

AEROBIC DANCE

Over the past decade, aerobic dance classes have become one of the most popular activities at health clubs and community centers throughout the country. For many people, the term “aerobics” has become synonymous with this form of dance and coordinated exercise set to music.

A typical aerobic dance class begins with a slow warm-up period, then progresses to a level of activity that should maintain a targeted heart rate for a minimum of 20 minutes. A general cool-down period follows. Cardiovascular conditioning, muscle toning, and stretching are emphasized through coordinated dance steps and body movements. Aerobic dance classes are fun: people jump, kick, and sometimes yell or sing, all to the beat of lively music.

The intensity of this activity should not discourage a person with lower limb amputation. Because aerobic dance is so popular, classes for a wide range of skill levels are available at most clubs and community centers. “Low-impact” classes are the least strenuous with regard to jumps and kicks; thus, there is less danger of excess pressure on the residual limb.

For people over the age of 60, those with high level bilateral amputations, or those just learning to function with a prosthesis, it may be best to choose a class in which the participants are seated. Seated classes do not provide the same degree of aerobic strengthening; nonetheless, they can effectively provide some cardiovascular conditioning through routines that exercise the upper body, shoulders, arms, and legs to a limited degree.

PREPARING FOR AEROBIC DANCE EXERCISE

Many aerobic centers have installed special floors that have a rebound action to cushion the impact effect on the body. The person with lower limb amputation should choose a class in a facility with this type of floor if possible, and begin with low-impact exercises that do not require jumping movements.

Aerobic dance shoes are specially designed to soften the impact to the body and to stabilize the foot. Impact-absorbing insoles, such as those available from Spenco, can be placed in aerobic dance shoes (or in any other tennis or training shoe) to further reduce the impact on the residual as well as on the sound limb. However, adding insoles to shoes can cause changes to the alignment of the prosthesis. When dance shoes are worn with insoles, a prosthetist should check their prosthetic alignment before they are used for exercise.

In order for the lower limb amputee to get the full benefit of aerobic exercise classes, the prosthesis must allow for stability and range of motion. Certain range-of-motion exercises may not be possible, depending upon the design of the prosthesis. In some cases, the limitations can be minimized by making special adaptations to the prosthesis, as discussed later in this chapter.

With a good-fitting prosthesis and conscientious practice, a person can often work up to “high impact” aerobic dancing. One can modify the pace and technique of the dance routine in a way that still

achieves a good aerobic workout. For example, one could jump on the sound limb only, or jump every other time on the prosthesis rather than every time, as the routine may require. The dance routines are going to be more difficult for an individual with bilateral amputation—in those cases, low-impact aerobics is advised.

For those with partial foot loss, jumping up and down places multiple stresses on the residual foot. In such cases, it is important that the prosthetist adjust the fit of the shoe insert of the prosthesis so that the exercises do not cause pain or create blisters on the residual foot. High-top aerobic shoes are recommended because they provide additional ankle support. Again, it is best to begin with low-impact exercises.

The person with a hip disarticulation amputation is unlikely to participate in aerobic dancing while wearing a prosthesis. It is usually easier to

participate without the prosthetic limb. However, the sound leg must be protected. A program that involves jumping as the main form of exercise, as in high-impact aerobics, should be avoided. Low-impact or seated aerobic classes, or water aerobics, are the better choices.

PROSTHESES AND SPECIAL DEVICES

Energy-Storing Feet

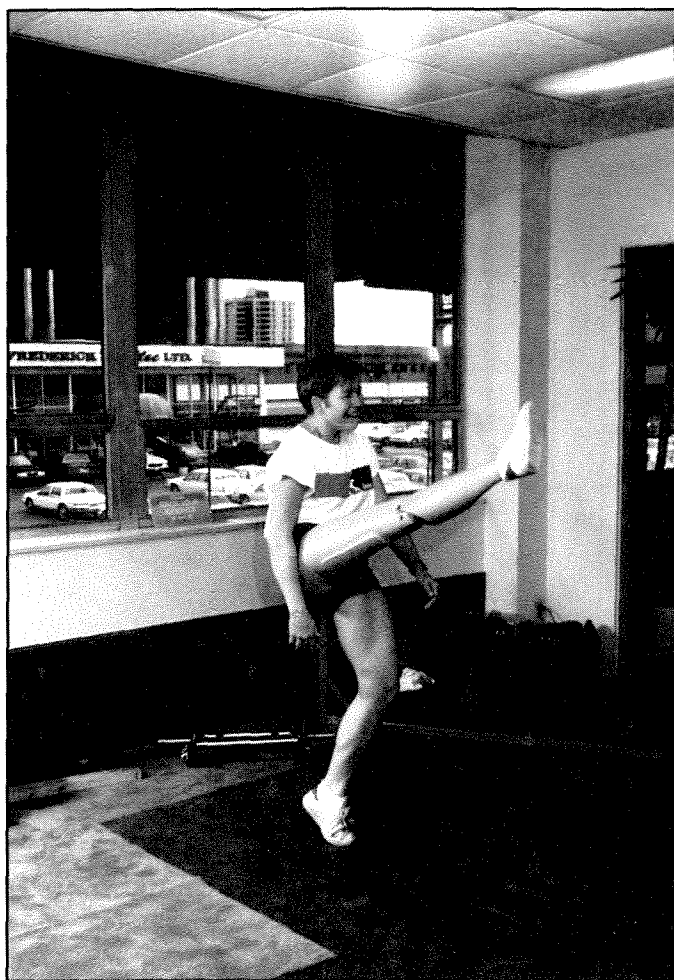
The Seattle Foot, Flex-Foot, Springlite Foot, Carbon Copy II Foot, Quantum Foot, SAFE Foot, DAS Foot, and STEN Foot help reduce the impact that results from jumping up and down. The Terry Fox AK Spring Device can be adapted to reduce vertical shock loads when jumping. (This device is still experimental and not commercially available). The Carbon Copy II Foot, the SAFE Foot, and the new Seattle Lite Foot are energy-storing feet that accommodate Syme's amputation during jumping activities. The Springlite Foot for Syme's is now available on a limited basis.

Below-Knee Adaptations

Socket Interface. Total surface-bearing sockets that evenly disperse vertical force loads on the residual limb are best suited for high-level activities such as aerobic dance exercises. Liners that have impact-absorbing qualities include silicone liners that absorb the shear forces on the residual limb, multiple durometer liners that use a combination of materials, and the PM liner.

Flexibility. Range of motion and flexion of the knee are important in order to perform many aerobic exercises. The prosthetist may be able to modify the trim lines on the condyles or hamstring areas of the prosthesis. If modifying these trim lines creates functional problems when the prosthesis is used for walking, flexible "ears" or brims can be made out of flexible resins or thermoplastics. For the avid exerciser, a special leg can be used specifically for aerobics.

Suspension. Good prosthetic suspension is necessary to prevent blisters. Suspension sleeves control pistoning and allow for full extension of the knee. However, they do have some disadvantages. Latex and neoprene suspension sleeves may restrict flexion



of the knee and may feel hot while exercising. A cuff suspension with an additional waist belt attached will limit full extension of the knee in certain cases. One way to solve these problems and improve suspension is to wear a neoprene suspension sleeve over a cuff strap suspension.

A Silicone Suction Socket (3S) or Icelandic Roll-on Suction Socket (ICEROSS) can also be effective in eliminating the need for straps, sleeves, and in some cases, stump socks. The Hyperbaric Socket utilizes a silicone that is band-impregnated to the sock, creating a suction BK socket and eliminating the need for belts, straps, or sleeves.

Above-Knee Applications

Those with amputations above the knee will benefit from a stable Stance Phase Knee unit, a flexible socket, and an energy-storing foot.

Knee Units. The “Bouncy Knee” can be added to an Endolite Knee Unit to reduce the impact on the residual limb, absorb shock, and provide cushioning from the rubber torsional element. Another option is to use the Mauch SNS Knee Unit, which is helpful if one is jumping while wearing a single, prosthetic limb. This device also provides stability for maintaining balance.

Socket Interface/Suspension. The CAT/CAM or Narrow ML socket can reduce the vertical loading of the prosthesis, as compared with the standard quadrilateral socket. The Narrow ML socket reduces the pressure against the ischial tuberosity by fitting inside the socket, and offers increased alignment stability. The conventional quadrilateral socket does not adequately provide this protection; the ischial tuberosity rests on the posterior shelf and may be uncomfortable during the wearer’s performance of aerobic exercises. When worn for such activities, it is best to alternate and modify the aerobic routine by jumping on one leg at a time or by jumping every other sequence.

Flexibility. Certain range of motion exercises may be impossible or quite difficult, depending upon the design of the proximal brim of the prosthesis. A flexible brim socket design will work best for extensive range-of-motion exercises, particularly when the wearer bends forward to touch the floor and the hip is flexed. The ISNY-style socket allows the inner socket to expand for muscular

activity and many people feel there is less heat build-up than with other sockets. Above-knee suction sockets that have adequate suspension for walking may need the additional suspension of a Silesian Belt or TES Belt when used for aerobic dance, especially when the inside of the socket becomes moist, making it more prone to slippage.

SPECIAL CARE

People who have lost a limb usually perspire more than people who have their extremities intact. The body’s heat is dissipated at a higher rate through the limited skin surface area. Because the socket of the prosthesis is not porous, skin areas covered by the prosthesis can experience excessive perspiration during physical activity. Also, because an artificial limb is less efficient than a sound limb, a participant will put forth more energy and therefore will perspire more when exercising.

Stump socks should be changed before and after aerobic exercise because heat generated within the socket may cause skin irritations. An additional stump sock can be used during exercise. Many people experiment with sock combinations if their usual stump sock is not adequate for aerobics. Certain BK residual limbs may benefit from having the shear forces reduced by the use of a silicone gel liner. Sheaths should also be worn under the stump socks to reduce and wick away the perspiration on the skin surface. The Drionic Sweat Control device can help when residual limb perspiration is complicated by skin problems.

To help prevent blisters, Spenco™ Skin Care Pads, Spenco™ 2nd Skin™ or Johnson & Johnson Bioclusive® Pads should be applied to potentially problematic areas of the stump before each exercise class. If a blister does develop, these skin care pads also aid healing and reduce pain while walking. It is important to know when to stop exercising. The exerciser should not continue if the pain is such that the prosthesis can not be worn.

Clothing worn during exercise should allow heat to dissipate quickly. Loose-fitting, lightweight cotton clothing is better than sweatshirts and sweatpants. Initially, some people may feel uncomfortable wearing shorts in public. Long pants are fine as long as they are loose-fitting and are of lightweight cotton.

WATER AEROBICS

Exercises that are difficult or impossible for a person with lower limb amputation become effortless and enjoyable when performed in water. Water aerobics is an excellent and gentle method for conditioning the entire body and is nontraumatizing to the residual limb.

The popularity of water aerobics has grown considerably over the past few years; it is now taught in many health clubs and in other facilities with swimming pools. Like swimming, it is very relaxing and effective in reducing tension and the risk of injury.

“Many doctors and therapists recommend water aerobics for patients who are unable or unwilling to participate in other forms of exercise,” says Barbara Schaut, a water aerobics instructor in Seattle, Washington. According to Mrs. Schaut, water aerobics has a special advantage over floor aerobics for those with lower limb loss because the person is no longer handicapped when in the pool. “The warmth of the water loosens and relaxes muscles while the support and cushioning effect allows greater range of joint motion. In addition, water creates a resistance against the body producing a therapeutic and strengthening effect on muscles and joints.”

Because extra force is required to move through water, the movements are slower and less physically stressful. The body, supported by water, becomes buoyant, making possible the execution of exercises often unachievable outside of the pool, allowing the participant to move freely without harmful results.

The exercises can be performed with or without a prosthesis, although people with bilateral amputation would need to wear their prostheses in order to stand on the bottom of the pool. (Water aerobics require use of the arms to create resistance in the water. The bilateral amputee not wearing a prosthesis would just be treading water.)

Care of the skin is important, particularly in a highly chlorinated pool. Water tends to deplete the natural oils in the skin. In some cases, chemicals in the water may cause the skin to become very dry and irritated. The residual limb should be cleaned with mild soap and water immediately after the workout. Badly dried-out skin can benefit from Vite 28-32000 I.V. applied directly to the skin when the prosthesis is removed at night. Routine skin care is essential to prevent postworkout problems and to minimize the breakdown of healthy skin, particularly on the residual limb. A physician should be consulted if the skin becomes badly dried out.