



TheraPilates® for Knee Pain

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TheraPilates® for Knee Pain:

Knee pain is one of the biggest barriers to maintaining optimal health and independence in life! If your client has knee pain during Footwork, what do you do? Pilates mat and apparatus work is often lacking in lower extremity strengthening. Learn to help your clients hurdle the knee pain barrier through Pilates alignment and mat work. Find out the best progressions for dealing with leg strengthening. How do you identify the difference between a structural problem and a strength problem? Let's get your clients back on their feet again!

Objectives:

1. Understand normal foot, knee, hip and pelvis basic anatomy and common anatomical variations and anomalies.
2. Review common pathologies affecting the knee leading to pain and dysfunction (osteoarthritis, chondromalacia, meniscal/ligament injuries)
3. Identify foot alignment (normal, pronation, supination, pes cavus, pes planus, bunions, hammertoes.
4. Identify knee alignment (varus, valgus, recurvatum, normal)
5. Identify hip alignment (internal rotation, external rotation, normal)
6. Identify pelvic alignment (anterior, posterior, torsions, normal)
7. Assess movement patterns for sit to stand, squats, lunges and transfers.
8. Identify strength vs. joint injury patterns.
9. Practice and apply Pilates-based exercises to correct faulty movement patterns and strengthen correct movement patterns.

Schedule:

Review foot, knee, hip and pelvis basic anatomy and common anatomical variations and anomalies.

Review common pathologies affecting the knee leading to pain and dysfunction (osteoarthritis, chondromalacia, meniscal/ligament injuries)

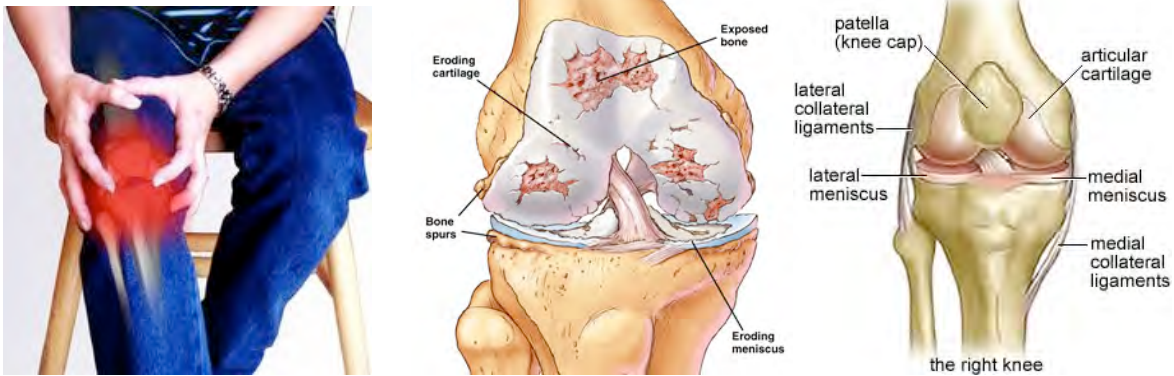
Identify foot, knee, hip, pelvis alignment and faulty postures.

Assess and practice movement patterns for sit to stand, squats, lunges and transfers.

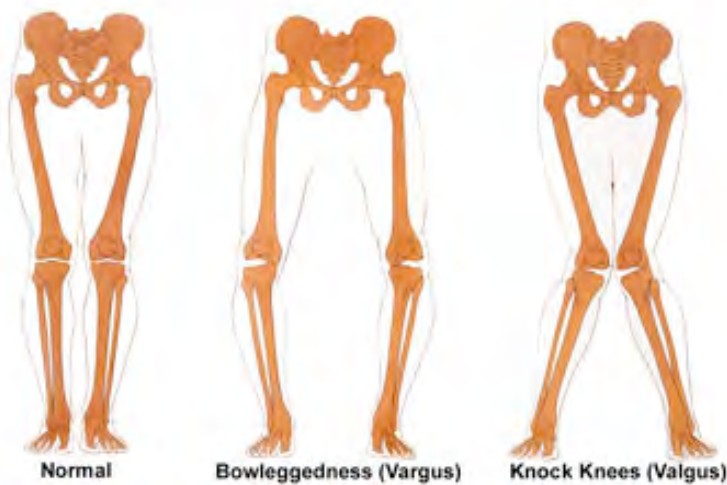
Practice and apply Pilates-based exercises to correct faulty movement patterns and strengthen correct movement patterns.

Q & A and Course Evaluations

Knee Pain is one of the biggest barriers to exercise!

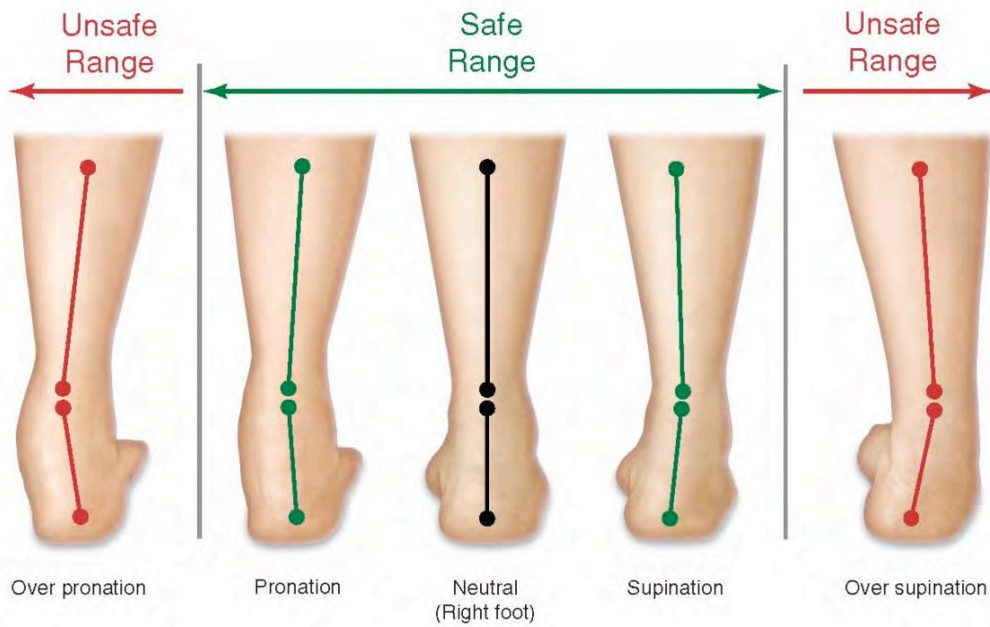
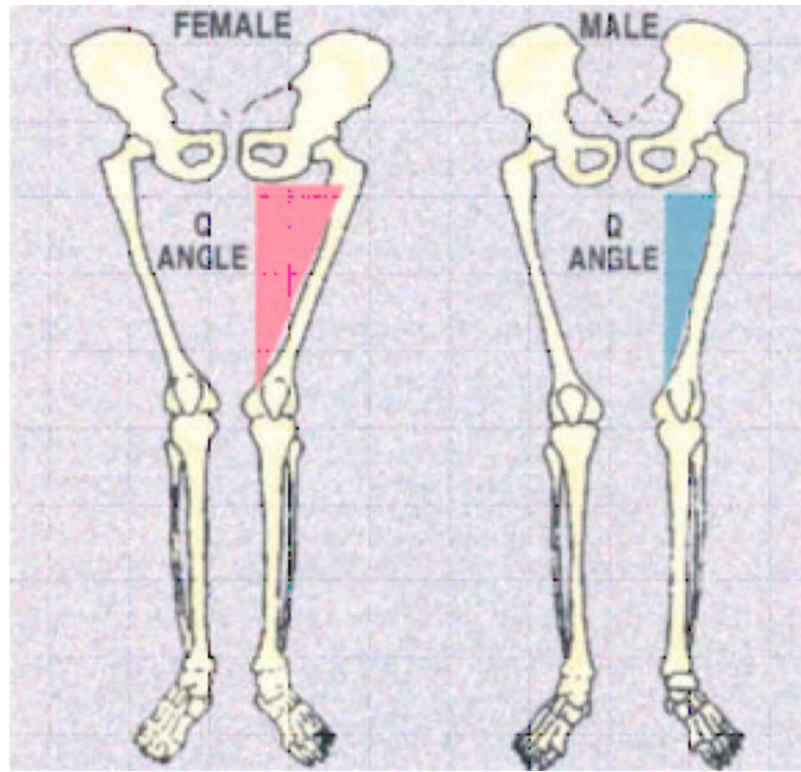


The goal of rehabilitation is to promote muscle strengthening around the affected joint, while minimizing joint loading and pain.



Genu Valgus

Greater in Females than males and may contribute to more problems with knee pain



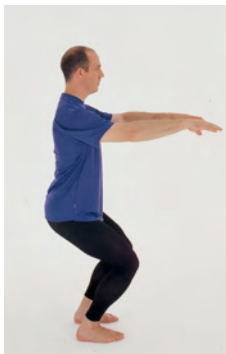
ASSESSMENT:



Sit to Stand



Half Squat



Half Squat with Vertical Torso:
Looks at Ankle Dorsiflexion
Tests Quadriceps

Foot: Pronation vs. Supination

Knee: Valgus vs. Varus, Hyperextension

Single Leg Stance

Single Leg Heel Raise x10 (with or without assist?) Knee flexion? Ankle aligned?

Full Squat with Vertical Torso

Plie: Parallel and Externally Rotated

If pain is present in Plies, (with good pelvic and foot alignment) try Plies on Ped-o-pul

If pain is decreased with Ped-o-pul Plies, then strength is the problem. If pain is still present then it may be a structural problem that requires medical or physical therapy intervention.

EXERCISES:

TENNIS BALL MASSAGE

Roll tennis ball longitudinally between metatarsals slowly from heel to MTPs.



Rolling Massage



Parakeet: MTP Flexion



Inch Worm

HEEL RAISE

Begin with tennis ball between ankles to practice subtalar neutral alignment.

Bilateral Correct Alignment with Tennis Ball Heel Lift



Unilateral Correct Alignment



Remember:

1. Keep Ankle Subtalar Neutral Alignment
2. Keep Knee Straight
3. Keep Pelvis Level: avoid anterior translation, hiking, or shifting laterally
4. Maintain Rib to Pelvis Alignment: avoid rib shift anteriorly, laterally or posteriorly and torso lean
5. Maintain Shoulder Girdle Organization: avoid elevation, ab/adduction and keeps arms crossed
6. Maintain Head Alignment: avoid forward head or jutting of chin
7. Repeat 10x with good balance: avoid touching legs together, touching lifted foot to floor, excessive torso movement, hopping or flailing arms
8. May use chair back rest and or cane for balance assistance. Strongly encourage students to attempt exercise without assistive devices (float hand 2" off of chair back rest or hold dowel/can 2" off floor for safety)

SIT TO STAND/Hip Hinge

Start Position



Hip Hinge



Fingers on TOP & Thumb UNDER



If unable to use the dowel behind back due to excessive kyphosis, dowel may be used as a cane.

Sit to Stand



Hold 10 sec



(Legs Touching Chair)



at 90° Hip Flexion



Use 18" Chair Seat Height.

Hip Hinge: Must keep neutral spine, hinge at hips 3-5x maintaining spine position with dowel against head, midback and sacrum. Use fingers/hand on top of dowel and place thumb between the dowel and the lumbar spine to monitor the space as hinging occurs.

Sit to Stand:

Scoot to front of chair, perform hip hinge (think of leading or initiating with tailbone) and stand up. Step back until backs of thighs are touching the chair. Repeat **Sit to Stands** barely touching thighs/buttocks to the chair 10x very slowly. Students can use the dowel as a cane if necessary.

Watch for:

1. Ability to stand up maintaining spine position and balance (avoiding flexion or pelvic tuck).
2. Ability to stand up with good knee and foot organization (avoids valgus, pronation or placing 1 foot behind the other if one leg is weak).
3. Ability to stand up without upper extremity assistance.
4. Ability to hold half squat in 90 degrees of hip flexion above the chair surface for 10-30 seconds.

SINGLE LEG KNEE BEND



Standing Tall in optimal posture with feet together, allow the weight to shift to the left leg. Keeping the pelvis level, lift the right foot off the ground and lift the leg until the knee is even with the hip (Imagine balancing a cup of tea on your knee). Allow the hip, knee and ankle of the standing leg to fold equally and bend as far as ankle range of motion will allow. Hold for 10 progressing to 60 seconds. When able to hold for 60 seconds, begin going up and down as if you are sliding up and down a wall. Repeat 10x each leg.

Remember:

1. Maintain tripod foot, subtalar neutral ankle alignment. Avoid pronation or collapsing arch.
2. Keep knee aligned over 2nd toe. Avoid valgus motion of the knee.
3. Keep Pelvis Level: avoid anterior translation, hiking, or shifting laterally .
4. Maintain Rib to Pelvis Alignment: avoids rib shift anteriorly, laterally or posteriorly and torso lean
5. Keep Shoulder Girdle Organization: avoids elevation, ab/adduction and keeps arms crossed
6. Keep Head Alignment: avoids forward head or jutting of chin
7. Perform 4-5 repetitions with band on right leg. Repeat with band on left leg.

3 WAY HIP: FLEXION, ABDUCTION AND EXTENSION (OF COURSE!)





3 Way Hip Without Band:

Standing Tall in optimal posture with feet together, allow the weight to shift to the left leg. Keeping the pelvis level, lift the right foot off the ground and lift the leg until the knee is even with the hip (Imagine balancing a cup of tea on your knee). Inhale to lengthen the spine. Exhale to send the right foot forward to about 2” off the floor until the knee is straight. Inhale to return to the “stork” position. Exhale to send the right foot out to the side to about 2” off the floor until the knee is straight. Inhale to return to the “stork” position. Exhale to send the right foot back to about 2” off the floor until the knee is straight. Pay special attention to the pelvis position avoiding anterior pelvic motion or lumbar spine extension. Imagine connecting the pubic bone to the sternum to maintain pelvic alignment. Inhale to return to the “stork” position. Repeat 10x each leg. Add pulses if desired.

3 Way Hip WITH Band:

Standing Tall in optimal posture with feet together, allow the weight to shift to the left leg. Keeping the pelvis level, lift the right foot off the ground about 2” with the knee straight and ankle dorsiflexed. Inhale to lengthen the spine. Exhale to lift the right leg about 12”. Inhale to barely touch the skin of the heel to the floor. Repeat 10x forward. 10x to the side and 10x to the back. Add pulses for a challenge. Pay special attention to the pelvis position when the hip extends, avoiding anterior pelvic motion or lumbar spine extension. Imagine connecting the pubic bone to the sternum to maintain pelvic alignment.

3 Way Hip with Standing Leg Bent:

Perform either of the above variations with the standing leg bent for an increased challenge.

Remember:

1. Maintain tripod foot, subtalar neutral ankle alignment of the standing leg. Avoid pronation or collapsing arch.
2. Keep knee aligned over 2nd toe. Avoid valgus motion of the knee.
3. Keep Pelvis Level: avoid anterior translation, hiking, or shifting laterally .
4. Maintain Rib to Pelvis Alignment: avoid rib shift anteriorly, laterally or posteriorly and torso lean
5. Keep Shoulder Girdle Organization: avoid elevation, ab/adduction and keeps arms crossed
6. Keep Head Alignment: avoid forward head or jutting of chin

TEETER TOTTER

Extend Hip



Rock Forward



Hinge Forward to a "T"



Add Shoulder Flexion/Hip Extension



Quadruped



Add Hip Extension



Add Shoulder Flexion/Hip Extension



Teeter Totter: Start with the left leg extended back with a neutral pelvis and straight knee. Place hands on back rest for additional support. Inhale, keeping a vertical and lengthened spine. Exhale, hinge forward, flexing the right hip. As long as neutral spine and pelvis are maintained, continue to hinge forward until body forms a "T" position. Imagine that you are one long plank from the head to the left foot. Inhale to return to starting position. Repeat 5-10 times on each side.

Teeter Totter-Quadruped: Start with the left leg extended back with a neutral pelvis and straight knee. Hinge forward and place both hands on the chair seat for additional support. Inhale, keeping a vertical and lengthened spine. Exhale, extending the left hip and add shoulder flexion with the hip extension. Inhale to return to starting position. Repeat 5-10 times on each side.



Knee Pain Routine:

1. Stand with feet as close together in parallel as possible.
2. Stand on 1 leg for 10 seconds, progressing to 30 sec and then 1 minute.
3. Perform 10 heel raises with knee straight and ankle neutral alignment.
 - Stand against a doorframe as needed for spine and pelvic alignment and support.
4. Perform 3 Way Hip Exercise with emphasis on Pelvic Stability with supporting leg aligned and knee straight.
5. Add resistance loop to the 3-Way Hip Exercise with band above knees, then below knees and finally just above ankles as strength progresses.
6. Long Stride Straight Leg Lunges (See Marriage Proposal Lunges)

Tips:

This program is designed to provide support to the joint in a non-painful position.

Starting with the calf and hip to strengthen distally and proximally will help a great deal with providing knee support.

To build strength rather than endurance, start with 8-12 reps and when able to perform 15-20 reps, it is time to add resistance or challenge. If they can perform 20 reps of any exercise, it is too easy to build strength.

When a client is weak and prone to increased pain, start with low intensity exercise. This means that they should be able to perform 20-25 reps of an exercise.



Lower Extremity Strength Progression:

1. Find Subtalar Neutral
2. Find Pelvic Neutral with relaxed lumbar paraspinals
3. Measure L3 distance from dowel
4. Stand with feet together
5. Stand on one leg x 30 seconds
6. Heel Raises x 10
7. Flex at hip, knee and ankle as if you are sliding down a wall on 2 feet and then in single leg stance
8. Lunge Progressions



Marriage Proposal Lunge: 3 foot stride, parallel legs and feet (railroad track image), pelvic headlights, lift pubic bone.



“Marriage Proposal” Lunge Progression

Level 1: Keep Knees straight, do heel lift only. Stretch calf and hip flexor.

Level 2: Bend Back Knee without dropping pelvis or torso, then bend front knee without dropping pelvis or torso.



Level 3: Go 1/2 way down, no translation of the body forward. Keep torso vertical.



Level 4: All the way to floor: ending in 90 degree angle at both knees with torso vertical

Modification: Spine against a door frame



Hip Hinge to Quadruped

Practice weight shifts and core control to achieve the high kneeling position.



Keeping the spine lengthened, shift the weight over and unweight the left knee bringing it to the floor.



Hinge at hips sitting back toward heels keeping neutral spine to bring hands to floor.

Lengthen the spine and press the shoulder blades wide to achieve a neutral or optimal spine position on the mat.

APPARATUS Exercises:

Reformer:

- Footwork progressing to Heavy Springs
- Standing Knee Extension (Parallel and External Rotation)
- Bridging
- Eve's Lunge
- Scooter (Careful with knee pain increasing)
- Thigh Stretch
- Standing Side Splits with Narrow Stance
- Front Splits/Russian

Trapeze Table:

- Footwork
- Parakeet
- Thigh Stretch
- Quadruped Hip Extension
- Spring Assisted Squats

Chair:

- Standing Leg Pumps
- Achilles Stretch
- Seated Footwork
- Forward Lunge
- Backward Stepdown
- Side Lunge
- Side Stepdown
- Plie Front/Back

Ped-o-Pul:

- Plies (parallel and external rotation)
- Single Leg Plies



Thigh Stretch is great for reducing patellar femoral pressure from a tight rectus femoris.



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