

Ai Chi for Individuals with Lower Extremity Amputation

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Ai Chi is an aquatic therapy and relaxation program ideal for creating a sense of calm while improving balance and range of motion. Immersion in warm water for active exercise increases blood supply to the muscles, increases muscle relaxation, reduces edema, decreases joint compression forces, and prepares soft tissue for mobilization. All of these factors assist in hastening the healing process. Experiencing buoyancy increases functional abilities, slows movements, and counters the effect of gravity on venous pooling in dependent limb. The result is faster rehabilitation to an active lifestyle.

What is Ai Chi

Ai chi is practiced upright in chest deep warm water – 88-92 degrees - using slow broad movements of the arms, torso, and limited movement of the legs in combination with deep breathing. Created in the early 1990's in Japan by Jun Konno and with Ruth Sova in the United States, Ai Chi uses soft, round movements with a profound inwardly directed focus. The practice of Ai Chi strives for tranquility rather than precision and rigidity of execution of the movements. All moves originate from the core of the body in the abdominal area and begin with the breath. Movements should flow with equal force and speed. The rhythmic flow synchronized with the breath integrates mental, physical, and spiritual energy. Shoulders remain submersed as all movement takes place in the water.

Initially, Ai Chi is a therapy component of the overall rehabilitation plan. When the physical aspect of Ai Chi is achieved, the focus can shift towards the mind/body healing aspect. Certification to lead Ai Chi is available through the Aquatic Therapy and Rehab Institute, Inc (ATRI). ATRI recommends that aquatic therapy practitioners have additional training in balance education and Ai Chi movement adjustments.

Traditional Chinese medicine views physical activity as essential to the proper flow of life energy – our chi – throughout our body. When our chi is blocked by problems such as poor posture, nervous tension, sedentary habits, or joint contracture, we experience illness. In our society, we tend to treat the body and mind as separate entities. We depend on external sources to heal our bodies and our mind. The essence of Ai Chi centers on an energy meridian channel that extends the long axis of the body. The study of exercise techniques such as yoga, shiatsu, and tai chi, all evolve from the longitudinal meridian and the flow of the breath along this channel. The openness and flow of the breath assists in improving health by bringing the mind and body into balance. Practice in water is most effective because the weightless conditions created by buoyancy improve flexibility, balance, and posture.

Value of Ai Chi for Individuals with Lower Extremity Amputation

Perhaps the greatest benefit of Ai Chi is for recent lower extremity amputees. Basic knowledge tells us exercising the residual limb in warm water increases circulation, limits edema, and hastens healing. Exercise in warm water stimulates proprioceptive and kinesthetic awareness of how and where the body is moving. This provides an ideal medium for muscle re-education. A new center of balance must be found. Water is supportive and enhances re-learning the new center of balance. Water provides time to react when falling by slowing the movement and affords an environment that protects from fear of injury. The body must constantly adapt to the challenges of fluidity and turbulence of the water. Vestibular stimulation helps to improve the equilibrium response by activating the anti-gravity muscles in the extremities and trunk. Alignment requires balance grounded around the fulcrum of the body. Ai Chi movements progress from upper extremity and trunk stability movements to lower extremity movements. Finally, total coordinated body movements are added. These require pivoting in the water while maintaining balance and trunk stability.

Another important outcome of Ai Chi is its ability to reduce falls. People faced with amputation because of chronic conditions such as diabetes have often been sedentary and are weak and deconditioned. Amputations as a result of traumatic accidents frequently happen to younger, active people who suddenly find themselves facing multiple adjustments. Recent amputees spend more time sitting. The longer they remain inactive, the more they experience joint stiffness and joint contractures, which can cause loss of range of motion and agility. Consequently, remaining joints and the lower back spend longer periods bent or flexed. A natural tendency for the individual is to keep the residual limb as close to the body as possible. Muscles and joints get used to being in a shortened position. This shortened position challenges joints to go through a full range of motion. Maintaining acceptable range of motion is vital to everyday living. Joint stiffness and loss of flexibility will increase with time if gentle stretching is not practiced. The progressive movements of Ai Chi encourage opening and extending the body to achieve stretch. The by-product is strength in the remaining limb, secure balance, and agility to move confidently. Typical exercises to increase awareness of the new balance center on land include reaching for objects, turning side to side while standing, and reaching forward, back, and side to side. The movements of Ai Chi encompass all of these moves while providing keen perceptual feedback in a safe environment.

Practical Implementation of Ai Chi

Ai Chi incorporates body positioning, balance, pelvic mechanics and movement techniques. Lower extremity amputees must adjust and re-learn all the basic activities of daily living affected by the change in body symmetry. The level of amputation is also a major factor in learning correct adjustment. Below the knee amputees have the advantage of the knee joint as the knee plays a major role in mobility and limb function. Keeping the joints near the amputation site mobile will provide a wider range of motion assisting balance and movement. Amputations at or near the hip must depend on pelvic adjustments to secure challenges to balance.

Body positioning requires a solid base, enabling shoulders to remain submerged. Adaptation for individuals with lower limb amputation requires a change from the spread leg stance to a centered stance on one leg. Planting the foot, centered, changes body alignment, including the trunk, hips, and pelvis. Slight flexion of the knee of the supporting leg stabilizes and isometrically strengthens the muscles. This allows counteraction to balance by permitting some sway in order to maintain alignment. Correct alignment of the trunk is essential in permitting movement around the buoyancy center.

Balance flows upward along a strong pliable line extending from the foot up through the body to the head. A Japanese proverb says, “*Willow does not break under weight of snow. Stiff or inflexible branches, bones, and psyches may break. The pliant willow doesn't break. Likewise, pliant bones, connective tissues and psyches won't break. Ai Chi helps to make us pliant.*” (Sova. *Ai Chi*. p.16) Achieving confidence in balance must be learned before participating in Ai Chi. Preliminary preparation starts with water adjustment. The amputee should not be afraid of the water and must demonstrate the ability to locomote in the water. The ability to submerge, exhibit breath control, and return to standing must be tested.

Various techniques using types of fixed support assist in balance re-education. One way to initiate necessary balance is to start by facing the wall of the pool. The wall provides a stationary ledge to hold and release for balance practice if the pool does not have therapy bars on the wall. Moving away from the wall, the therapist should face the patient with open hands to assist as needed. Many therapy pools have parallel bars used for gait training and balance. These parallel bars provide support as needed for the recent amputee in achieving greater confidence in their balance. Amputees who enjoy water activities may try a floatation belt. The therapist must practice caution with careful monitoring as the floatation belt may provide too much buoyancy for the recent amputee. Congenital or long time amputees have an adjusted center of balance on land. It is essential to be familiar with their water comfort. New amputees are re-learning their center of balance on land and in the water. Prior swimmers or water exercisers will adapt quickly in the water because of their ability to stabilize with their arms in addition to their torso.

Pelvic mechanics and movement techniques are interdependent on the ability to balance. It is also necessary to reach for objects while balancing. Twists initiated from trunk stability movements encourage correct pelvic alignment. As the arms and the torso flow into wide movements, balance is centered and enhanced. Stretching and extensions through the body core assist in releasing muscle tension and increase range of motion. Once the Ai chi movements are familiar, the mind is able to achieve relaxation, meditation, and unity through breathing. People who are long-time lower extremity amputees will quickly progress through the body positioning into the stretching and the relaxation of the movements because they have adjusted their center of balance through time. The pivot is always centered on the supporting leg. With the bilateral opening and closing of the arms, acceptable range of motion is encouraged in the torso of the body. The progression encourages extension of the body core through the residual limb followed by extension and flexion to release tension in the back muscles.

Prostheses in the Water

Some lower extremity amputees prefer to wear prosthesis in the water. It is important to ensure the prosthesis is water specific. The simplest swim prosthesis is a lightweight, hollow construction with a waterproof, nonarticulating foot attached. It should have drain holes at the top and bottom that allow the hollow center to fill with water to reduce buoyancy. The water drains out through the holes when you leave the pool. It is essential to have the fit of the socket done by the prosthetist familiar with the effect of water on the residual limb. Polyester resin outer shells are specifically made to function in a water environment. The prosthesis feels heavier and more cumbersome in the water. Another type of swim prosthesis is like a fin and used for swimming. The ankle unit allows full ankle flexion encouraging a propulsive kick. It feels much lighter in the water than when it is put on before entering the pool. Preference for using a prosthesis or not in the water is a personal decision. The prosthesis in the water encourages a wider range of motion by taking proximal joints out of flexion. Below the knee amputees learn to us wider range of motion in the knee and hip flexors/extensors while building strength in the residual thigh. Above the knee amputees must focus on hip motion stretching the hip flexors while strengthening the hip extensors.

More than the Physical

Ai Chi is more than physical movements. Ai Chi begins with finding a secure, balanced position. This allows entry into relaxed, deep breathing. The upper extremity movements involving various arm patterns opens the core of the body and prepares it to progress to trunk stability movements involving pivoting the body to each side with natural opening and closing of the arms. Lower extremity movements present the greatest challenge, but rewards can be immense. Achievement of additional benefits includes enabling ways to deal with anger, depression, and acceptance. It has been accepted for many years that exercise and gentle movement release endorphins to help decrease depression. Increasingly medical professionals are accepting that the integration of mind, body, and spirit allows us to cope with life's problems. Breath work and meditation are effective in controlling emotions and mood swings. Instructions on breathing are easier to effect when combined with simple movements. Stress and anxiety restricts the breath to the upper chest with tension in the shoulders. Diaphragmatic, or deep breathing, aids muscles relaxation, decreases pain, and helps relax and refocus the mind. Nothing is more basic than breathing for the purpose of releasing attitudes and restoring harmony to the mind and body. Attitudes are a fixed emotional response. Fear is the source of most of our attitudes and can produce a paralyzing force. The breath allows us to unload attitudes such as fear, anger, low self-esteem, or sadness that cause us to exhibit stagnant energy and disharmony. These are all emotions exhibited by the news of the necessity to amputate. At first, the person experiences denial and often anger. The uncertainty of the future leads to depression. With a strong support team, acceptance and a positive outlook will result. Productive therapy and recognition of the ability to continue most activities enjoyed before surgery encourage a faster return to a stable, happy life. Control of life stress is necessary for wellness no matter the challenge.

In Ai Chi we begin to slow and deepen our breath as we inhale through the nose. Our palms turn upward. Then, we exhale through our mouth as our palms rotate downward in the water. The rotation of the palms continues throughout the slow, broad movements in a continual flow pattern synchronized with the breath. Slow, full inhalations brings air into the lower portion of the lungs resulting in the heart rate slowing, a decrease in blood pressure, muscles relax, anxiety eases, and the mind calms. A quiet pool area and soothing music helps set the scene. The breath is the bridge between the body and the mind. As the breath slows, the mind begins to find calm and tranquility and the body reacts accordingly. The mind is alert and more attuned to subtle adaptations in balance and cognitive awareness. The perception of how we move and what our body is doing improves. The lower extremity amputee is self-conscious about being “visually” different from others, especially in a pool environment. A positive outlook and sense of humor are personal tools that put others at ease. The amputee needs constant awareness of where the center of balance and center of gravity are located. They must know where and how to be weight bearing or shifting weight. The water slows physical movement, giving time to become aware of our position. Coordinating the breath with the physical movements serve to unify us with the water. The water protects from injury in case of falls and gives a longer recovery time to regain footing. Bringing the mind and body together with the breath permits cognitive mindfulness of body alignment and movement while staying relaxed and controlled because of the deep breathing.

Ai Chi Visualization Focus

We have focused on the physical and breath aspects of Ai Chi. Many will enjoy entering the visualization focus. Each movement lets us look at ourselves and moves us forward. The first step is to experience the movements and breathing in natural slowness. This is an excellent approach to teaching movement to a person fearful of changing movement patterns or an individual faced with relearning movement patterns as the result of acquired disability. Repetition encourages confidence in ability to complete progressive and challenging movements and allows a profoundly inward focus. Ai Chi can be the first step towards doing something positive for the self. Anyone confronting acquired/traumatic amputation faces multiple challenges – mental, emotional, and physical. Ai Chi is a pathway towards a sense of regaining control over their lives and health. Discovered abilities in the water translate to acceptance. When challenges appear overwhelming, the ability to be present with the breath reduces feelings of anxiety. The water and the Ai Chi program offer boundless opportunities to experience confidence and success in a non-threatening environment. Remembering the calm, the tranquility experienced transcends to all we do. Take the concepts and translate them to everyday needs – deep breathing to relax when frustrated and challenged, or stretching in bed to release tension and pain.

Each day presents a new challenge. Ai Chi is a path to personal acceptance and courage to challenge the stresses in our future. Every person has his or her unique life scars or challenges. The lower extremity amputee has visible scars of life. Others may carry their scars inward. The way we accept these challenges and move forward directly affects our health. The mindfulness we achieve through our breath is the enabler to the

satisfaction and resultant success we achieve. Research shows the medical, physical, and emotional benefits of Ai Chi. Ai Chi is all-inclusive. Everyone is welcome to Ai Chi to experience the calmness and tranquility. Ai Chi – balance, harmony, and healing – adds a new dimension to a quality life.

For more information on Ai Chi, contact the Aquatic Therapy & Rehab Institute, Inc. at www.atri.org, or atri@up.net. To inquire about training, contact Ruth Sova at ruthsova@ruthsova.com or Mary Wykle at mwykle@aol.com.