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Total knee replacement (TKA) post-operative protocol

Total knee arthroplasty (TKA) is an elective operative procedure to treat an arthritic knee. This procedure replaces your damaged knee joint with an artificial knee implant. Knee implants consist of a metal piece attached to the end of your femur (thigh bone), a metal and plastic piece attached to the top of your tibia (lower leg bone). Once in place, the artificial components function like your natural knee. This protocol is guideline for rehabilitation of the knee to normal function.

Early post-operative phase (weeks 0-1)

Appointments- hospital stay to be supervised.

Rehabilitation goals

- Allow soft tissue healing
- Reduce inflammation
- Increase motor control and strength
- Educate patient regarding time scales and WB
- Begin gait re education
- Patient to work toward full passive knee extension at 0 degrees and work towards increasing flexion ROM to 90 degrees

Precautions

- IMPORTANT: Monitor wound
    - **If you have any concerns about your wound immediately contact us on: OS group: 0203 397 7779**
    - This would include any of the below symptoms or observations;
        - wound leakage – blood or discharge
        - redness around the area
        - excessive or worsening pain
        - raised temperature

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- <u>IMPORTANT:</u> <u>DVT awareness</u>

    - **If you have any concerns that you may have developed a DVT (deep vein thrombosis) immediately contact us on this number:**
        - **WARD (please insert):**
        - **OS group: 0203 397 7779**

    - This would include any of the below symptoms or observations;
        - sudden calf pain and swelling
        - pain, swelling and tenderness in one of your legs (usually your calf)
        - a heavy ache in the affected area.
        - warm skin in the area of the clot.
        - red skin, particularly at the back of your leg below the knee.
        - shortness of breath and chest pain (very rare)

- **Manage swelling**

    - Cryotherapy is advised
    - **PHYSIOLAB portable S1 device** is the preferred cryo-pneumatic device of OS group. See Appendix B for contact details.

- **Reduce mobility**
    - Rest as much as possible
    - Limited walking to around the house
    - If using crutches please see appendix A for instructions on advice on their use.

Rehabilitation outline

- ❖ Therapeutic exercises in supine

Quadriceps set, straight leg raise, prone hamstring curls, supine heel slides, supine heel down wall slides, extension (towel squeeze).

HEP consists of the same.

- ❖ Bed mobility and getting out of bed
- ❖ Gait training on flat surfaces and on stairs with appropriate assistive device per discharge plan

- Cryotherapy

Early rehabilitation phase (weeks 1-3)

Appointments – patient should be seen 1/2x per week to progress and monitor HEP.

Rehabilitation goals

- Reduce pain, inflammation, and swelling
- Increase range of motion (ROM)- work toward achieving full knee extension at 0 degrees and flexion ROM between 90-120 (Each patient must be encouraged to get back more ROM than he or she previously had)
- Increase strength – quadriceps and hamstrings
- Increase independence with bed mobility, transfers, and gait
- Gait training –Appropriate use of assistive device to emphasize normal gait pattern and limit post-operative inflammation
- Active extension without lag

Precautions

1. Monitor healing and wound for sign of infection
2. Exercises and strength progressions are based on client adherence to HEP.
3. Pain should not persist after rehabilitation visits for more than 24 hours and should be within patient's tolerance

Rehabilitation outline

- Strengthening
  Quadriceps setting in full knee extension, gluteal setting, towel squeeze, bridging.
- ROM -work using towel squeeze and HEP to achieve full extension and flexion between 90-120
- Cryotherapy daily x3 to control swelling
- Encourage normal gait mechanics with assistive device
- Sit to stand squats, with weight bearing as tolerated (WBAT)
- STT in elevated position to reduce swelling if needed

Criteria for progression to next phase

- ✔ Minimal pain and inflammation
- ✔ Pt ambulates with assistive device without pain or deviation
- ✔ Independent with current daily home exercises
- ✔ Overall improved muscle function, gait and ROM

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Middle phase of rehabilitation (weeks 3-6)

Appointments- x2 appointments per week unless ROM gains are own then further session will be need.

Rehabilitation goals

- 0-125 degrees FLX, quadriceps strong without lag straight leg raise (SLR) and short arc quads (sitting)
- Progression of strength towards bodyweight, normalization of gait and progression of sit to stand with equal WB
- Based on client's progression between 3-6 weeks patients should be able to transition on to one crutch or use a can and begin walking short distances without assistive devices. (must be non-antalgic gait pattern)
- Further reduce pain and inflammation
- Neuromuscular re-education as needed for appropriate mechanics of gait, equalizing weight bearing during function, balance and proprioception

Precautions

1. ROM to be achieved with minimal force provided by practitioner.
2. Supervised stand to floor transfers WB exercises in order to avoid rapid forced flexion due to weakness (can damage the integrity of the wound).
3. Impact exercises not allowed such as running and jumping
4. Single leg balance is incorporated somewhere into week 3-12 in a functional exercise only progressively through WBAT

Rehabilitation outline

- Knee ROM as needed
- Manual therapy as needed, with appropriate magnitude based on healing status. Skin needs to slide in order to have optimal flexion range
- Quadricep strength, Short arc quads, Straight leg raise, 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 floor transfer training
- Stationary Bike low intensity
- Closed chain weight shifting activities including side-stepping

- Pool if needed once incision is completely closed. (not before 4 weeks, must have surgeon approval)

Criteria to progress to next stage of rehabilitation

- Continuing improvement in ROM
- Quadriceps function
- Gait and activity tolerance
- Minimal pain and inflammation
- Patient ambulates without assistive device without pain or deviation
- Good voluntary quad control

Late stage Rehabilitation weeks (6-12)

Appointments – 1-3 times per week reduce this if ROM is already achieved at this stage and muscle control and power is improving.

Rehabilitation goals

- ROM full both in extension and flexion
- No extensor lag
- Normal gait patterning without any assistive devices and or pain.
- Stair climbing with normal gait and movement function
- Independent transfers to and from the ground
- Progressive HEP – maiming todays ALD's and personal goals

Precautions

1. Repeated heavy lifting still discouraged but reasonable on occasions (when supervised by practitioner)
2. Emphasis need to be on continuing fitness (CV) to ensure Patient doesn't gait weight after TKA.
3. Still only stationary bike ROM and fitness activity. Only when pain free can some resistance be added to the cycling.

Rehabilitation outline

- Progression of exercises into dynamic movements (light multidirectional movements)
- Progressively increasing resistance and repetitions Front lunge and squat activities
- Progress balance and proprioception activities (STAR and ball toss, perturbations)
- Initiate overall exercise and endurance training (walking, swimming, progress biking)

- Continued LL strengthening and emphasising the quads hip and core strength
- Continued concentration on the injured side during functional movements e.g. sit to stand for to stand transfers.

Criteria to progress to the next stage or rehabilitation

- No pain with activities of daily living (ADL's)
- Good lower limb strength throughout
- Patient is independently walking pain free with normal gait and able to climb stairs alone.
- Patient constantly adhering to home exercises.
- Practitioners discretion

Return to recreational level sports (+3 months)

- Continue walking, swimming and biking programmes for endurance and CV fitness (aerobic conditioning).
- Begin outdoor cycling
- Obtain clearance from surgeon for return to impact sports such as tennis or jogging
- The goals stages are personally directed to the level of sport or desire of activity level the patent ants to return to.

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Suggested outcome measures tests to be used to monitor progression throughout the rehabilitation

Single leg Stance test

Instructions for the Patient (Eyes Open, SLS)

Stand on one leg, place your arms across your chest with your hands touching your shoulders and do not let your legs touch each other. Look straight ahead with your eyes open and focus on an object in front of you. Ideally do this with the shoes off.

Criteria to stop timing the test

The legs touched each other, the feet moved on the floor, their foot touches down, or the arms moved from their start position.

Instructions for the Patient (Eyes Closed, SLS)

Stand on one leg, place your arms across your chest with your hands touching your shoulders and do not let your legs touch each other. Close your eyes once you have gotten in position. Ideally do this with the shoes off.

Criteria to stop timing the test:

The legs touched each other, the feet moved on the floor, their foot touches down, the eyes open during the eyes closed test, or the arms moved from their start position.

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Qualitative Analysis of Single Leg Loading

(Single leg squat)

(Single leg step down)

(Single leg hop for distance)

- See page 14 for test descriptions
- Score a zero if the appropriate strategy is used and one for inappropriate movements. (Best overall score is 0 and worse is 10 points)

Date: Patient: Condition:

Left Right Bilateral

QASLS		Left	Right
Arm strategy	Excessive arm movement to balance		
Trunk alignment	Leaning in any direction		
Pelvic plane	Loss of horizontal plane		
Thigh motion	WB thigh moves into hip adduction		
Knee position	Patella pointing towards 2nd toe (noticeable valgus)		
	Patella pointing past inside of foot (significant valgus)		
Steady stance	Touches down with NWB foot		
	Stance leg wobbles noticeably		
	Total		

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Qualitative Analysis of Single Leg Loading - Test Descriptions

Single leg step down

- Participant stands on a 30cm box
- Instructed to step off the box onto a mark, 30cm from the box and 5cm on the contra-lateral side to the mid line

Single leg hop for distance

- Participant stands on mark at side of standard tape measure
- Hands resting on iliac crests
- Attempts to hop as far as possible staying parallel to the tape.

Cross Over Hop Test

- Subject stands by two parallel lines 20cm apart extending at least 5m
- Undertakes four consecutive hops without pause crossing the grid lines each time.

Star Excursion Balance Test

- Subject stands on leg to be tested in centre of star. Keep heel down.
- Instructed to reach as far as possible down the line without taking undue support from the reaching leg or stepping over onto that leg
- 4 practices then test 5 repetitions

General notes

- All landings for single leg step down and single leg hop for distance must be held for 3 seconds, emphasis during task instruction must be placed on this
- Evaluate all landings using the QASLS scoring system
- For single leg hop for distance also include the distance hopped and the leg length
- Position camera a minimum of 2m from the landing position, zoom in to maximise the size of the subject within the frame
- Allow the subject a minimum of two practice attempts (continuing until they are able to do tasks appropriately) then record a single attempt.

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Appendix A - Crutches

- When standing up and sitting down, make sure you take your arms out of the crutches and hold them in one hand. This will help to avoid any shoulder injuries.
- When walking with the crutches, keep the handles pointing forwards and your arms close to your sides.
- Place both crutches forwards together with enough space in between them to step into.
- If you are advised that you are not allowed to put any weight through your injured leg (non-weight bearing), place your crutches forwards together. Now lean through your arms as you hop your uninjured leg up to the same level as the crutches. The foot on your injured leg must stay off the floor at all times when walking.
- If you are advised that you are allowed to weight bear, place the crutches forwards together and then step your injured leg up to the crutches. Now lean through your arms as you step you uninjured leg forwards to the same level.
- When climbing stairs, try to use a banister or rail in one hand and a crutch in the other (you can also carry the extra crutch in this hand):
- GOING UP: Good leg, bad leg, crutch
- GOING DOWN: Crutch, bad leg, good leg.
- Check the rubber stoppers regularly. If they are worn down, bring them back to the Physiotherapist will replace them.

Appendix B - Physiolab

Link for hire https://physiolab.com/products/to-rent/s1-portable.html

Website www.physolab.com