

WALKING

Walking is the most natural form of aerobic exercise. It is also the most gentle. It does not place undue stress on the musculoskeletal system, because one foot is always in contact with the ground. Unlike other forms of exercise, walking can be combined with the daily living routine. It does not require any special training, skills, or equipment.

Although walking is basic to almost everyone, there are certain techniques that will enhance its aerobic benefit.

- Maintain an upright posture with shoulders back and head held up.
- Let the upper body do some of the work by swinging the arms in coordination with the legs.
- Land on the heels of the foot and push off with the toes.
- Establish a comfortable consistent rhythm.

The aerobic benefits of walking will be further improved by increased pace, length of stride, and distance walked.

The only equipment needed for walking as an exercise is good shoes (these are especially important for a person with a unilateral amputation, since much stress is placed on the sound limb). Special shoes for pace walking are a somewhat recent development but, like running shoes, may be found in most sporting goods stores. Two important features to look for in walking shoes are firm heel support and a flexible forefoot. Walking shoes should fit comfortably even when new.

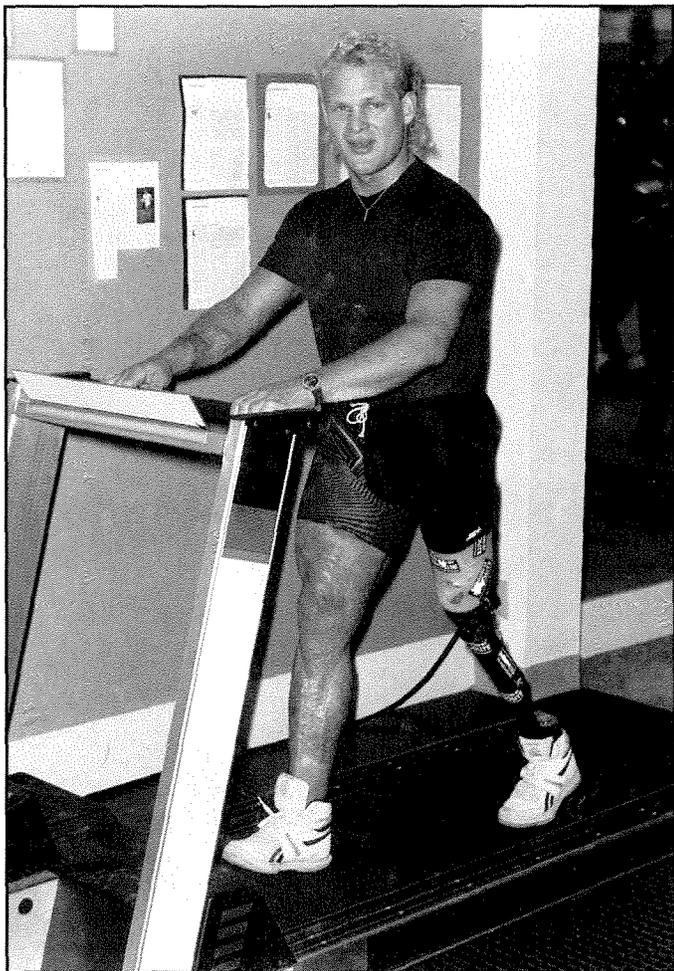
The prosthetic components selected for every-

day use will generally be suitable for walking as an aerobic exercise. Most prostheses are designed primarily for standing and walking. On occasion, some modifications or separate prosthetic components may be needed. Additional suspension may be needed, and energy-storing feet are an advantage for most individuals. A single-axis foot or the combination of a multi-axis ankle with an energy-storing foot is good for walking down hills and provides for increased knee stability.

A person with lower limb loss who is comfortable standing and moving about with a prosthesis will find that walking is excellent for beginning and maintaining an aerobic conditioning program. However, some people do experience difficulties as the result of surgical, prosthetic, or musculoskeletal problems. In such cases, the physician, prosthetist, and therapist may be able to solve these problems by prescribing a new limb, therapy, or surgery. If these options are not feasible or successful, there are other forms of aerobic exercise that are even less stressful to the residual limb. Swimming, bicycling, or rowing, for example, can be beneficial even without the use of a prosthesis.

STATIONARY MACHINES

Exercising on a treadmill walking machine is a good way for a person with lower limb loss to train for outdoor walking. It is also an excellent way to warm up and exercise for someone who is just



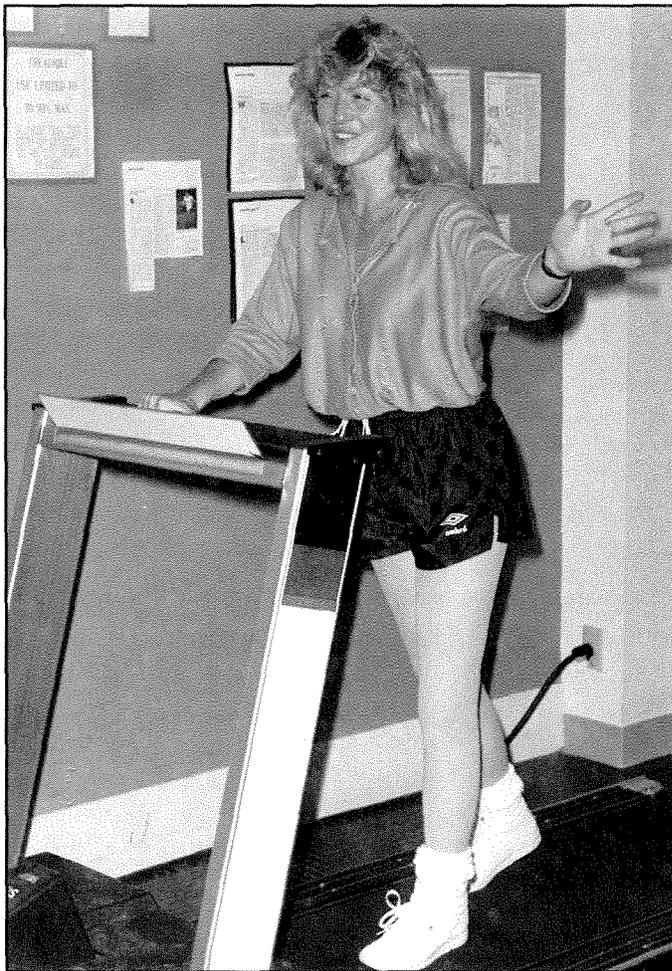
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Distance and time can be monitored while walking on a computerized treadmill. It is best to hold on to the hand grips when beginning in order to establish balance.

beginning a fitness program. A digital computerized motor-driven treadmill is best to start with, because it is easier to walk on than are many of the self-propelled models.

However, a constant pace must be maintained in walking on a treadmill machine, and the base of support must remain within a specific area. This takes good balance and can be difficult for some people wearing a prosthesis. For best results when first using a treadmill, the machine should be set for a slow pace and gradually adjusted to a faster pace.

Getting on and off the treadmill may also be difficult for the prosthesis wearer, so one should practice until balance can be maintained easily. A side railing for hand support will provide added



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A motorized treadmill can be an excellent method of achieving aerobic fitness for skilled individuals with bilateral AK amputations. The self-propelled walkway creates a controlled environment that can be monitored. Speed of the walkway can be gradually increased. It is helpful to hold on to the hand rails and use caution getting on and off the moving belt.

safety in addition to the single handbar in front of the walkway.

Treadmill training has advantages over outdoor walking for the prosthesis wearer. If there is pain or an irritation of the residual limb due to exercising, one does not face the prospect of having to walk back to the starting point, thus causing further irritation. One can get off the treadmill, adjust the prosthesis and, if necessary, discontinue exercising until an adjustment can be made by the prosthetist. Also, in many cases, the treadmill "gives" a little with each footfall. This helps cushion the impact to

the residual limb. This is why some people prefer walking on the treadmill to walking outdoors.

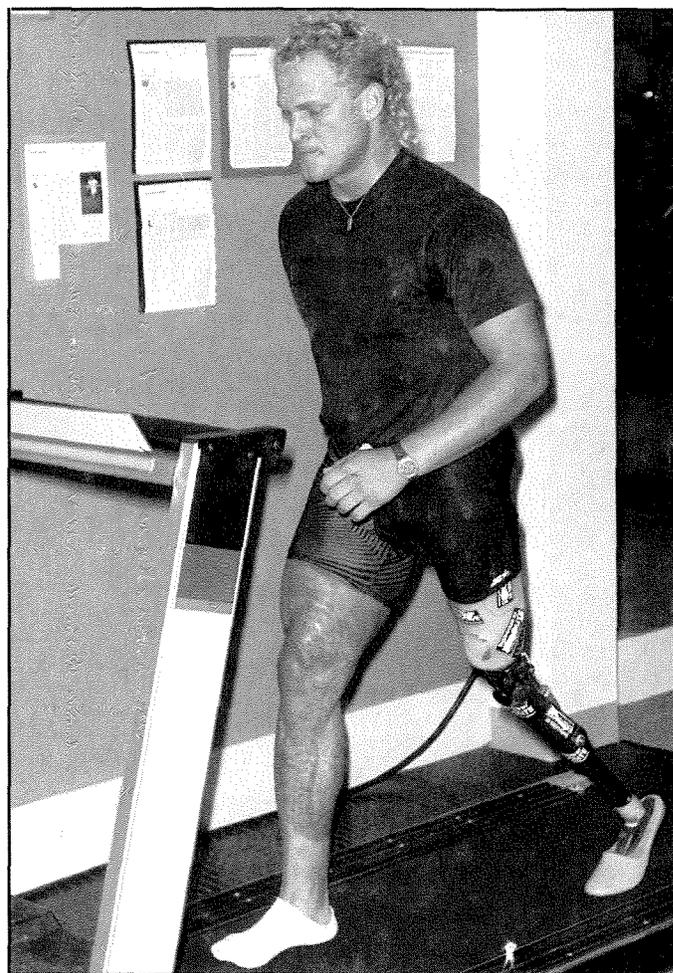
The "distance" covered on the treadmill should be gradually increased. Once stamina is built up and prosthetic problems, if any, are solved, walking outdoor distances will be safe and enjoyable.

DESIGNING A WALKING ROUTINE

Walking for exercise, whether accomplished outdoors or on a treadmill, should be approached in a manner similar to other types of aerobic sports. Walkers should start slowly and gradually build up time, distance, and speed over a predetermined number of weeks of training. The American College of Sports Medicine recommends that the minimum amount of exercise needed to maintain good aerobic health is 20 minutes, three to four times per week. Walkers should work up to a combined total of about 3 hours a week, walking at a pace that maintains the heart rate in the targeted zone of 70-85 percent of 220 minus their age. (See pp. 24-25 in Chapter 4.)

It is important for a beginner to monitor his or her pulse rate. If the pulse rate during a workout is above 85 percent of maximum, the walking pace should be slowed. If the pulse rate is well below 70 percent, the walking pace or the rate of the arm swing should be increased. It is beneficial to keep a log of pulse rate at the beginning, middle, and end of each workout. The length of recovery time after each walk should be noted along with the amount of time walked and the distance covered. (Recovery time is the time it takes for the pulse to return to its normal rate after one exercises. As physical condition improves, the recovery time shortens.) More experienced exercisers will not need to monitor the heart rate regularly. They will be able to feel it when they are exercising within their target range.

Some individuals, particularly older people, may find they cannot maintain their heart rate at 70-85 percent of maximum for as long as 20-30 minutes. In this case, similar fitness levels can be achieved by exercising at a lower intensity level for a longer period of time. For example, a person may work to achieve 60 percent of maximum heart rate for 40 minutes or 50 percent of maximum for 50 minutes.



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With practice, a steady pace will improve the aerobic benefits of the treadmill. The graphite Endolite prosthesis shown has a CAT-CAM Suction AK socket, polyethylene inner socket, and polypropylene outer frame attached to the Endolite Stance Phase Flexion Stabilized Knee, Mauch Swing Phase Hydraulik Knee Unit, Endolite Bouncy Knee, Endolite Multiflex Ankle, and graphite foot.

Three hours of walking per week is generally adequate for most individuals to maintain good aerobic fitness. Certainly one can gain additional benefits by training for more than 3 hours a week, but it is not necessary unless one is interested in competitive activities. It is best for beginning walkers to train every other day with a rest day in between. This allows the muscles to relax and recover. In the beginning, it is more important for the walker to concentrate on the length of time he or she is able to maintain the target heart rate than to be concerned with distance covered. As strength and

stamina are improved, those who wish to may walk briskly for exercise every day.

Walking for aerobic fitness is more demanding than ordinary walking; warm-up and stretching exercises before and after walking will help prevent

muscle soreness. Even with such exercises, as speed is increased and the arm swing becomes more vigorous, muscles in the legs, upper arms, and shoulders may become sore. If soreness is problem, one should progress at a slower rate.



AP/WIDE WORLD PHOTOS

Jeff Keith, right, is shown at the beginning of his successful cross-country run in Boston on June 4, 1984. With him is his friend, Ted Kennedy, Jr. (left), who ran along for the first mile. Keith, who lost his leg to cancer, said he made the run to prove that "disabled" does not mean "unable."