continue cryotherapy 20 minutes before and after exercise program
- Superficial massage to minimize hypersensitivity following surgery
- May maintain compression to the limb to reduce swelling and pain with ace-wraps
- Elevate extremity
- Acetaminophen 650mg every 4 hours, scheduled
- Meloxicam 15mg daily or Naproxen 500mg twice daily or Celebrex 200mg twice daily, ***scheduled,*** depending on kidney functional status
- Tramadol 50mg every 6 hours as needed for moderate pain
- Oxycodone 5mg every 4 hours as needed for severe pain
- If pain is not controlled with these measures, please contact Dr. Morton.

Therapy:

- Active, Active Assist, Passive exercises seated and supine
- Isometric quadriceps, hamstring and gluteal isometric exercises
- Straight leg raises
- Closed chain exercises (depending on ability to control pain, muscle strength and balance)
- Closed chain exercises should be performed with bilateral upper extremity support
- Gait training on flat surfaces and stairs
- Transfer training

Criteria for progression to phase II:

- Quadriceps contraction and/or able to perform a straight leg raise
- Active knee range of motion of -10 to 80 degrees
- minimal pain and inflammation
- independent transfers and ambulation of at least 100 feet

PHASE II - MOTION (2 days - 6 weeks)

Goals:

- Improve knee range of motion to 0 - 110 degrees
- Strengthening to operative extremity with attention to knee extensor and flexors
- Focus on areas of weakness in the operative extremity as well as any other areas in upper extremity, trunk or contralateral lower extremity.
- Proprioception training to improve spatial awareness
- Endurance training
- Functional - promote independence in activities of daily living
- Gait training - Discontinue assistive devices when patients have appropriate extremity strength and balance between 1 and 4 weeks
- Reduce swelling and inflammation

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Evaluation:

- 10-14 day postoperative visit: Check for any wound complications. There should be no wound drainage.
- Evaluate any erythema or redness

Pain Management

- Cryotherapy 1-3x/day for swelling/pain management
- Other modalities depending on clinical findings
- Wean from narcotic usage. Continue to use NSAID, Tramadol and Tylenol as prescribed

Therapeutic exercises (Week 1 - 4)

- Active, active assist and passive ROM to obtain >90 degrees of flexion and extension
- Stationary bicycle for ROM. Start with partial revolutions. Progress as tolerated to full revolutions without resistance
- Continue isometric quadriceps/hamstring and gluteal isometric exercises
- Supine heels slides and seated long arc quad
- Straight leg raise in 4 planes (flexion, abduction, adduction, extension)
- Neuromuscular electrical stimulation for quadriceps if poor contraction is present.
- Gait training to improve function and quality of performance during swing-through and stance-phases.
- Wean from assistive device by the end of the second week of surgery
- Postural cues/re-education during all functional activities

Therapeutic exercises (Week 4 - 6)

- Continue above exercises
- Front and lateral step up and step down
- 1/4 front lunge
- Sit-to-stand and chair exercises to increase knee flexion during functional tasks
- Continue stationary bicycle for ROM
- May begin pool program if incision healed

Criteria for progression to phase III

- Active ROM of 0 to 110
- Good voluntary quadriceps control
- Independent community ambulation (>800 feet) without assistive device
- Minimal pain and inflammation

6 Week Visit: X-ray obtained to confirm appropriate implant placement

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PHASE III: - Intermediate (7 - 12 weeks)

Goals

- Maximize range of motion 0 to 115+
- Good patella-femoral mobility
- Good strength for all lower extremity musculature
- Return to functional activities
- Begin light recreational activities (walking, pool program)
- Active ROM without pain.
- 4+/5 muscular performance of all lower extremity musculature
- Minimal pain or swelling

Therapeutic Exercises

- Continue Phase II exercises with resistance and repetitions
- Evaluate patients with limited hip and knee stability and consider open/closed chain activities based on individual needs.
- Initiate endurance program - walking and/or pool
- Initiate age-appropriate balance and proprioception exercises
- May discontinue neuromuscular electrical stimulation if quadriceps activity is present and good quality

Phase IV - Advanced strengthening and higher-level function stage (Week 12-16)

Goals:

- Return to appropriate recreational sports and activities as tolerated
- Enhance strength, endurance, and proprioception as needed for activities of daily living and recreation

Therapeutic Exercises

- Continue prior exercises
- increased duration of endurance
- Initiate recreational activity: Golf, tennis, progressive walking, biking
- If patient desires to kneel, may initiate kneeling protocol.

Criteria for Discharge

- Non-antalgic and independent gait
- Independent step-over-step stair climbing
- Pain-free active range of motion
- at least 4+/5 strength to all lower extremity musculature
- Age-appropriate proprioception
- Patient independent with home exercise program.

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Kneeling Protocol

Discuss kneeling protocol with Dr. Morton prior to begining. Revision total knee patients may not be canidates for kneeling postoperatively

Common reasons for not being able to kneel after surgery include:

1. Pain
2. Discomfort
3. Fear of damaging the implant
4. Stiffness
5. Sensitivity of the scar
6. Recollection of being told not to kneel

68% of patients report the ability to kneel after a total knee without difficulty. Of those with difficulty, the following protocol may allow for kneeling in 81% of those who initially had difficulty kneeling.

Kneeling Protocol

- Week 1 - Kneel 10 min a day on a couch
- Week 2 - Kneel 10 min a day on a couch cushions on the floor
- Week 3 - Kneel 10 min a day on a thin pillow on the floor or on thick carpet
- Week 4 - Kneel 10 min a day on a thin carpet or rug
- Week 5 - Kneel 10 min a day on the floor or on the ground outside

Source: *S.J.S. Wallace, R.A. Berger. Most patients can kneel after total knee Arthroplasty. The Journal of Arthroplasty 34 (2019)898-900*

If you have any questions, please do not hesitate to reach out to Dr. Morton