Exercise

Pilates

Pilates Finds Its Roots in Therapeutic Exercise

by Christine Romani-Ruby, PT, MPT, ATC

PHOTOS COURTESY OF PHI PILATES

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The Pilates method of exercise, created by Joseph Pilates in the 1920s, has ranked as one of the top 10 fitness trends for the last 5 years. Pilates is presently ranked as number nine for 2010.[1] In the fitness arena, Pilates is well known for its effects on strengthening the core muscles, but the technique was originally created for rehabilitation.

Joe Pilates was a sickly child suffering from asthma and rickets, and he created the method to increase his physical ability. He was very successful with his method, progressing physically to perform as both a boxer and a gymnast. He then went on to use his method for the rehabilitation of dancers and polio victims.

Today, Pilates has become a useful method for general fitness, but its roots in rehabilitation have not been forgotten. In the hands of a PT, Pilates takes on the more unique role it was originally intended to fulfill as therapeutic exercise. Presently, a large group of PTs are finding the Pilates equipment and method their most effective tool for impairments stemming from postural problems to muscle imbalances.

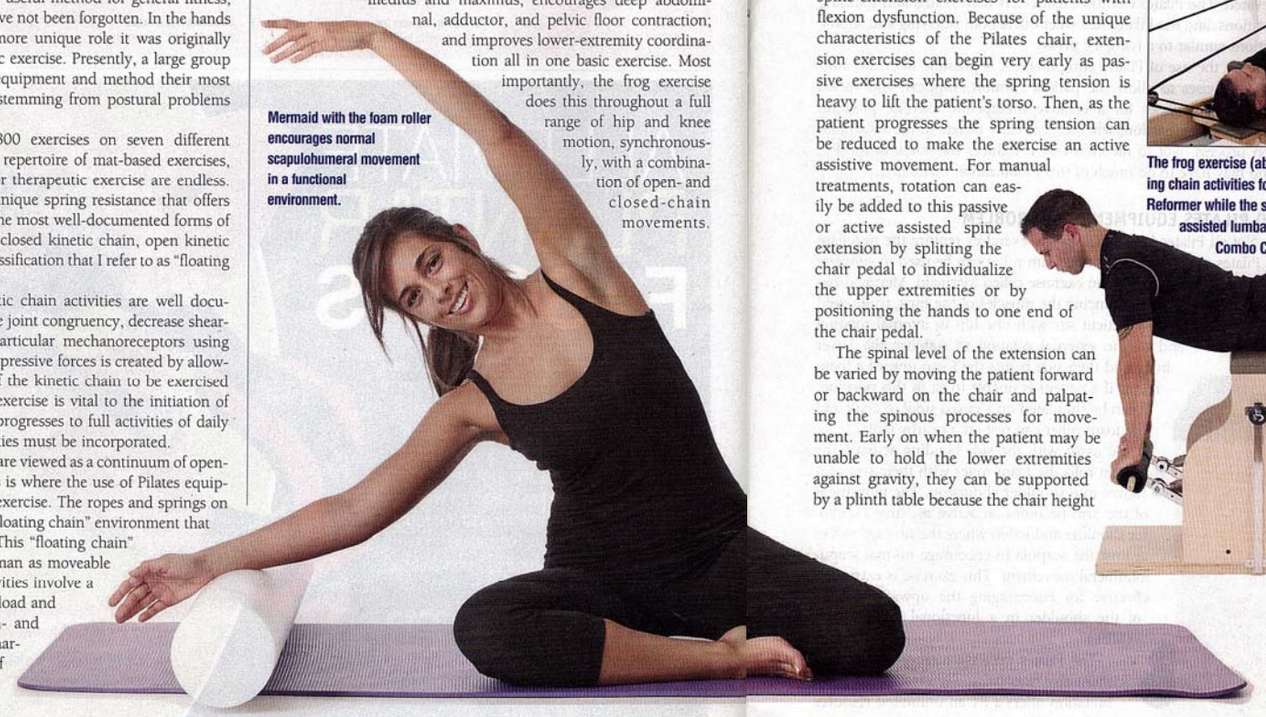
Incorporating more than 800 exercises on seven different pieces of equipment and a full repertoire of mat-based exercises, the Pilates treatment choices for therapeutic exercise are endless. The Pilates equipment uses a unique spring resistance that offers unlimited options for some of the most well-documented forms of therapeutic exercise, including closed kinetic chain, open kinetic chain, and a more functional classification that I refer to as "floating kinetic chain" exercises.

The benefits of closed kinetic chain activities are well documented. Their ability to enhance joint congruency, decrease shearing forces, and stimulate the articular mechanoreceptors using axial loading and increased compressive forces is created by allowing the entire linkage system of the kinetic chain to be exercised together. Closed kinetic chain exercise is vital to the initiation of rehabilitation, but as a patient progresses to full activities of daily living, open kinetic chain activities must be incorporated.

Functional activities actually are viewed as a continuum of open- and closed-chain activities. This is where the use of Pilates equipment is unique for therapeutic exercise. The ropes and springs on the Pilates equipment create a "floating chain" environment that simulates functional activities. This "floating chain" movement is described by Dillman as moveable external load (MEL).[2] MEL activities involve a moveable end with an external load and include a combination of open- and closed-chain actions that are characterized by co-contraction of the muscles around the joints.[2]

These "floating chain" exercises are especially useful when a client has an imbalance in the global joint support system. For example, the frog exercise demonstrated in the photo above is particularly useful in balancing the muscles of the lateral oblique system (quadratus lumborum, gluteus medius, iliotibial band, and hip adductors) and the posterior oblique system (gluteus maximus, latissimus dorsi, and lumbar fascia). Imbalances in this area can be causes of Sacroiliac instability and pain, patellofemoral pain, Iliotibial band syndrome, gait disturbances such as Trendelenberg or gluteus maximus lurch, labral tears in the hip, and plantar fasciitis.[3]

The frog exercise lengthens the iliotibial band and hip internal rotators; strengthens the gluteus medius and maximus; encourages deep abdominal, adductor, and pelvic floor contraction; and improves lower-extremity coordination all in one basic exercise. Most importantly, the frog exercise does this throughout a full range of hip and knee motion, synchronously, with a combination of open- and closed-chain movements.



Mermaid with the foam roller encourages normal scapulohumeral movement in a functional environment.

The arm circle exercise here demonstrates the floating chain activities for the upper extremity on the Reformer.

There is not another exercise machine that can simulate this as easily or as accurately in the early stages of rehabilitation.

THE PILATES COMBO CHAIR

An additional opportunity for therapeutic exercise on the Pilates equipment is evident in the use of the Pilates Combo Chair for spine-extension exercises for patients with flexion dysfunction. Because of the unique characteristics of the Pilates chair, extension exercises can begin very early as passive exercises where the spring tension is heavy to lift the patient's torso. Then, as the patient progresses the spring tension can be reduced to make the exercise an active assistive movement. For manual treatments, rotation can easily be added to this passive or active assisted spine extension by splitting the chair pedal to individualize the upper extremities or by positioning the hands to one end of the chair pedal.

The spinal level of the extension can be varied by moving the patient forward or backward on the chair and palpating the spinous processes for movement. Early on when the patient may be unable to hold the lower extremities against gravity, they can be supported by a plinth table because the chair height matches the height of a standard plinth table. This exercise is very effective for the treatment of lumbar herniated discs for the centralization of radicular symptoms, and it allows easy access to the spine to palpate or assist movement manually.

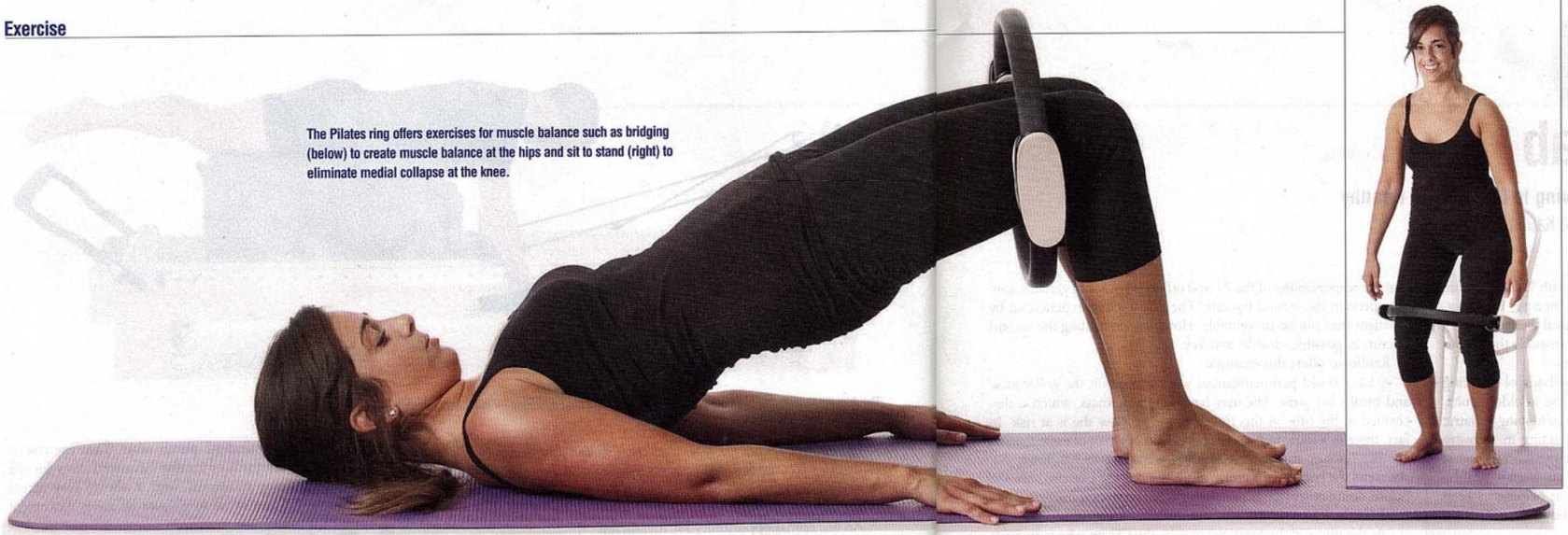
The frog exercise (above) demonstrates the floating chain activities for the lower extremity on the Reformer while the swan (below) provides active assisted lumbar spine extension on the Combo Chair.

The Pilates Combo Chair is also effective in providing spinal flexion activities for patients with spinal stenosis. One exercise, called Hamstring 1, allows the patient to flex the spine comfortably in standing with support and resistance from the chair pedal springs. Then on the return from forward bend, the chair pedal provides an active assistive force that assists the PT in teaching the patient how to avoid extension in the low back. The extension of the low back on the return from a forward bend is a common cause of pain in patients with spinal stenosis, and this is one of the most vital physical therapy lessons for patients with spinal stenosis.[4,5]

THE PILATES RING

One of the smaller pieces of Pilates equipment, called the Pilates ring, offers exercises for muscle balance in the lumbo-pelvic-hip complex. This exercise, not traditionally in the Pilates repertoire, is really a functional activity enhanced by proprioceptive feedback from the Pilates ring. In this exercise the patient wears the Pilates ring above their knees like a skirt while moving from sit to stand.[6] The goal of the exercise is to avoid dropping the ring while coming to a full standing position.

The proprioceptive feedback of the ring encourages the patient to avoid medial collapse at the knee, which is a common problem for patients with gluteal or quadricep weakness, patellofemoral problems, iliotibial band syndrome, ACL insufficiency, or in postrehabilitation from knee surgery. This same exercise can be easily replicated in a bridging position for those who are unable to bear full weight early in the

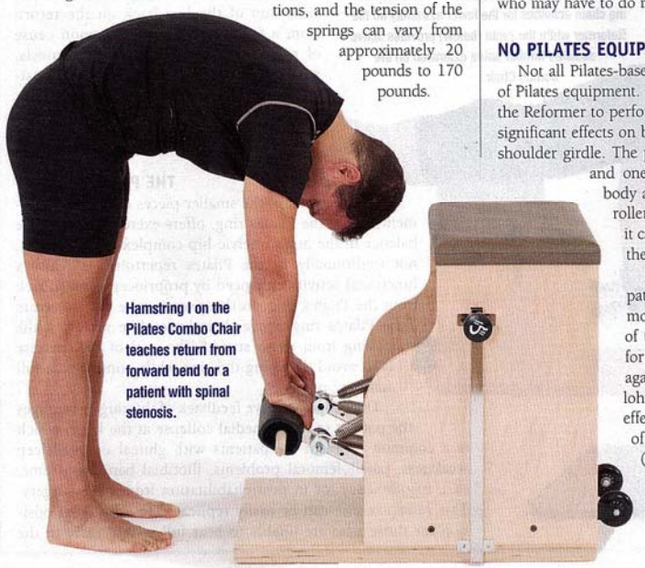


The Pilates ring offers exercises for muscle balance such as bridging (below) to create muscle balance at the hips and sit to stand (right) to eliminate medial collapse at the knee.

rehabilitation process. This is an excellent option for those with recent total knee replacements.

PILATES AND TOTAL KNEE REPLACEMENT

While discussing the topic of total knee replacement, every PT is aware of the need for early and constant mobilization following surgery. The Pilates equipment provides many options for encouraging early range of motion using passive stretching and PNF stretching techniques with the assistance of the spring resistance. The exercises encourage both flexion and full extension in a variety of body positions, and the tension of the springs can vary from approximately 20 pounds to 170 pounds.



Hamstring I on the Pilates Combo Chair teaches return from forward bend for a patient with spinal stenosis.

One of the Pilates apparatus called the Cadillac uses a push-through bar that allows the patient to lie in supine with the feet elevated. The Pilates Combo Chair offers both seated and standing positions, and the Pilates Reformer offers both sidelying and supine options similar to a lying leg press.

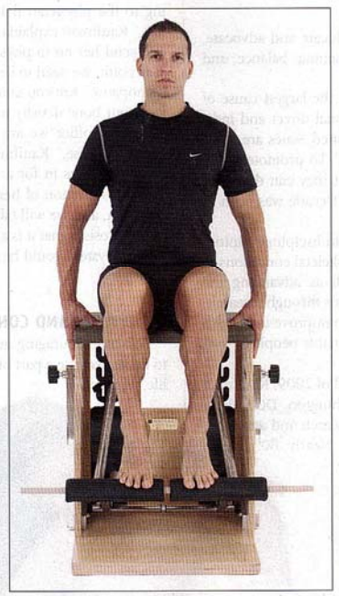
With the use of Pilates equipment, it is possible to create multiple exercises to allow the patient comfort, support, and varied functional activities for a creative therapeutic exercise program geared to mobilization, whether it is early or late in the rehabilitation process. Not to mention that it reduces the stress to the PT, who may have to do much of this mobilization manually.

NO PILATES EQUIPMENT? NO PROBLEM

Not all Pilates-based therapeutic exercises require the purchase of Pilates equipment. A 6-inch foam roller can be used to simulate the Reformer to perform an exercise called Mermaid. Mermaid has significant effects on balancing the muscles of the hips, trunk, and shoulder girdle. The patient sits with one hip in internal rotation and one in external rotation to stabilize the lower body and then side bends the torso toward a foam roller. If a patient is unable to sit in this position, it can be simulated on a raised stool or chair and the foam roller can rest on a nearby table.

To assist with the side bending activity, the patient rolls the foam roller with their arm as it moves into shoulder abduction. The movement of the arm becomes an active assistive exercise for shoulder abduction where the rib cage moves against the scapula to encourage normal scapulohumeral movement. This exercise is extremely effective for encouraging the upward rotators of the shoulder in a functional environment (MEL).

The Pilates exercise method and equipment that was originally created for rehabilitation offers a PT an unlimited resource for therapeutic exercise. Returning to activities of daily living, no matter what they may be, is the goal of our patients, and therapeutic exercise is key. If PTs want to be successful in this endeavor, they need to explore an increasing number of options for creating an environment that will lead to functional activities. The earlier patients can get to some form of functional activity, the better. The Pilates method offers a full playground for creative functional activities. **PTP**



Footwork exercises on the Pilates Combo Chair provide early mobilization of the knee status post total knee replacement.

Christine Romani-Ruby, PT, MPT, ATC, is a member of the Physical Therapy Products' *editorial advisory board. She is the founder of PHI Pilates, an organization that offers training and mentoring to physical therapists in Pilates rehabilitation. She operates a Pilates studio and clinic in Pittsburgh and is also an associate professor in exercise science at California University of PA and a part-time professor in physical therapy at Slippery Rock University. For more information, contact PTPeditor@allied360.com.*

Product Resources

Are you interested in adding more Pilates equipment to your practice? Contact these companies for more information.

Balanced Body Pilates
(800) 745-2837; www.pilates.com

efi Sports Medicine
(800) 541-4900; www.efisportsmedicine.com

Stott Pilates
(800) 910-0001; www.stottpilates.com

Centerworks Pilates Institute
(800) 946-7804; www.centerworks.com

Pilates PhysicalMind Institute
(212) 343-2150; www.themethodpilates.com