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Pilates Fundamentals for the Physical Therapy Patient

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Introduction

- Rhondi Miller, PT, MS, SCS, ATC
- Over 25 years of orthopedic experience
- Board Certified APTA: Sports Clinical Specialist
- Certified Pilates Teacher- Pilates Method Alliance
- Comprehensively Certified Pilates Teacher-Balanced Body. Faculty: CoreAlign, MOTR
- Certified Athletic Trainer
- PT at Viverant (Mpls, MN) Director of PT/Pilates program
Learning Outcomes

After this course, participants will be able to:

- Independently list the nine Pilates principles
- Define the inner unit and outer unit and their roles in movement vs. stabilization
- Identify the criteria of proper grounding in supine, quadruped, prone and standing
- Describe how Pilates fundamentals can be applied to physical therapy exercises of bridging, bird/dog, planks and squats

Course Sequence

- Pilates exercises are used frequently by PTs, however further detail on how patients can more fully benefit from Pilates is needed.
- There will be four courses in this series: Pilates Fundamentals for the PT Patient, Clinical Use of the Reformer for Core Integration, Clinical Use of the Reformer for the Lower Body, and Clinical Use of the Reformer for the Upper Body.
- The background and basis for Pilates is presented in course 1. Then is further developed in courses 2-4 on the reformer. Many outpatient clinics have a reformer. These courses will teach clinically-relevant exercises that address correcting dysfunctional movement patterns for the entire body.
- This will progress from basic local isolation, to regional interdependence and finally to global, whole-body integration.
Pilates definition

- Pilates is a method of exercise which emphasizes the balanced development of muscles and the mind/body connection. Movements encourage focused awareness and control of the body during a wide range of patterns and sequences.
- Pilates builds strength from the inside, out
- Pilates works the whole body and has applications for every kind of activity.

Brief Pilates History

- Developed by German-born Joseph Pilates
- Used background in physical exercise from boxing, gymnastics, martial arts, and experience as "rehab aide" in WWI to devise his regimen called "contrology"
- Contrology eventually was called "Pilates"
- Immigrated to US in 1926
- Inventor of many devices
- His vision was to bring Contrology to the masses to increase mind-body health of the people
- Patent expired in 2000 and since then it has grown exponentially
Rehab Benefits of Pilates

- Improves posture, balance\(^{(3, 4)}\) and alignment\(^{(3)}\)
- Effectively activates the mm’s of the inner unit\(^{(5, 6, 7, 8, 9, 10)}\)
- Increases strength\(^{(3, 5, 7)}\), mobility\(^{(3, 7, 11)}\) and flexibility\(^{(7, 11)}\)
- Decreases pain in chronic LBP patients \(^{(3, 12, 13, 14, 15)}\)
- Increase Functional outcomes \(^{(3, 12, 13, 14)}\)

Benefits of Pilates

- Increases lung capacity and circulation (method of breathing)
- Creates muscle balance around a joint (OKC & CKC)
- Non-compressive to joints
- Much of the work is eccentric- controlling a load while mm is lengthening
- Can be applied to all ages, all levels of fitness
- Improves coordination- muscular and mental
- Improves bone density and joint health
- Improves body awareness
Pilates Principles

1) Breathing - connect mind/body, tissue oxygenation, supports performance
2) Concentration - cognitive attention while performing the exercises
3) Control - postural management, just the right amount of energy to perform
4) Centering - core, powerhouse, all work radiates outward from there
5) Precision - perform correctly, proper patterning, accurate movement
6) Relaxation - balance between work/relaxation, release unnecessary tension
7) Rhythm/Flow - smooth, coordinated transitions/movement
8) Balanced muscle development - all sides of the joint, all planes
9) Whole body movement - integration, global systems in sync throughout

Definition: Inner Core/Unit

Consists of
- Transversus abdominis
- Diaphragm
- Multifidi
- Pelvic floor
Definition: Outer Core/Unit $^{16,17,18}$

- Deep Longitudinal system:
  - occipitals
  - erector spinae
  - quadratus lumborum
  - thoracolumbar fascia
  - sacrotuberous ligament
  - biceps femoris
  - gastroc
  - plantar fascia

Definition: Outer Core/Unit

- Anterior Oblique sling:
  - serratus anterior
  - external oblique
  - contralateral internal oblique
  - contralateral adductors
Definition: Outer Core/Unit

- **Posterior Oblique sling:**
  - Latissimus dorsi
  - Contralateral glute

**Lateral system** (not pictured)
- quadratus lumborum
- glute medius/minimus
- contralateral adductors

**Leg spiral** (pictured)
Imaginary spiral from medial arch of foot, up to VMO, spiraling to lateral hip rotators.
Controlled mobility/stability

- It is through coordinated movement that the inner and outer units work together to create efficient movement between the legs, pelvis, spine, thorax and shoulder girdle.
- Restrictions/dysfunctions in any of these systems can lead to poor patterning that can lead to injury/pain.
- Physical therapists are uniquely positioned to restore joint/tissue mobility and retrain healthy movement patterns. (19)

Grounding: Supine

- Finding Neutral pelvis: pelvic rocking post/anter using abs. ASIS/lower anterior rib angles=bony landmarks for patients.
- Abdominal activation: proper activation of transversus abdominis, maintain neutral pelvis/spine
- LE alignment
- Ribcage arms: scapular/ribcage/core connection
video

- View supine grounding 2, 3, 4 videos

Grounding: Quadruped

- Neutral pelvis
- Neutral scapular position
- Spinal mobility: lumbar vs. thoracic
- Spinal elongation
- Isometric abdominal brace
video

- View quadruped grounding

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Grounding: Sidelying

- TrA activation, narrowing of waistline
- Scapula/ribcage/oblique connection
- Adductor/pelvic floor/TrA connection
- Posterior line activation all the way to head

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Continued

video

- View side bridge

Continued

Grounding: Prone

- Neutral pelvis
- Inner Unit activation: breath/pelvic floor/TrA/multifidi
- Spinal elongation
- Leg lift from gluteals
- Arm lift from lower trap/lat balance
Video

- View prone grounding

Grounding: Standing

- Look at all planes
- Active arch: foot intrinsics, maintenance of metatarsal and longitudinal arches
- Neutral pelvis: sagittal
- Side view: head over shoulders; ribs over pelvis; pelvis on centered femurs; body over feet
Bridge:

- Common faulty movement patterns:
  - Overuse of lumbar extensors
  - Tight hip flexors/rectus femoris
  - Compression of vertebrae/ Loss of elongation
- Clinical considerations
  - Tight hip flexors/rectus femoris
  - Poor abdominal control
  - Poor rib control/rib flare
  - Loss of neutral spine
  - Loss of LE alignment
  - Pelvic rotation
- Flat vs. Articulating
Bridge:

- Principles: elongation, hip/pelvis dissociation (flat back version), articulation, open anterior hip, rib cage control, balanced mm development, breath
- Inner: Initiate posterior pelvis tilt with abdominals and include pelvic floor mm activation. Don’t hold breath.
- Outer: shortening anterior/lengthening posterior which opens lumbar spine. Lengthening anterior hip/thigh. Maintain medial line of LEs.

Bridge:

- Local- LE: if ITB is tight, then difficult for adductors to activate. If hip flexors/quads are tight, then hams at disadvantage, compensate with lumbar extensors.
- Regional: hip/pelvis: goal of equal work between abs/glutes. If lumbar extensors are overworking, then lower height of hip lift.
- Global: Step back: ideal= relaxed head, neck; open collar bone; connected ribs; elongated/decompressed spine; proper LE alignment. Completely integrated.
- If so, then ready to add challenge: march, hip dip (lumbar rotation)- same ability to maintain integration
video

- View bridge

Bird/Dog: Quadruped arm/leg

- Common faulty movement patterns:
  - Loss of neutral spine
  - Overuse of upper traps
  - Overuse of hip flexors
  - Dropped head
  - Winging scapulae
  - Underuse of abs/pelvic floor
  - Overuse of back extensors

- Clinical Considerations
Bird/Dog: Quadruped arm/leg

- Principles: elongation, hip/pelvis dissociation, articulation, open anterior hip, rib cage control, balanced mm development, breath
- Inner: for TrA cue naval to spine, decompression of spine; breath control; float ribcage off pelvis; float pelvis off femurs; pelvic floor participation
- Outer: cue anterior oblique sling for stance limbs arm/core/leg connection. Posterior oblique sling for lifted limb connection. Medial line for both stance & lifted legs.

Bird/Dog: Quadruped arm/leg

- Local: Wrist: decompress, can modify w elbows on box. Shoulder: balance anter/post, humeral ER in CKC. Hip/leg alignment: neutral
- Global: Head to tail activation posteriorly/anteriorly. Share the work throughout the whole body. What’s your purpose?
video
- View bird dog and bird dog 2

Plank
- Common faulty movement patterns:
  - Loss of neutral spine
  - Winging scapulae
  - Dropped head
  - Overuse of quads
  - Overuse of back extensors
  - Underuse of abs/inner thighs
- Clinical Considerations
Plank

- Principles: elongation, hip/pelvis dissociation, articulation, open anterior hip, rib cage control, balanced mm development, breath
- Outer: deep longitudinal- keep head in line. Balance anterior/posterior lines.

Plank

- Regional: shoulder/thorax: humeral ER; serratus activation/not pec. Arm/core/feet connection: balanced support anteriorly & posteriorly, spinal elongation.
- Global: Head to heel integration: front to back, top to bottom; breath, ease, efficiency.
- If so, then can add challenge: leg/arm lift, leg/arm abd.
video

- View hover, plank1

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Squat

- Common faulty movement patterns:
  - Loss neutral spine
  - Compressed spine
  - Flare of ribs
  - Loss of scapulohumeral rhythm
  - Pelvic/Hip poor dissociation
  - Overactive upper traps/hip flexors
  - Poor head position
  - Knee/ankle/foot alignment errors
  - Underactive glutes/core
  - Tight lats

- Clinical Considerations
Squat

- **Principles**: elongation, hip/pelvis dissociation, rib cage control, balanced mm development, precision
- **Inner**: co-contraction of TrA/multifidi/pelvic floor. Use of breath to assist abdominal brace.
- **Outer**: posterior obliq sling: glute max. deep longitudinal line: balance with anterior line. Medial/lateral lines balanced for LE valgus/femoral IR.

**Local**: foot/ankle-arch/pronation, DF of ankle. Hip: adduction/IR of femur

**Regional**: pelvifemoral dissociation & control; Ribcage organization over pelvis; maintain spinal curves & decompression. Scapulohumeral rhythm if arms overhead.

**Global**: foot to head integration. Centered joints, decompressed joints. Static, dynamic & single-leg conditions.
Clinical Pearls

- Foundation training is something people need to do to maintain health and be able to do the fun things in life. Pilates, performed correctly, is foundation training.
- PT’s are experts in movement analysis, guiding patients into optimal movement, diagnosing movement dysfunctions, and developing programs for treatment and prevention (sahrmann).
Clinical Pearls

- APTA Vision Statement on the profession of physical therapy=
  "Transforming society by optimizing movement to improve the human experience" (20)

- Pilates is an intervention that a PT can use to train healthy movement patterns and correct chronic, unhealthy movement in patients. Pilates equipment allows for 3-D, whole body training & integration.

Clinical Pearls

- Watch for overgripping with muscles
- Watch for the path of least resistance
- Cue ease and efficient movement, if they can’t move efficiently, step back and analyze. Stop and correct- cue better, regress, break into parts, put back together. May need manual intervention.
- Continue to push their edge in order to see what strategies the patient chooses. Do they revert to their old, unhealthy patterns? If so, they are not integrating/applying the learning.
Clinical Pearls

- Remember the stance limb/s or stabilizing limb/s are just as important as the moving ones.
- Just as much energy should be spent controlling the return movement as the initial movement:
  
  e.g. lowering phase of bridge equal to lifting phase.
- Breath can help facilitate abdominal and pelvic floor activation. Breathing during Pilates training assists patients with chronic pain who tend to be shallow breathers.

Summary

- Learned the 9 Pilates Principles
- How the inner and outer units work together to provide a stable base for patients to move from
- Learned Pilates fundamentals in supine, quadruped, prone, sidelying and standing.
- How apply the concepts to frequently used exercises in the clinic of bridges, bird/dog, planks and squats.
Final Thought

- Pilates “develops the body uniformly, corrects wrong postures, restores physical vitality, invigorates the mind and elevates the spirit”
  -- J. H. Pilates

Thank you!

- Upcoming courses:
  - Clinical Use of the Reformer for Core Integration
  - Clinical Use of the Reformer for the Lower Body
  - Clinical Use of the Reformer for the Upper Body
References and Contact

- REFERENCES:
  - Provided in attached PDF

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