Delaware Physical Therapy Clinic

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Rehab Practice Guidelines for: *Unilateral Total Knee Arthroplasty (TKA)*

Primary Surgery: Tricompartmental, TKA-any approach

Expected number of visits: Dependent on when patient begins physical therapy can range from16-28 visits

Recommended progression of strengthening exercises[2]:

- Strengthen at 70 % of 1 Repetition Maximum or 100% of 8 Repetition Maximum (*updated: 3/2/15)
- Once able to perform 3 sets of 8 reps with minimal fatigue increase to 3 sets of 10 reps.
- Once able to perform 3 sets of 10 reps with minimal fatigue re-assess 8RM and add resistance accordingly; start back at 3 sets of 8 reps with added resistance.

Time	Treatment[2]	Milestones
Phase 1 **0-2 Weeks Post-Operatively** **Visits 1-6**	**ROM[2]** • Exercise bike for ROM 5-10 minutes, forward and/or backward pedaling with no resistance until able to perform full revolution at the lowest seat height. • Supine active-assistive wall slides for knee flexion ROM • Passive knee extension stretch with manual pressure • Seated bag hang or prone bag hang providing low load long duration stretch (weight and time may vary to achieve goal) • Patellar mobilizations all directions as necessary[3] **NMES [1-2, 5-6,8]: See end note for guidelines** **Volitional strength[2],[10]** • Exercise example: SAQ, standing bilateral 45° squats with UE support, clamshells, side-lying hip adduction, glute squeezes **Balance/Agility[9]** • Exercise example: Multi-directional stepping, weight shifting, side-stepping (UE support as needed)	Able to complete 3x8 reps without fatigue[10] Pain at rest <4/10[10] AROM/PROM <10-90[10] Independence with mobility in and out of home[10]
Phase 2 **2-6 Weeks Post-Operatively** **Visits 7-16**	**ROM[2]** • Exercise bike for 5-10 minutes, forward and backward pedaling with no resistance until able to perform full revolution at lowest seat height. Once can achieve this add resistance. • Supine active-assistive wall slides for knee flexion ROM • Passive knee extension stretch with manual pressure • Seated bag hang or prone bag hang providing low load long duration stretch (weight and time may vary to achieve goal) • Patellar mobilizations all directions as necessary[3] **NMES [1-2, 5-6,8]: See end note for guidelines** **Volitional Strength[2,10]** • Exercise example: LAQ, SLR, clamshells hip abduction sidelying, step-ups/side step ups/ step downs/step up and overs at 5-15 cm, sit to stand, bilateral calf raises standing	AROM/PROM 0° to > 105° of flexion[2] Minimal to no pain and swelling[2] Voluntary quadriceps muscle control or 0° knee extension lag[2] Heel strike/push off achieved with least restrictive device. Begin focusing on TKE in stance phase of gait. Obtain baseline isometric quadriceps index, and activation with a superimposed electrical stimulation burst at the end of week four.

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	TKE with Theraband ™ for resistance from 45-0°, standing hamdstring curls • Increase step height if good concentric/eccentric control **Balance/Agility[9]** • Exercise example: Marching (decrease UE support), backward walking, forward lunges (progress depth and decrease UE support)	
Phase 3 **5-8 Weeks Post-Operatively** **Visits 16-21**	**ROM[2]** • Exercise bike for 5-10 minutes, add resistance if able to perform full revolution, lower seat height to produce stretch with each revolution • Continue ROM activities as described in phase 2 treatment section with increased duration until milestones are achieved **NMES[1-2, 5-6,8]: See end note for guidelines** **Volitional Strength[2,10]** • Exercise example: LAQ with ankle weight, standing hamstring curls with ankle weights, standing 4-way hip with UE support, bilateral calf raises, ball wall slides, step ups/side steps ups/steps downs/step up and overs **Balance/Agility[9]** • Balance board stance, forward lunging, SLS eyes open (progress surface), grape vine, figure 8 walking (progress volume and speed)	Consistent with carryover of AROM 0° to >115° Collaborate with surgeon if by 4-6 weeks post-op carryover of AROM in flexion is less than 10°-15° from initial outpatient PT evaluation measurement. Steady increase in MVIC[3]
Phase 4 **7-10 Weeks Post-Operatively** **Visits 22-28**	**ROM[2]** • Continue as previously described until milestones are achieved **NMES [1-2, 5-6,8]: See end note for guidelines** **Volitional Strength[2,10]** • Exercise example: Machine leg extension, machine leg curls, supine stability ball hip extension progression, standing 4-way hip with reduced UE support progressing to no support, machine leg press, machine calf press, wall slides with hold. **Balance/Agility[9]** • Exercise example: Star excursion foot reach, SLS with eyes closed (re-start SLS progression), side shuffles, grape vine, figure 8 walking, backward walking (progress volume and speed).	AROM 0-120° Walk foot over foot up and downstairs without assistive device Unlimited walking distance with normalized gait and least restrictive device Retest isometric quadriceps index and activation. Quadriceps at 70% strength of uninvolved side

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	Prior to discharge • Review and practice safe kneeling with patient during one session. • Provide handouts to patient on safe kneeling, local gyms, risk of weight gain following TKA, and nutrition.	

ROM: range of motion; AROM: active range of motion; PROM: passive range of motion; > greater than; reps: repetitions; SLR: straight leg raise; RM: repetition maximum; TKE: terminal knee extension; SAQ: short-arc quadriceps; MVIC: maximum volitional isometric contraction; PT: physical therapy; SLS: Single limb stance

Patient Education[11]:

- Encourage loading of surgical limb and to be active
- Instruction in HEP and activity
- Prior to discharge review and practice proper kneeling techniques

Home Exercise Program[10]:

- First month post-op exercises 2x daily, afterwards 1x daily, at discharge 3-5x/week based on recovery.
- Home activity:
  - Phase 1: 10 minutes walking daily
  - Phase 2: 30 minutes per day of walking 5+ days per week
  - Phase 3: >30 minutes per day (walking, cycling, swimming) 5+ days per week
  - Phase 4: >30 minutes per day (walking, cycling, swimming, elliptical, stepper) 5+ days per week

Pain and swelling

Ice, compression, and elevation daily after exercises[1-2, 5-6]

Incision mobility

Soft tissue mobilizations to entire length of incision with greater emphasis on distal 1/3 of incision[1-2,5-6] until incision moves freely over subcutaneous tissue[3]

Vital Signs

Monitored during each session[2]

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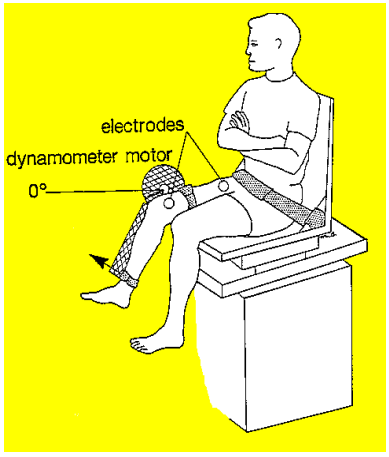
NMES Protocol Guidelines[1,2,5,6,8]

At home: *To be performed twice a day for the first 6 weeks*

- Secure the lower limb with Velcro straps to a stable chair to allow for about 85° of hip flexion and 60° of knee flexion
- Electrodes placed over proximal lateral quadriceps and distal medial quadriceps
- Stimulation parameters: 250usec, symmetrical waveform, 50 Hz, 3 second ramp, 15 seconds on, 45 seconds off, intensity to maximum tolerable and patient should be encouraged to increase the intensity throughout to tolerance

In the clinic:

- Stimulation Parameters: 250-400 usec, 50-75 Hz, 2 second ramp, 12 second on, 50 second off, intensity to maximum tolerable or at least 30% of the maximum volitional isometric contraction (MVIC), 15 contractions per session
- 3 sessions per week until quadriceps strength MVIC is 70% of uninvolved.
- Performed isometrically at 0-60 degrees of knee flexion—dependent on tolerance and therapeutic goal (ie. near max extension for quad lag, etc.)



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