Phase I (surgery to about 2 weeks after surgery)

Appointments	• Physician appointment within 2 weeks after surgery • Rehabilitation is usually 2 times per week. This can be modified based on findings of evaluation.
Rehabilitation Goals and Priorities	• Safe transfers and ambulation with assistive device, progressing distance towards one half mile, heel strike and use of available knee extension during gait. • Restore ROM, increasing each visit toward 125 degrees flexion, and 0 degrees extension. • Literature supports ROM returning to prior level (if patients had flexion contracture before TKA, they are more likely to have one after). • Each patient must be encouraged to get back **more** ROM than he or she previously had. • Active extension without lag. • Consistent compliance with home exercise program (HEP), check pain rating and compliance each visit.
Suggested Therapeutic Exercises	• Quadriceps set (QS), straight leg raise (SLR), prone hamstring curls, supine heel slides, supine heel down wall slides, extension on bolster. HEP consists of the same. • Sit to stand squats, with weight bearing as tolerated (WBAT), supine leg press from 0 degrees of extension to current flexion end range versus minimal weight, (20-40 lbs) and **stationary bike with no resistance** if able to get on and off.
Modalities	• Ice, electrical stimulation (E-stim) to augment poor quad contraction, and **transcutaneous electrical stimulation** (TENS) for pain control if other means are unsatisfactory. • Edema reduction soft tissue mobilization in elevated positions, if needed.
Precautions	• Watch incision for signs of separation and/or infection. • Keep incision strain at a minimum, watch blanching during flexion to monitor this. • Pain should not persist after rehabilitation visits for more than 24 hours and should be within patients' tolerance. • Provide education on "hurt vs harm".
Cardiovascular	• Upper body ergometer (UBE) if patient desires.
Progression Criteria	• Improvement in ROM, muscle function and gait over the first 2 weeks.

Phase II (begin after meeting Phase I criteria, usually 3-6 weeks after surgery)

Appointments	• Physician appointment at 6 weeks after surgery • Rehabilitation appointment frequency is based on patient's ROM. If gains are occurring at twice weekly, continue this until 0-125 or plateau for 2-3 weeks. • More frequent visits or at least 2 times per week if no gains in ROM are occurring • If ROM from 0-125 exists, once per week is enough, barring any other issues
Rehabilitation Goals and Priorities	• ROM 0-125, quadriceps strength without lag in straight leg raise (SLR) and short arch quadriceps (SAQ) (sitting). • Progression of strength towards bodyweight, functional ambulation and normalization of gait, stairs with reciprocal gait, use of affected knee with equal weight bearing with sit to stand transfers. • Based on patient progress, between post-operative weeks 3 and 6, patients should be able to transition to one crutch or use a cane and begin walking short distances without an assistive device. • This needs to be with a useful, non-antalgic gait pattern.
Suggested Exercises/ Treatment	• Knee ROM as needed • Manual therapy as needed, with appropriate magnitude based on healing status. Skin needs to slide in order to have optimal exion range. • Neural mobilization for tibial nerve may help improve exion contracture. • QS, SAQ, SLR, supine and/or standing, leg press, sit to stand squats, single leg balance, gastrocnemius strengthening, step ups in multiple directions, lunges through partial range if safe. • Standing total knee extension (TKE) with theraband • Hip and core strengthening as needed • Stand to oor transfer training • Neuromuscular reeducation as needed for appropriate mechanics of gait, equalizing weight bearing during function, balance and proprioception • Pool if needed once incision is completely closed. (not before 4 weeks, must have surgeon approval)
Modalities	• E-stim if patient's quadriceps lag is still slow to improve • Soft tissue mobilization (STM) in elevated positions for edema if this inhibits quadriceps
Precautions	• ROM to be achieved with minimal force provided by rehabilitation therapist, care exercised during stand-to- oor transfers and weight bearing exercises in order to avoid rapid forced exion due to weakness, incision/infection issues. • Impact such as running is not allowed • Single leg balance is incorporated somewhere into the week 3-12 portion, in a functional exercise or three. TKA patients have a 25% higher fall rate within the rst year post operative, and hence some structured balance/proprioception movements are reasonable
Cardiovascular	• UBE • Stationary bicycle in partial or full revolutions if incision looks OK during and pain does not limit use
Progression Criteria	• Continuing improvement in ROM, quadriceps function, gait and activity tolerance

Phase III (begin after meeting Phase II criteria, usually 6-12 weeks after surgery

Appointments	• Physician appointment 3-6 months after surgery, depending on patient's progress • Rehabilitation appointment 1-3 times per week, less if maximal ROM already achieved and muscle control/power improving predictably, more if ROM or muscle function is slow to progress.
Rehabilitation Goals and Priorities	• ROM 0-125 • No extensor lag • Normal gait without assistive device • Stairs with reciprocal gait for 1-2 ights up and down with or without rails • Independent transfers to and from the ground • Independent function pertaining to personal goals
Suggested exercise/ Treatments	• Therapeutic exercise versus bodyweight, in functional, dynamic movements • Lateral and multidirectional movements during strengthening as well • Continued LE strengthening, emphasizing quadriceps, hip and core strengthening • Continued emphasis on use of the affected side during function such as rising from sitting, moving from stand to sit
Modalities	• If exion contracture persists, ultra sound (US) for tissue extensibility increase prior to stretching
Precautions	• Lifting more than 50 lbs should be discouraged during functional activities most of the time • 30-50 lbs is reasonable on occasion, but the patients need to know that repeated heavy lifting is discouraged • Emphasis needs to be on continuing tness activity so that patients do not gain weight after TKA
Cardiovascular	• Stationary bike for ROM and tness with some resistance after 6 weeks if not painful • Walking without devices, up to a mile or more after 6 weeks
Progression criteria	• Achievement of goals above