

# PILATES

The Balanced Body® Newsletter

# CORETERLY



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## REHAB CORNER

### Pilates and Knee Injuries

By Dane Burke, PT, ATC

Knee injuries are among the most common orthopedic injuries. Causes associated with injuries of the knee can range from direct trauma with instant damage; to overuse that can take a long time to degrade the tissue in and around the joint. Another, somewhat less obvious cause of knee injuries is misalignment of joints above and below the knee. Paired with repetitive movements and activities like walking, running, or work-related tasks, these misalignments can lead to accelerated wearing of joint surfaces. In the knee, the structures most prone to wear are the articular cartilages of the femur and patella and the shock absorbing medial and lateral menisci. The degradation of joint tissues leads to intra-articular deformities that cause things like clicking, grinding, and joint locking. Gone unchecked, these changes in the joint will eventually lead to pain and dysfunction.

Movements in the Pilates repertoire done on the equipment are very useful in the course of rehabilitation for the knee in terms of both assessment, as well as treatment of an injury. With assessment, the movements can be used to get an overall idea of how the joint moves and what the preference for movement is. In terms of treatment, the movements can be used to treat the injury on a more local arthrokinematic level by addressing the way the joint moves within the joint capsule. Elements such as *roll* and *glide* can be addressed in a supported environment as with footwork supine on the Reformer. Also, in this non-destructive environment more efficient muscle activation can be re-established. With movement and both tactile and verbal cueing through the range of motion, correct retraining of involved muscles can easily be achieved. As the individual gains increased confidence and control, the movements can be progressed to full weight bearing with decreased assistance from the springs. Movements such as *standing leg pump* without support of the hands, *forward lunge* on the Chair, *side splits* and *front splits* on the Reformer, and *assisted squats* with leg springs on the Trapeze Table; can all be used to challenge the recreated control at the knee joint. The course of rehab and progression through these exercises depends on different factors. The tissue that is injured and the severity, the length of time that the injury has been present and what kinds of compensatory mechanisms the body has adopted all play a role in the degree and how quickly an individual will be able to recover function.

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These movements also afford the opportunity to address one of the subtle causes of knee injury mentioned earlier. The knee joint's primary plane of movement is in the sagittal plane, which means that the joint is most comfortable with flexion and extension. Therefore, when we talk about turning the knee in and out, or medial and lateral rotation of the knee, in most cases we actually are referring to rotation at the hip joint. If awareness and control, are not cultivated at the hip, as well the knee then, combined with a fixed foot in weight bearing activity, there is potential for the knee to be twisted out of alignment regardless of how strong the muscles around the knee are. Cueing to maintain control and alignment at the hip joint will ensure that the knee is positioned correctly between the hip and the foot, preventing any unwanted torsion at the knee joint during loaded knee flexion. The outcomes of treatment are usually good because the Pilates repertoire allows focus on the specific issues relating to the injury. While treating and controlling these issues may help reduce destructive forces and allow tissues to heal, it may not reverse all structural changes that have occurred.

### Case Study

'John' was suffering from L knee pain that started slowly after playing squash. He reported that his pain was rated at 2/10 on average, but had significant increase in pain rated at 6/10 when descending stairs and sometimes when getting in and out of a chair. Diagnostic tests showed a small tear in his medial meniscus that did not warrant surgical intervention. Until this point, John had not sought any structured rehabilitation in the hopes that the symptoms would resolve. When the symptoms did not lessen after 6 months, he was referred for Pilates Rehabilitation. John was seen twice per week.

Upon initial screening/evaluation, John presented with the following objective findings:

**Gait:** John demonstrated hip external rotation and moderate genuvarum bilaterally during walking. Pt also demonstrated mild lateral tibial torsion secondary to his genuvarum. Postural alignment was otherwise unremarkable.

**A/PROM:** John was within functional limits throughout bilateral lower extremities. Had discomfort with passive flexion of L knee past 120 degrees.

**Strength:** With manual muscle testing, John presented with 4/5 strength with L knee extension and 3+/5 with R dorsiflexion. He was graded at 5/5 with all other lower extremity muscle testing. Of note was that with L knee extension, there was a significant decrease in activity of L vastus medialis as compared visually to the R vastus medialis muscle with active R knee extension.

**Neurological:** Reflexes and sensation were intact and full throughout bilateral lower extremities.

### Treatment/Exercise plan:

**Weeks 1-4:** Goal was to reinforce correct alignment and use cueing and exercises to isolate inefficient muscles.

	Week 1	Week 2	Week 3	Week 4
Exercises	P0/90 P/AROM hip disassociation Footwork on the Reformer Knee extension seated on footbar Scooter (with emphasis on full hip/knee extension) Seated Leg Pump on Chair	Same as Week 1 Single leg Footwork on the Reformer Added hip external rotation to knee extension seated on footbar Standing Leg Pump with hand support	Same as week 1 & 2 Increase spring tensions to increase challenge Home exercises: isometric quad contractions; short arc knee extension	Same as previous weeks. Added step downs off of moon box with spring assistance on Chair.

**Results:** At the end of week 4, with consistent cueing for quadriceps activation and alignment of hip and knee, John was describing decreased pain with movement, especially descending stairs. He also stated that he was able to play squash with less soreness during and after in L knee.

**Weeks 4-8:** Goal was continued strengthening of quadriceps and to challenge stability of hip and knee joint.

	Week 5	Week 6	Week 7	Week 8
Exercises	Phase out passive exercises  Continue modifying spring tension as appropriate to increase challenge  Added sitting box step down with spring assistance on Chair  Added active hip IR/ER standing on rotating discs	Same as week 5  Added assisted squats with leg springs  Added single leg standing balance to HEP	Same as previous weeks  Added forward lunge on Chair with hand support and with moon box to limit range of motion	Same as previous weeks  Added forward lunge on reformer

**Results:** At the end of week 8, John demonstrated increased tolerance to all exercises with minimal complaint of knee pain. He was able to climb and descend stairs without discomfort and only experienced L knee pain with passive knee flexion to end range. Objective measures were improved as well. Bilateral quad strength was equal at 5/5 and visually, the L vastus medialis showed increased activity with isometric, closed chain and open chain activities. Additionally, increased awareness of hip stability was demonstrated with all exercises. After two months of Pilates exercises focused on strengthening the muscles around the knee and stabilizing the hip, John was back to full function without limitations.