Physical Assessment for the Pilates Professional

Physical Therapy of Los Gatos
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Why assess?

- Assessment should be done at the first session to determine goals and limitations.
- Assessment will help direct your choices in exercises to reach your client’s fitness goals, avoid injury, and to keep your client with you.
- Assessment includes muscle flexibility, strength, range of motion, and motor control.
Health Questionnaire

1. Name__________________________________________
2. Why are you taking Pilates? __________________________________________
3. Do you have any specific fitness goals? __________________________________
4. What the physical demands of your occupation? (ex.: sitting, standing, walking, driving) ______________________________________________________________________
5. Do you have any current injuries? No ___________ Yes ______________________
6. Are you under medical care? No ___________ Yes ______________________
7. How often do you exercise? ______________________________________________________________________
8. What type of exercise? ______________________________________________________________________
9. Do you have any concerns or questions? ______________________________________________________________________

10. Do you have a history of:
    Diabetes No ___________ Yes ______________________
    High blood pressure No ___________ Yes ______________________
    Surgery to your head, neck or spine No ___________ Yes ______________________
    Abdominal surgery No ___________ Yes ______________________
    Shoulder injury No ___________ Yes ______________________
    Knee injury No ___________ Yes ______________________
    Ankle injury No ___________ Yes ______________________
    Wrist injury No ___________ Yes ______________________
    Low back pain or injury No ___________ Yes ______________________
    Neck pain or injury No ___________ Yes ______________________
    Fractures No ___________ Yes ______________________
    Osteoporosis No ___________ Yes ______________________
    Rheumatoid arthritis No ___________ Yes ______________________
    Osteoarthritis No ___________ Yes ______________________
    Are you currently pregnant? No ___________ Yes ______________________
Subjective answers

- Occupation? Provides information about habitual postures of the patient.
- Injuries? Have they seen a medical practitioner?
- Exercise level? Current level of conditioning.
- Type of exercise? Provides additional information about habitual postures, muscle imbalances.
- Is the client new to Pilates?
**Systems review**

- **Diabetes** - may have difficulty feeling hands and feet, watch blood sugar levels and know signs of hypo or hyper, are they insulin dependant? Do they carry glucose tablets with them?

- **High Blood pressure** - do they take medications? Some cause decreased sweating and stunt heart rate, may cause overheating and fainting. Keep heart rate and blood pressure numbers within safe range.
Orthopedic injuries

- Surgery to head or neck - beware of decreased range of motion and movement precautions
- Shoulder injury - beware of range of motion - look at their scapular pattern
- Knee injury - beware of range of motion - look at ankles and hips
- Ankle injury - beware of range of motion - look at balance and hip strength.
- Wrist injury - be cautious of weight-bearing activities.
- Past fractures - weakness surrounding that site.
Continued……

- **Osteoporosis**: Are they on meds? Weight-bearing and resistive exercises are the best. Beware of thoracic spine flexion exercises.
- **Rheumatoid arthritis**: May have ligament laxity, don’t push end-ranges.
- **Osteoarthritis**: Limited range of motion.
- **Pregnant**: Limited exercise in supine position, increased ligament laxity, especially in 3rd trimester. No feet in straps exercises.
Red Flags for referral to medical professional.

- Pain, numbness or tingling radiating down an extremity
- Sleep disturbances secondary to pain
- Anatomical deformities (scoliosis, lateral shift, knee, foot etc.)
- Sudden unexplained changes in weight or appetite
- Excessive fatigue or weakness
- Dizziness
- Vision changes
Assessment of Optimal posture

A plumb line is most often used. The line should be referenced with a point just anterior to the lateral malleolus for lateral views and midway between the heels for a posterior view.

Optimal posture minimize muscle activity in standing and optimizes energy efficiency.

The lateral viewpoints:
- Slightly anterior to lateral malleolus
- Slightly anterior to axis of knee joint
- Slightly posterior to axis of hip joint
- Bodies of mid-lumbar vertebrae
- Shoulder joint
- Bodies of mid-cervical vertebrae
- External auditory meatus
- Slightly posterior to apex of coronal suture.

Posterior viewpoints:
- Should bisect the body
Plumb line pictures
Poor posture
Lumbar flexion 65 degrees
Scoliosis
Scoliosis screen

- Scoliosis is a lateral curvature of the spine.
- Observe a rib hump when the client bends forward.
- May be fixed or compensatory.
- Fixed will remain.
- Compensatory will normalize when bending forward.
Scoliosis treatment

- Stretch concavity
- Create stiffness in spine
- Symmetrical strengthening
- Best shown in side plank
Lumbar extension 27 degrees
Lumbar side-bend 20-30 degrees
Hamstrings 60 degrees
Hip Flexors 30 degrees
Plantar flexors 10 degrees
Quadriceps 120 degrees
Neural tension signs

- Reproduction of leg pain, pulling, or tingling with:
  - Straight leg raise
  - Slumped sitting
- If positive, refer client to medical professional avoid flexion exercises.
- Recommend no flexion or extension exercises
Hypermobility scale

- Beighton hypermobility score (0-9)
- One point may be gained for each side for maneuvers 1-4 so that the hypermobility score will have a maximum of 9 points if all are positive
Hypermobility Score (cont.)

The ability to:
- Passively dorsiflex the 5th metacarpophalangeal joint to $\geq 90^\circ$
- Passively appose the thumb to the volar aspect of the forearm
- Passively hyperextend the elbow to $\geq 10^\circ$
- Passively hyperextend the knee to $\geq 10^\circ$
- Actively place hands flat on the floor without bending the knees.
Trunk muscles

**Trunk Muscle Endurance Testing**
Recent work by McGill and others has shown muscle endurance, not strength, better discriminates who has had back troubles from those who have not. McGill has shown the relationship of endurance among the front, side and back muscles is altered once back troubles begin and remains even after the symptom resolve. Endurance testing of these muscles is described below and measured in seconds.

**Lateral Musculature Test**
The lateral musculature is tested with the person lying in the full side-bridge position. Legs are extended, and the top foot is placed in front of the lower foot for support. Subjects support themselves on one elbow and on their feet while lifting their hips off the floor to create a straight line over their body length. The uninvolved arm is held across the chest with the hand placed on the opposite shoulder. Failure occurs when the person looses the straight-backed posture and the hip returns to the ground.

**Flexor Endurance Test**
Testing endurance of the flexors begins with the person in a sit-up posture with the back resting against a jig or table angled at 60º from the floor. Knees and hips are flexed 90º, the arms are folded across the chest with the hands placed on the opposite shoulder, and toes are secured under toe straps or secured by the physical therapist. To begin, the jig or table is pulled back 10 cm (4 in.) and the person holds the isometric posture as long as possible. Failure is determined to occur when any part of the person’s back touches the jig.

**Back Extensors Test**
The back extensors are tested in the “Biering-Sorensen position” with the upper body cantilevered out over the end of a test bench and with the pelvis, knees, and hips secured. The upper limbs are held across the chest with the hands resting on the opposite shoulders. Failure occurs when the upper body drops from the horizontal position.

*Mean age 21 yrs (men: n = 92; women: n = 137)*

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<th>MEN</th>
<th>WOMEN</th>
<th>ALL</th>
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<td>LSB</td>
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RSB = right side bridge, LSB = left side bridge

Flexion test position (135 seconds)
Front plank (120 seconds)
Extension test position
(170 seconds)

- Biering-Sorensen position
- Pelvis hips and knees secured to a table or bench.
- Failure when upper body drops from horizontal position.
- Average is 185 seconds.
Side test position (90 seconds)
Single leg heel raises

- Client should be able to perform 25 repetitions on one leg.
- Weight over 1\textsuperscript{st} and 2\textsuperscript{nd} toes.
Balance-dynamic running simulation (30 seconds)
Anterior cervical control
(45 seconds)
Glenohumeral rhythm
Push-ups

- Watch for scapular winging and lumbo-pelvic control
- Best performed on ground
Breathing
Now what?

- Following an assessment, examine the findings on your evaluation sheet to determine client goals.
- Choose specific exercises to meet those goals based on Pilates principles.
How are you prescribing the exercises?

Based on Pilates principles:
- Core control or trunk stabilization – for those who perform poor trunk tests.
- Organization of shoulder girdle, thoracic spine, or cervical spine – for those with poor glenohumeral rhythm, anterior cervical control, push up.
- Spine articulation or range of motion (do they need spinal flexion or extension?) – for those with poor spinal ROM.
- Alignment and weight bearing of lower extremity (strength or balance) – for those with poor dynamic balance.
- Breathing – for those with poor rib expansion.
Spinal Articulation Classification

**Flexion**
- Forward bend
- Roll up/down
- Articulated bridge
- Rolling like a ball
- Seal
- Child’s pose
- Abdominal curls
- Head raised 100’s
- Single leg stretch
- Scissors
- Spine stretch
- Roll-over/jackknife

**Extension**
- Swan prep
- Swimming
- Dart
- Boat
- Single leg kick
Who needs flexion exercises?

- Clients who show excessive lumbar lordotic posture
- Clients with a “military” posture
Who shouldn’t do flexion exercises?

- Clients with a history of disc herniation or “slipped” disc.
- Clients with pain or neural tension in legs or arms.
- Clients with osteoporosis
Who needs extension exercises?

- Clients who do excessive computer work or driving
- Clients with a kyphotic thoracic spine
- Clients with a sway back posture
- Clients with a flat lumbar spine
Who shouldn’t do extension exercises?

- Clients with lumbar stenosis
- Pain in legs upon extension
Exercise prescription and progression

- Listen to clients — it will make their experience better and they will want to return
- Be familiar with the targeted muscles and the client’s weaknesses
- Carefully observe the client. Make sure you can see the proper muscles contracting.
- Ask your client where they feel the exercise or stretch
Subjective: 49 year old female with chronic low back pain over 10 years. She underwent physical therapy last year during a symptom flare up and obtained significant relief. She discontinued the home exercise program instructed by her Physical Therapist approximately 6 months ago. She does not perform any cardiovascular exercise. She also reports intermittent left shoulder and right hip pain but has not seen a doctor for these symptoms. She has never before performed Pilates exercise, but her friend recommended she try it. Past surgeries include cesarean section.
Evaluation Findings

1. Posture: she is kypho-lordotic.

2. Lumbar Range of motion in degrees:
   - Flexion/forward bend: 100 - 50 = 50/65
   - Extension/backward bend: 18
   - Right sidebending: 25
   - Left sidebending: 21

3. Lower Extremity flexibility in degrees:
   - Hamstring: Left 50 Right 60
   - Hip flexors: Left 12 Right 15
   - Plantar flexors: Left 15 Right 15
   - Quadriceps: Left 130 Right 130
   - Neural tension signs: Positive straight leg raise Left, Negative Right
Evaluation Findings

4. Strength:

   Trunk muscles:
     Front plank 30 seconds
     Right side plank 20 seconds
     Left side plank 10 seconds
     Extensors 60 seconds

   Single Leg Balance:
     Left 30 seconds
     Right 55 seconds

   Anterior Cervical Control
     Good, patient able to lift head in supine

   Glenohumeral rhythm: Early upward rotation left

   Pushups: bilateral scapular winging

   Breathing: good, lateral costal expansion bilaterally
Treatment Plan/Prescription

What are the goals for this client?

Correct posture
Lumbar Range of Motion: increase BB, left SB
Increase flexibility: hip flexors, left hamstring
Increase trunk muscle endurance
Improve single leg balance
Improve glenohumeral rhythm
Treatment Plan/Prescription

Which Pilates exercises would you give her to achieve these specific goals in session 1?

Mat work: Pelvic clock, Angry cat/horse, Quadruped, Swimming (pre), Femur arcs

Reformer: Footwork, Supine arm arcs, Standing hip stretch (eves lunge), Scooter, Seated or standing leg press

Trapeze: Legs springs supine or sidelying, Thigh stretch

Chair: Standing or seated leg pump, Achilles stretch
Which Pilates exercises would you give her to achieve these specific goals at four weeks?

Mat work: Bridging, Prone extension/pre swan, Mermaid, Spine stretch (modified)

Reformer: Mermaid, Feet in straps

Trapeze: Breathing Cat, Supine push through, Seated pull-down (shoulder) Roll down series

Chair: Swan, Prone Scapular series
Which Pilates exercises would you give her to achieve these specific goals at eight weeks?

Mat work: Swan dive, Sidekick, Advanced bridging (single leg), Leg pull front/back, Leg pull front/back, Swimming

Reformer: Prone pulling straps (long box), Kneeling arms, Side or front splits (abduction), Short box series, Short or long spine

Trapeze: Hip extension with tower bar, Teaser Dolphin, Hanging series

Chair: Assisted dips or frog, Forward lunge, Lateral flexion