

9

LEGS

People with lower limb amputation may tend to focus on developing only upper-body strength. They often do not understand the importance of developing strength in their sound leg and residual limb. Leg conditioning helps to retain symmetry of the body, improve the walking gait, and combat the natural process of atrophy that takes place in the residual limb. Weight training helps keep the muscles of the legs strong and protects the joints from injury. Strong leg muscles reduce the stress placed on the sound limb of the person with a unilateral amputation during walking, running, and sports activities.

Each person's residual limb is unique in structure. For this reason, the way one person with AK amputation accomplishes a particular exercise while wearing a prosthesis may be quite different from the way another person with AK amputation does the same exercise. Method greatly depends on the structure and length of the residual limb. However, a variety of weight training and resistant exercises are available, and one may select those which best suit the conditions of the residual limb and prosthetic fit. It is a good idea to switch exercises periodically to work the muscles at different angles.

The knee is one of the largest and most complex joint structures of the body and is surrounded by numerous tendons and ligaments. Tendons connect muscle to muscle; ligaments connect bone to bone. You cannot strengthen tendons and ligaments di-

rectly through weight training. Training the quadriceps muscles will help to strengthen the tendons and ligaments in a secondary fashion, but not directly. The stronger the muscles, the more the muscle structure can give support to the tendons and ligaments. Strength of the knee muscles and stability of the knee joint structure via its ligaments is vital to the physical abilities of individuals who wear below-knee prostheses. For those with an above-knee amputation, a strong knee on the sound leg is important in maintaining mobility and agility.

Weight training exercises that require standing may be difficult for some people with lower limb amputation because standing exercises require balance. Also, additional weight is placed on the residual limb when lifting weights. In turn, this weight is transferred through the socket. For weight lifting exercises from a standing position, extra socks may be necessary to help withstand the added strain on the residual limb. Seated leg exercises, using equipment such as Nautilus or Universal, are preferred for many individuals with lower limb amputation because they are better able to isolate the muscle group they want to work, as well as eliminate balancing problems.

The following exercises strengthen the adductor/abductor, hamstring, gluteus maximus, quadriceps, and gastrocnemius/soleus muscles. This type of program should be performed every other day on a regular basis.

LEG EXERCISE ROUTINE		
Muscle	Exercise	Title
Quadriceps/Lower Thighs	36	Single Knee Extension
Quadriceps	37	One-legged Low Wall Pulley Knee Extension
Quadriceps	38	Seated Knee Extension
Quadriceps/Thighs	39	Skier's Position
Quadriceps/Gluteus Maximus	40	Moon Bench Leg Press
Upper Thighs/Hips	41	Nautilus Double Leg Press
Quadriceps/Hip Extensors	42	Alternating Leg Press (Nautilus Duo Squat Machine)
Quadriceps	43	Half Squats
Hip Extensor/Hamstrings/ Gluteus Maximus	44	Nautilus Hip and Back Machine
Hamstrings	45	Leg Curl
Hamstrings	46	Standing One-legged Low Pulley Leg Curl
Hamstrings/Gluteus Maximus	47	Standing Pulley Hip Extension
Abductor/Adductor	48	Nautilus Hip Abduction/Adduction Machine
Abductor	49	Low Pulley Single Hip Abduction
Hip Adductors	50	Low Pulley Single Hip Adduction
Gastrocnemius	51	Weighted Standing Calf Raise
Gastrocnemius/Soleus	52	Seated One-legged Toe Raise

**INCREASING
THE
NUMBER
OF
REPETITIONS**

Always do warm-up exercises before lifting weights.

Start with a minimum of 8 repetitions with a given weight. If a minimum of 8 repetitions cannot be completed, the weight is too heavy for you and the resistance should be lowered until 8 repetitions can be completed.

When 12 repetitions can be successfully completed, the weight should be increased by 5-10 pounds. When 12 repetitions can be completed with the increase in pounds, the weight may be increased again.

Work up to 15-20 repetitions per set for muscle maintenance, endurance, and tone.

When performing exercises with free weights, it is recommended that 2-6 sets for each particular muscle group be used.

CAUTION

Beginners are encouraged to use free weights with a spotter present. Certain exercises will require a spotter regardless of skill level (e.g., squats).

EXERCISE 36. SINGLE KNEE EXTENSION**PURPOSE**

Develops the quadriceps muscles.

PROCEDURE

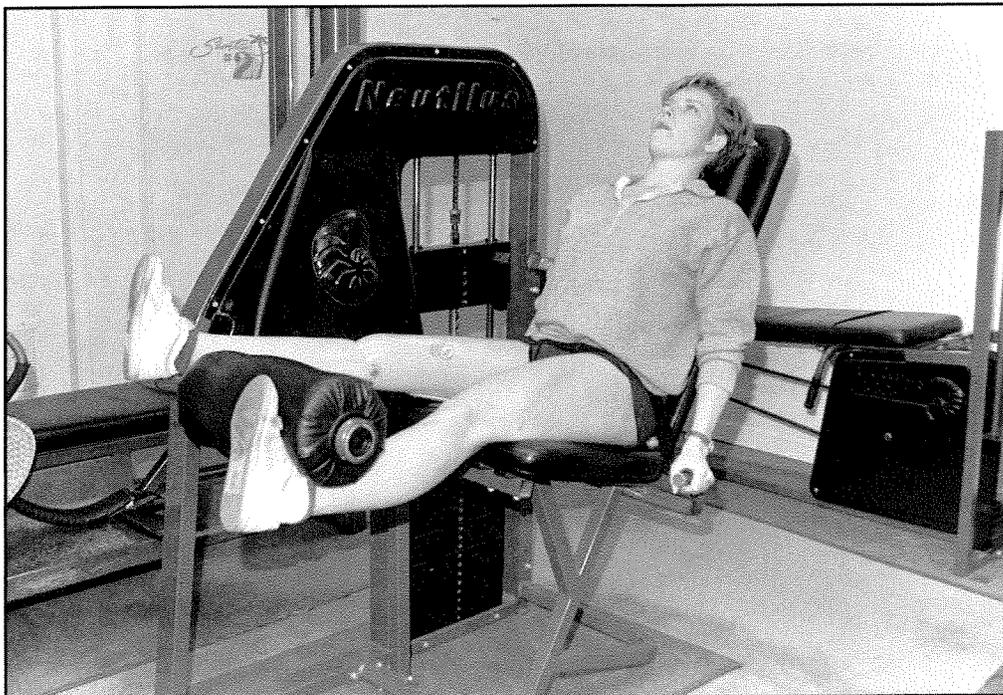
- Sit on the bench so that the back of the knee of the sound leg is touching the edge of the bench and the foot is on the floor.
- Place the top of the foot and ankle under and against the foot pad.
- Sit with the back pressed against the back support. Secure the seat belt and grasp the handles on the sides for support.
- Extend the knee until the leg is nearly parallel to the floor. Slowly lower your leg back to the starting position.

MODIFICATION

For those with AK amputation, the prosthetic knee may be locked in extension and the leg placed on a bench or chair off to the side, or the knee may be left in a flexed position over the edge of the bench, because the prosthetic leg cannot be used effectively in this exercise.

SKILL LEVEL

Intermediate.



Linda Pedersen demonstrates this knee extension exercise on the Nautilus equipment.

EXERCISE 37. ONE-LEGGED LOW WALL PULLEY KNEE EXTENSION**PURPOSE**

Develops the quadriceps muscles.

PROCEDURE

- Position a fairly tall flat bench sideways in front of the weight stack.
- To exercise the prosthetic leg, pull the cable underneath the bench and attach the cuff strap around the prosthesis in the middle of the socket. The position will vary depending on the length of residual limb and individual preference (see NOTE below).
- Start with both feet on the ground with the lower legs vertical to the floor. Adjust the position of the bench far enough away from the machine so the weights are slightly off the stack before beginning to lift the leg.
- Hold onto the bench for support and extend the prosthetic leg until it is at full extension. (Full extension may be difficult to obtain with certain prostheses that have cuff suspension or joints and lacer.)

MODIFICATION

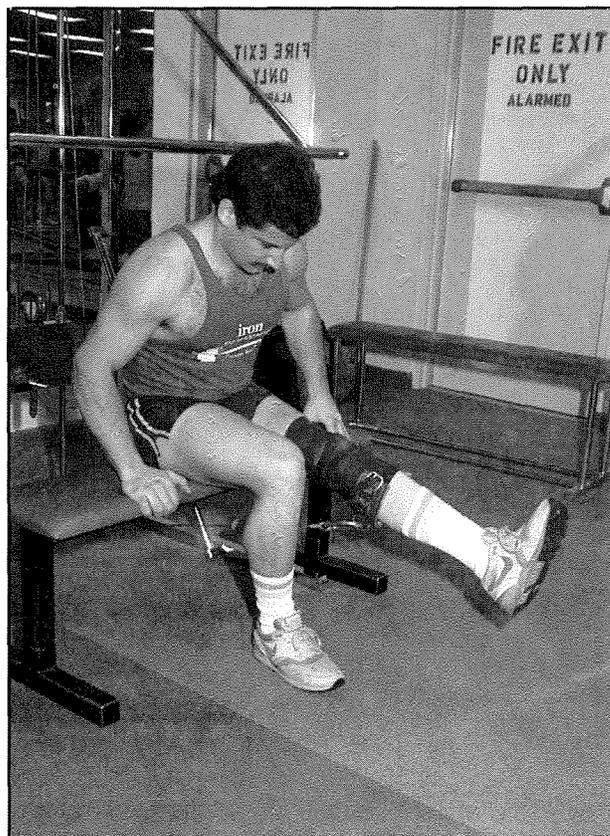
For those with short residual limbs, moving the cuff strap proximally on the leg rather than placing it distally at the ankle should prevent anterior distal tibia pressure.

SKILL LEVEL

Intermediate.

NOTE

To obtain full extension of the knee, sleeve suspension works well for the BK prosthesis. This is a good exercise to accommodate the prosthetic limb, but when you want to train the sound side it is easier to use the conventional Leg Extension Machine seen in Exercises 36 and 38.



Albert Rappoport demonstrates leg extensions using a pulley attached to a leather cuff strap and D-Ring on his exoskeletal prosthesis.

EXERCISE 38. SEATED KNEE EXTENSION**PURPOSE**

Strengthens the quadriceps.

PROCEDURE

- Sit on the edge of the bench with the back of the knees touching the edge of the bench.
- Place the top of both feet and ankles against the foot pad. Sit with the back flat against the back support.
- Secure the seat belt, if available, and grasp the support handles or the sides of the chair.
- Extend the knees until both legs are nearly parallel to the floor. Hold the position briefly and then slowly lower the legs back to the starting position.

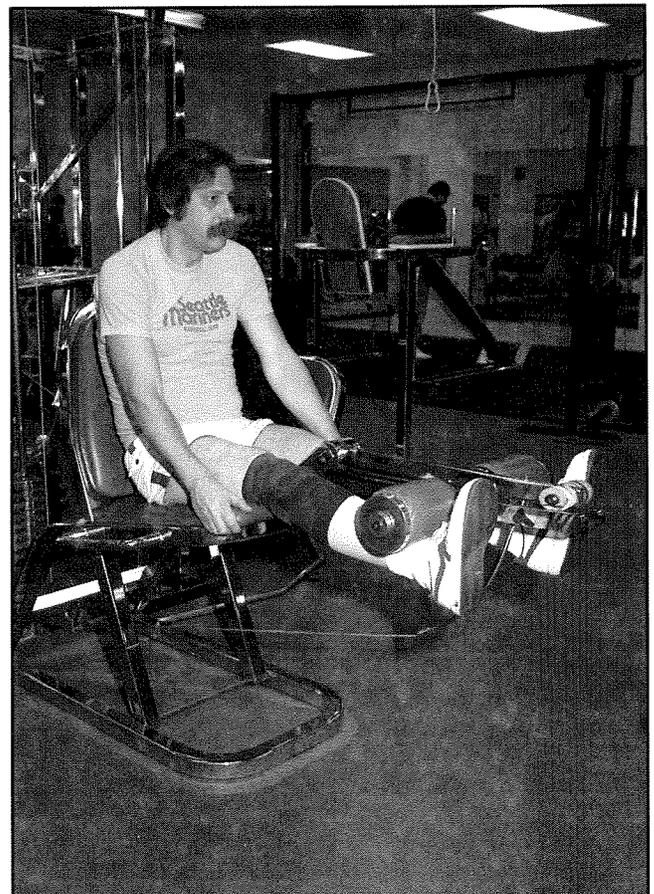
SKILL LEVEL

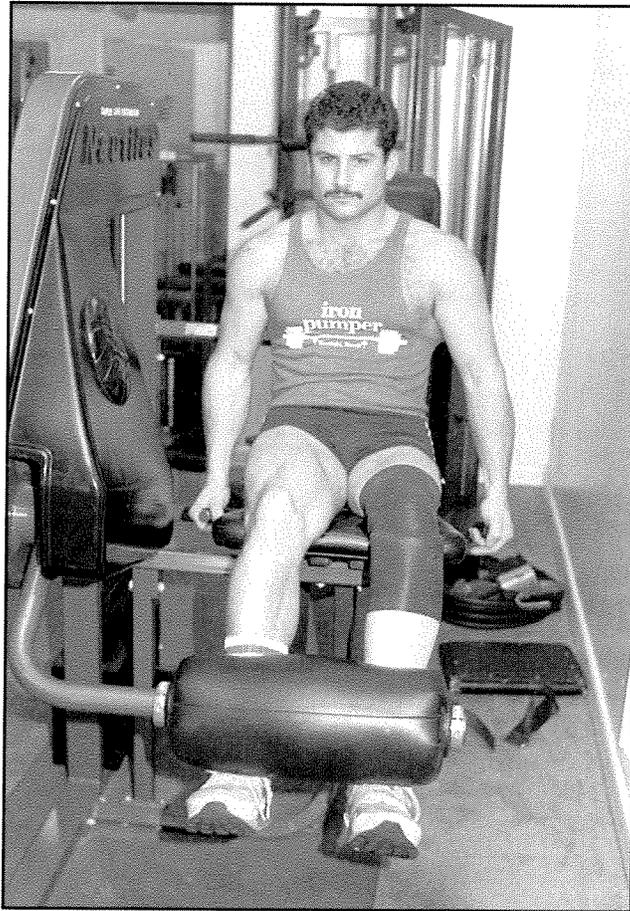
Intermediate.

CAUTION

In this exercise, resistance is placed against the ankles and can be tolerated by those with long residual limbs. Some machines allow the foot pads to adjust upward, which will provide greater comfort for people with short residual limbs. However, people with short residual limbs may experience anterior distal pressure. In such a case, this exercise may be used for the sound leg only, or the One-legged Low Wall Pulley Knee Extension (Exercise 37) may be substituted, since it allows the resistance to be placed at a mid-socket point to relieve anterior distal pressure.

John Everett demonstrates the knee extension exercise from a seated position.



EXERCISE 38. SEATED KNEE EXTENSION (Continued)

Albert Rappoport demonstrates (on a slightly different type of equipment) the knee extension exercise from a seated position.

EXERCISE 39. SKIER'S POSITION

PURPOSE

Develops quadriceps muscles through static muscle contraction, including the muscles of the residual limb.

PROCEDURE

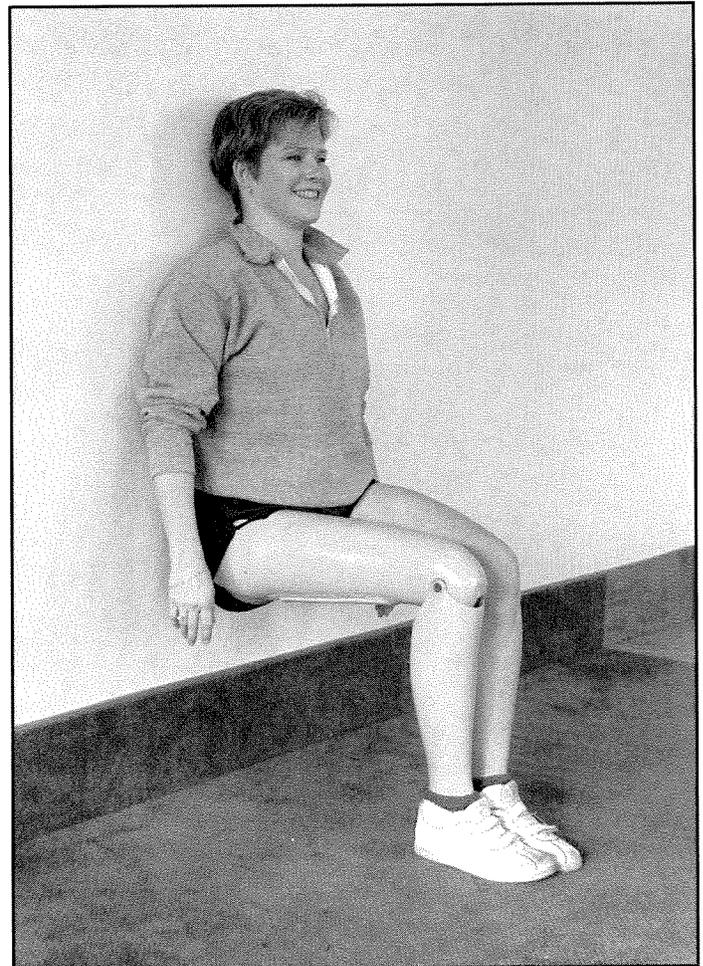
- Stand against a wall. With the back pressed to the wall, lower the body until the position shown in the photo is achieved.
- The hands may be used against the wall while lowering the body into position. Both feet should be flat on the floor and far enough away from the wall so that the upper portion of the legs are parallel to the floor and the lower portion of the legs are in a vertical position to the floor, as shown in the photo.
- Keep the hips positioned at the same height as the knees.
- Keep hands loose and shoulders back against the wall.
- Work up to holding this position for 30 seconds, and then relax for 30 seconds. Repeat three times every other day. Increase the time spent in the Skier's Position by 15 seconds each week.

VARIATION

Beginners should start with the buttocks higher than the knees, while keeping the back against the wall. More advanced individuals can gradually maintain a position where the hips are parallel to the floor. If this position is difficult to maintain, you may ease tension on the thigh muscles by placing your hands on your knees. Gradually increase the length of time spent in the Skier's Position and shorten the length of the rest periods to make the exercise more difficult.

SKILL LEVEL

Advanced.



Linda Pedersen demonstrates this static muscle contraction exercise.

EXERCISE 40. MOON BENCH LEG PRESS
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PURPOSE

Strengthens the quadriceps and gluteus maximus muscles.

PROCEDURE

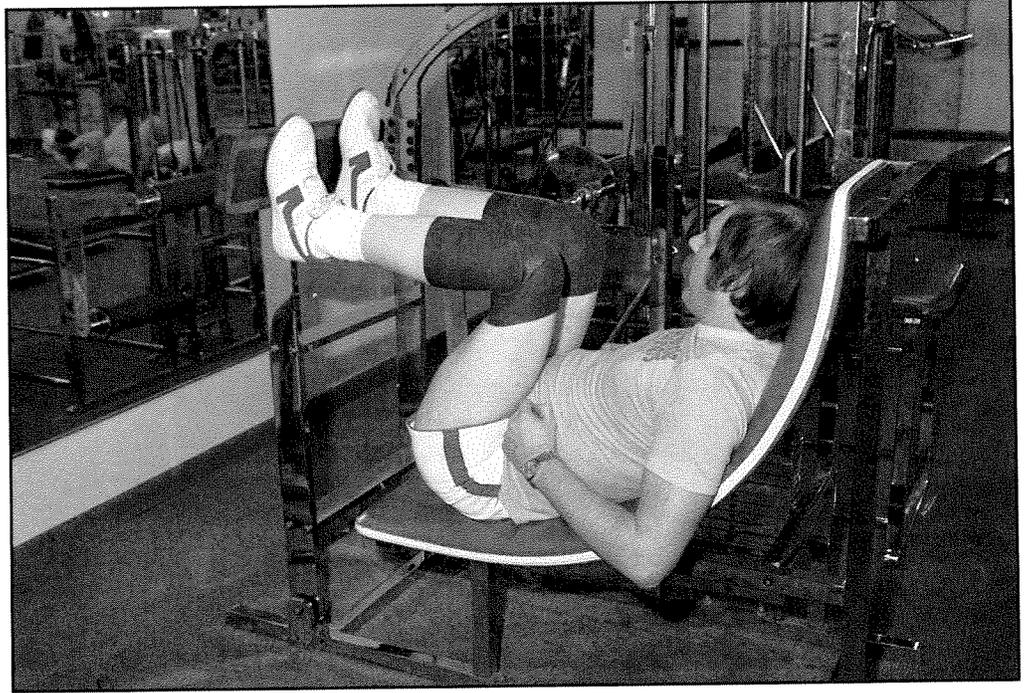
- Sit on the Moon bench so that the buttocks are at the front of the bench.
- Place both feet on the foot pad and space them several inches apart, as shown in the photo.
- Hold the bench under the buttocks for support, if needed. Push against the foot pad evenly with both legs until the legs are completely extended as shown.
- Slowly bring the legs back to the starting position.

MODIFICATIONS

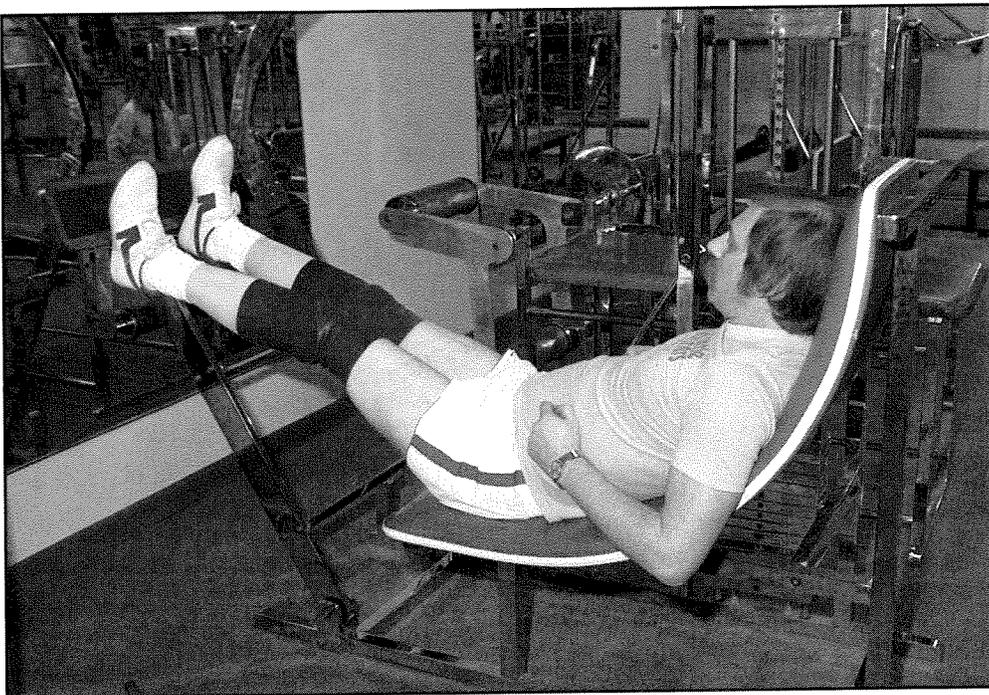
Certain prostheses may restrict flexion and extension of the knee for those with BK amputation. Adjustments may be necessary with suspension, posterior trim lines, or joints and lacer. Sleeve suspension is helpful in achieving full extension, although flexion may remain restricted in some cases. Lower posterior trim lines of the socket can help reduce pressure on the hamstrings.

SKILL LEVEL

Intermediate.



John Everett demonstrates the seated leg press using both prosthetic legs to achieve a full range of motion.



EXERCISE 41. NAUTILUS DOUBLE LEG PRESS

PURPOSE

Develops strength in the upper thighs and hips.

PROCEDURE

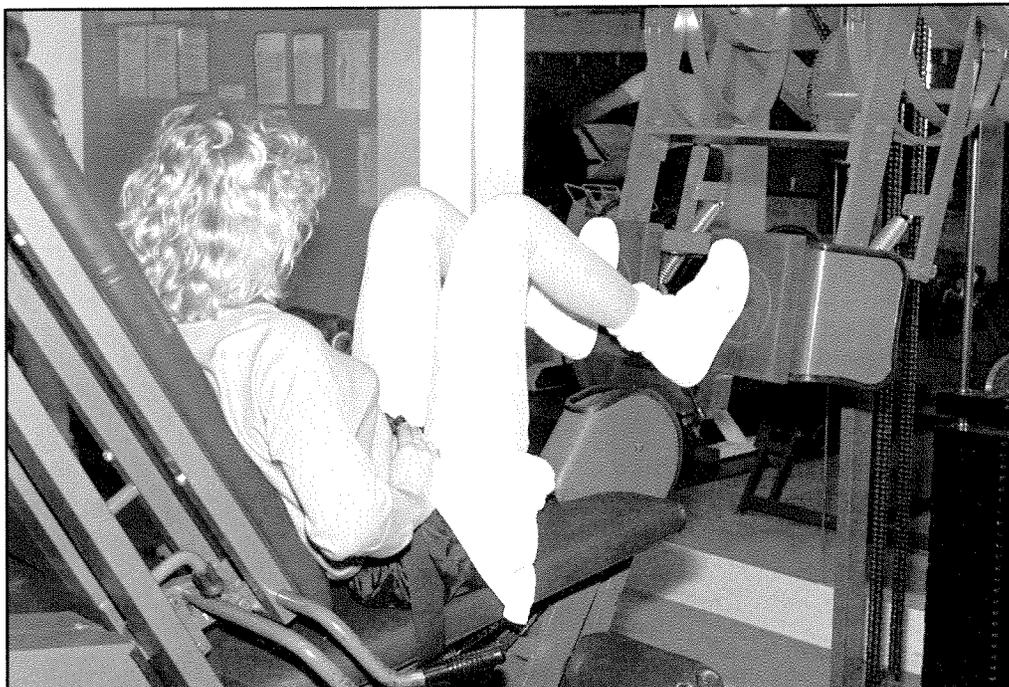
- Adjust the back of the seat so that your legs are at a 90-degree angle (or more) when your feet are placed flat on the footrests. Make sure you secure the seat belt as you keep your back flat against the backrest.
- Straighten the legs. After the legs have reached maximum extension, bring them back slowly until the knees are flexed to at least a 90-degree angle.
- Exhale while extending the legs and inhale as the knees are brought to the starting position.

MODIFICATIONS

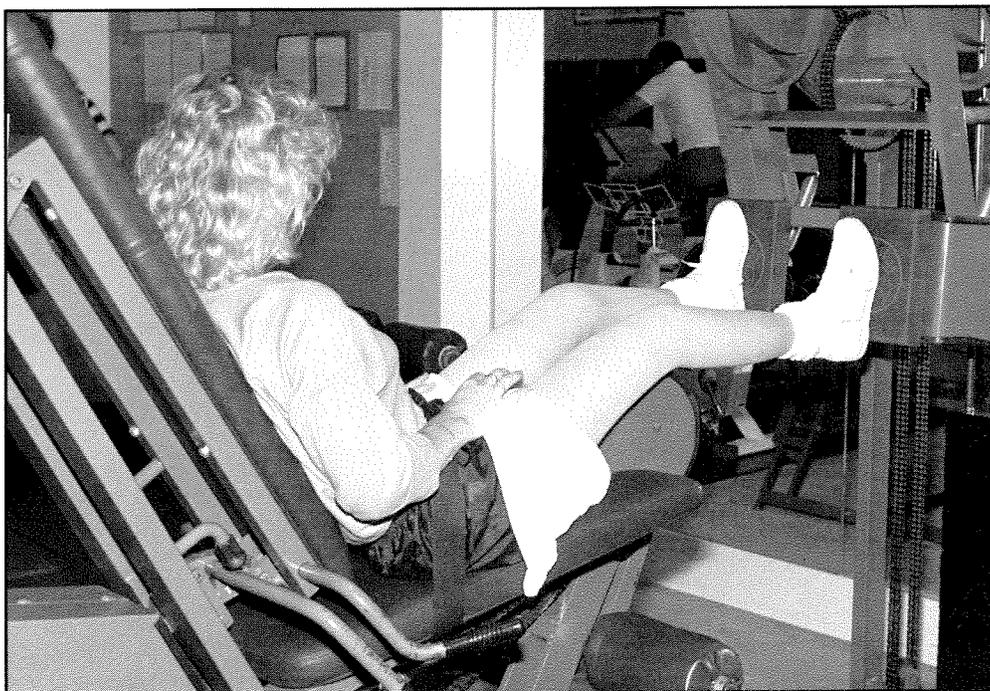
If you are breaking suction in your AK socket while flexing the hips, try moving the seat back so your legs do not go into as much flexion. You may also try lowering the anterior trimlines of your socket. Additional suspension using a Silesian bandage or Neoprene TES Belt may be helpful. Training the legs for the bilateral AK amputee should start with low weights. Those with BK amputation who find it difficult to bend the knee to a 90-degree angle should move the seat back to a lesser angle.

SKILL LEVEL

Intermediate.



Samantha Ellis is in the starting position with knees flexed.



Samantha Ellis pushes both of her residual limbs down in hip extension to extend her prosthetic legs. Knees are locked out as far as possible to complete the exercise.

EXERCISE 42. ALTERNATING LEG PRESS (NAUTILUS DUO SQUAT MACHINE)**PURPOSE**

Strengthens the quadriceps and hip extensors.

PROCEDURE

- Lie on the bench with shoulders pressed against the shoulder pads and hands gripping the support bars.
- Position both feet on the foot pads and extend both legs. Keep one leg extended and flex the opposite leg, as demonstrated in the photo.
- Press the flexed leg against the foot pad so that it is again extended.
- Continue to alternate legs, as shown in the photo.
- Always bring both legs to a fully extended position before beginning another flexion.

MODIFICATIONS

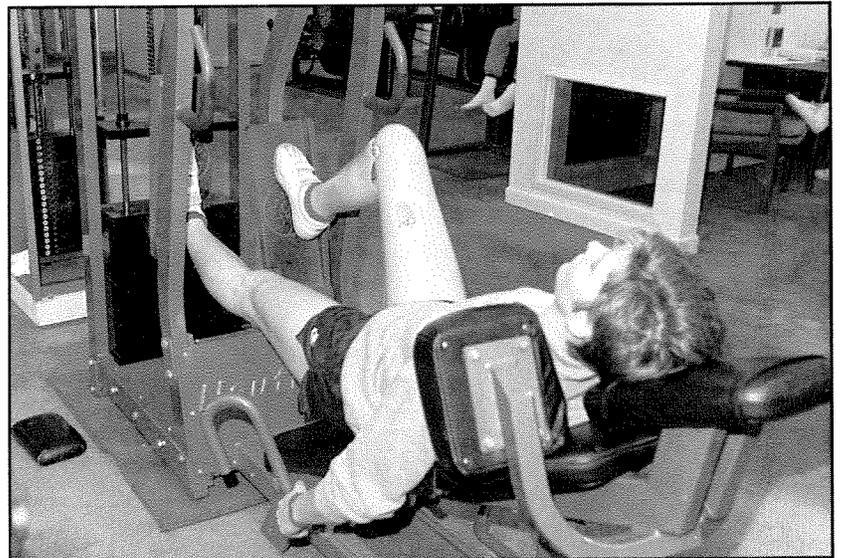
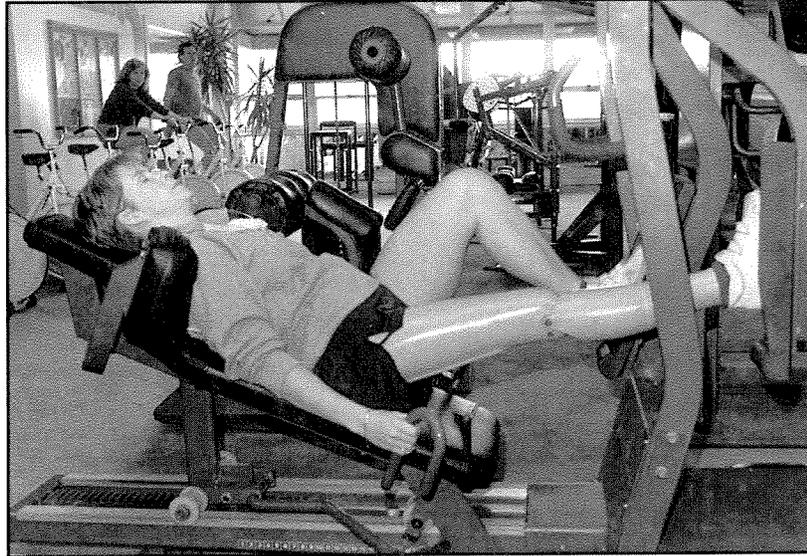
Because the weight needed to effectively exercise a sound leg is likely to be considerably greater than the weight needed for a prosthetic leg, it is best to exercise each leg independently. The legs are worked one at a time, and a lower weight (which can be gradually increased as strength develops) is placed on the side with the prosthesis. Some people with AK amputation may feel that they will not be able to do the exercise, but with practice, most will be able to. The AK-level individual can perform this exercise by extending the thigh, which extends the prosthetic knee. This works the muscle of the residual limb inside the socket.

SKILL LEVEL

Advanced.



Linda Pedersen demonstrates the alternating leg press exercise.



EXERCISE 43. HALF SQUATS

PURPOSE

Develops strength in the quadriceps muscles.

PROCEDURE

- Take a medium stance with the feet approximately 16 inches apart or a wide stance with the feet approximately 30 inches apart.
- Place your hands on the bar, positioning them wider than the shoulders.
- Rest the bar on the upper portion of the back.
- Keep your head up and your back straight at all times.
- From the standing position, squat until your thighs are parallel to the floor.
- Head is up, back straight, and knees are pointed out. Heels are elevated with the weight on the balls of the feet.
- Inhale while squatting; exhale as you return to the starting position, keeping legs extended and placing the heels on the ground.

VARIATION

Use a weight belt to help protect the back from injury. The serious, competitive powerlifter may benefit from a special prosthesis that accommodates the wide stance and keeps the foot flat on the ground at all times for greater stability. For lifting light to medium weights, an everyday walking prosthesis is usually adequate.

MODIFICATIONS

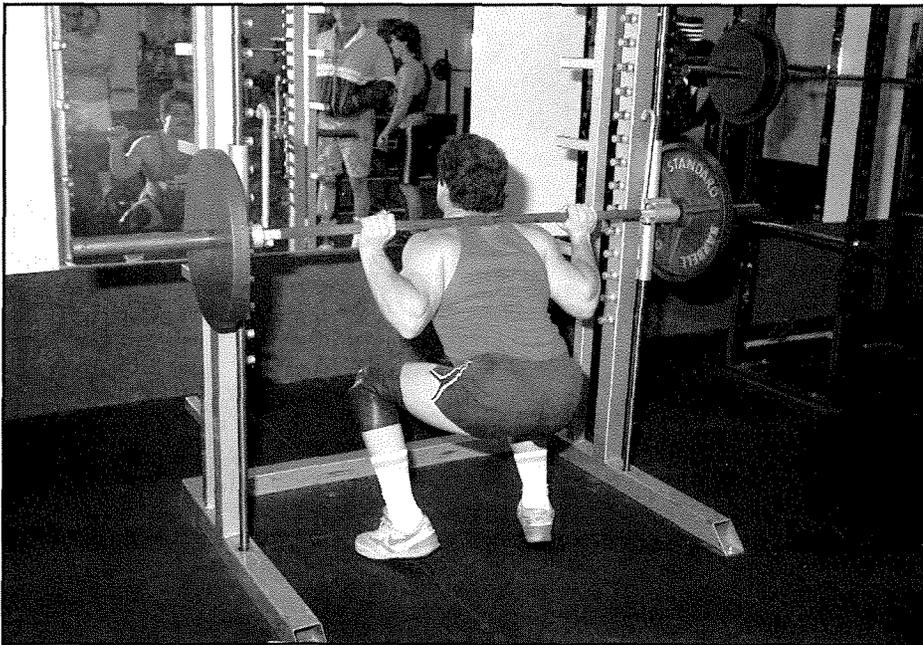
Because Velcro™ on the cuff strap suspension may pull apart when fully flexed, suspension sleeves are particularly useful. The ActivSleeve is pictured on page 105. Trim lines may need modification on some prostheses to allow increased range-of-motion, particularly to medial and lateral walls and posterior trim lines.

SKILL LEVEL

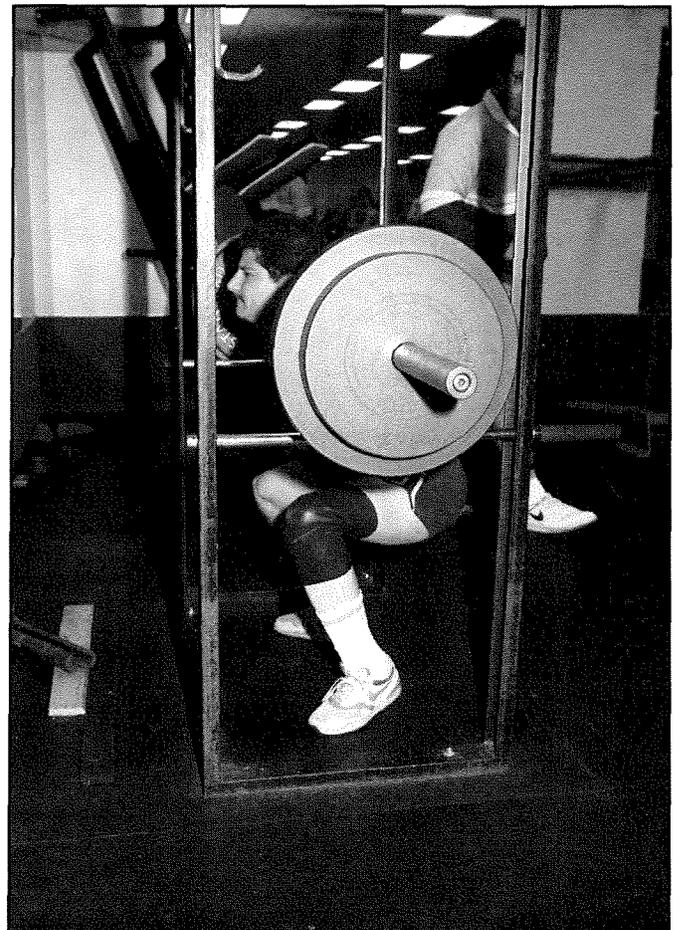
Advanced.

NOTE

A close stance (feet less than 16 inches apart) is usually not recommended for individuals with lower limb amputation because it makes it very difficult to maintain balance when squatting. Although squats generally are performed with a 2 x 4 board underneath the heels to elevate them through the entire exercise, this is not recommended for those with prostheses. The elevated position could create instability, throw the amputee lifter too far forward, and vary prosthetic alignment. It is possible to align a prosthesis just for squatting when standing on a 2 x 4 board. However, many prefer a special weight-lifting shoe with appropriate alignment.



Albert Rappoport demonstrates 90-degree half squats with 205 pounds. He performs squats using his everyday walking leg. Notice how weight is on the ball of the foot (prosthetic side) because the prosthetic ankle cannot bend as far forward as the sound side. This still provides adequate balance and support. Rappoport's heavy workouts include 3 sets of 5 repetitions with up to 275 pounds.



Even though a majority of the weight is taken on the sound side, squats are an excellent conditioning exercise for the residual limb.

EXERCISE 44. NAUTILUS HIP AND BACK MACHINE**PURPOSE**

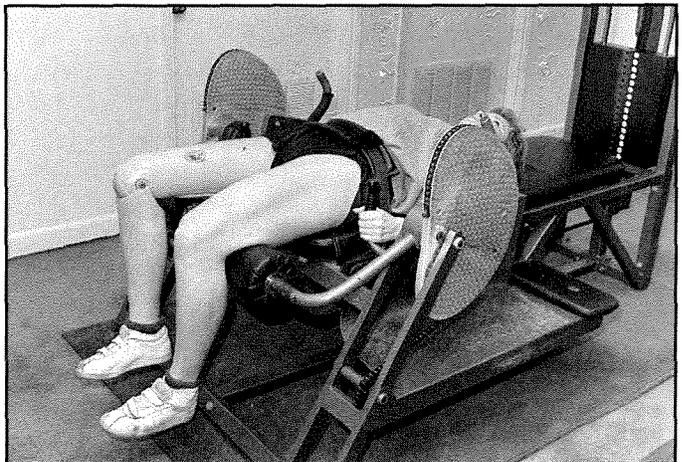
Strengthens hip extensor. Works the gluteus maximus and hamstrings. This exercise is good for those with AK amputations because it strengthens the musculature of the residual limb.

PROCEDURE**■ Step 1**

- Lie flat on the bench, flex the hips so the thighs are vertical, and place the lower legs over the pads. Position yourself so that both hips are in line with the cam. (This will insure that the body's axis of rotation is lined up with the machine's.)
- Strap the seat belt across the waist and grip the handle bars on each side for support.
- Push down on both legs and touch both feet to the floor if possible, as seen in the Step 1 photos below. The extended legs hold down the weights by maintaining a static contraction on the lower back and hips.

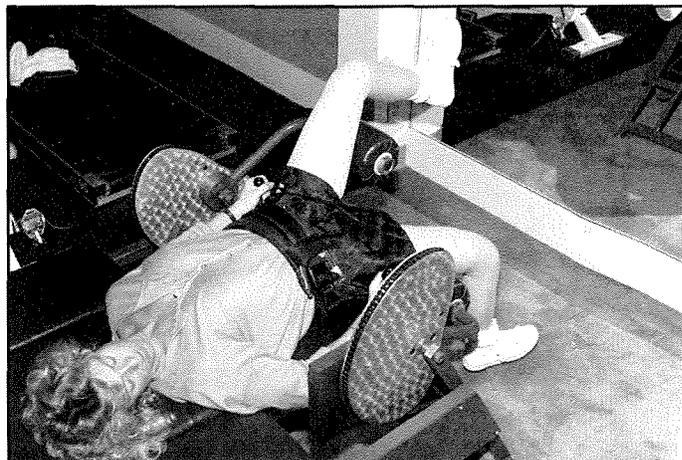


Samantha Ellis and Linda Pedersen demonstrate Step 1 of this exercise, which gets both legs in position to begin the repetitions. The Nautilus Hip and Back machine works the same muscles as does the pulley/cable used in Exercise 47, but it is not always available in small facilities. Some people with lower limb loss find it easier to use this machine than the pulley/cable.

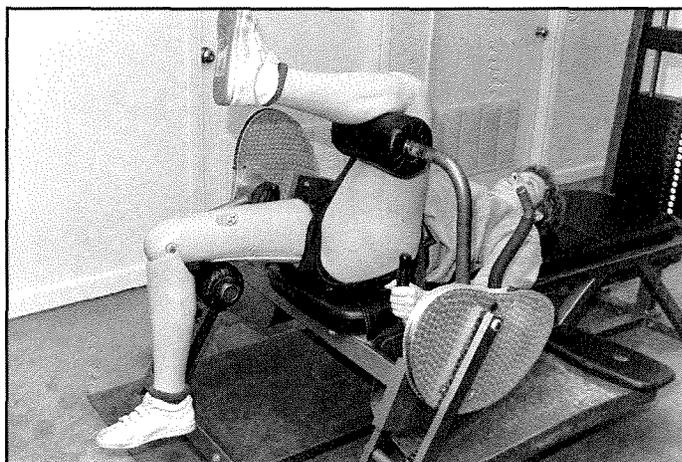


■ Step 2

- Keep one foot in contact with the floor and bring the other leg up (with a count of four) until the thigh is flexed and perpendicular to the floor, as seen in the photos on the right.



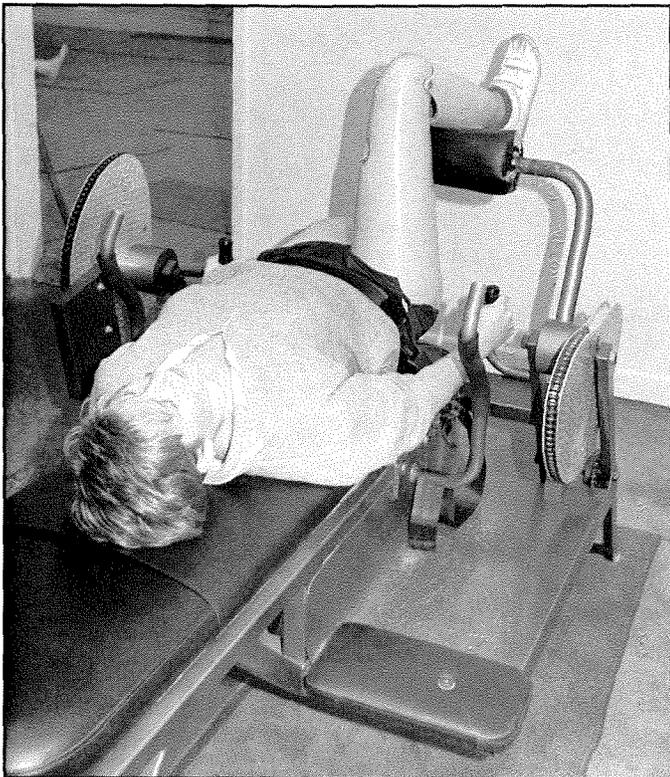
- As shown, the leg in contact with the floor maintains static contraction holding the weight bar down while the other leg is brought up slowly until the thigh is in a vertical position.

**■ Step 3**

- Push the flexed leg down against the resistance of the weights by extending the hip until both feet are touching the floor with a count of two.

EXERCISE 44. NAUTILUS HIP AND BACK MACHINE (Continued)**■ Step 4**

- Bring the other leg up slowly with a count of four, while the previously raised leg maintains static contraction against the weight resistance with the foot on the floor (same as Step 2, but with the other leg).
- Repeat Step 3 in preparation for another full repetition.

**SKILL LEVEL**

Intermediate to Advanced.

CAUTION

This exercise can be stressful to the lower back. Omit if low back problems are present.

EXERCISE 45. LEG CURL**PURPOSE**

Develops the hamstrings.

PROCEDURE

- Lie face-down on a leg curling bench.
- Make sure the knees are off the end of the bench and the legs are straight with the heels under the foot pads.
- Flex one leg as far as it will go, trying to touch the foot pad to the buttocks.
- Slowly lower the leg back to the extended position.

MODIFICATIONS

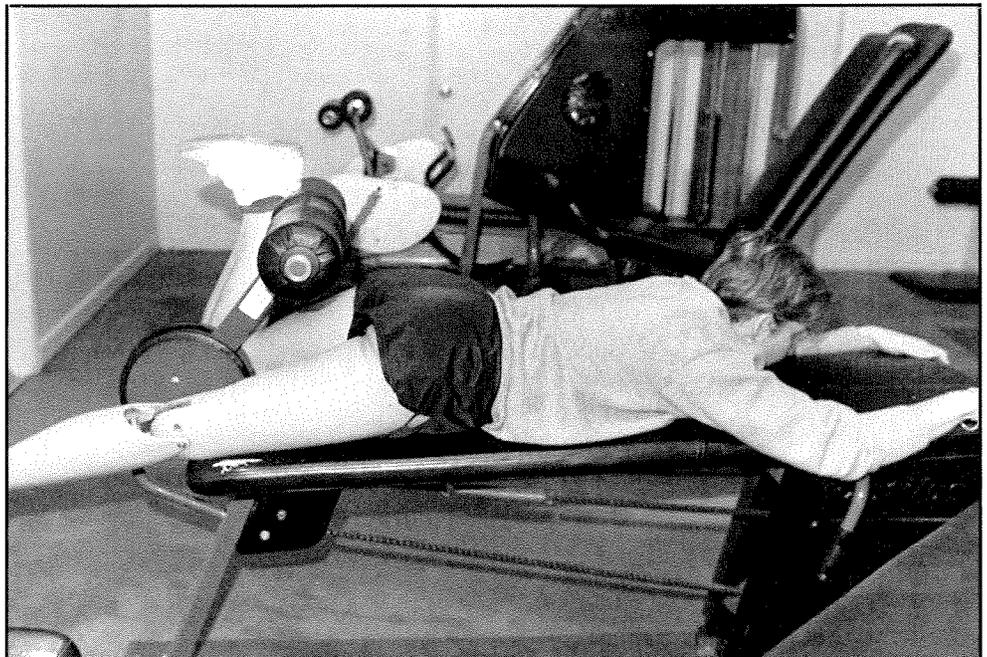
For those with AK amputation, working the residual limb from this position is not feasible because the knee is not controlled by muscles. Exercise 44, the Nautilus Hip and Back Machine, should be used. Those with BK amputations may not be able to complete full range of motion due to short residual limb size or flexion restrictions on prosthesis. Exercise 46 or 47 should be used as an alternative.

SKILL LEVEL

Intermediate.

CAUTION

Avoid arching the lower back.



On the Nautilus equipment, Linda Pedersen demonstrates the Leg Curl using her sound limb.

EXERCISE 46. STANDING ONE-LEGGED LOW PULLEY LEG CURL**PURPOSE**

Develops the hamstring muscles.

PROCEDURE

- Face the weight machine and place a cuff strap around the middle of the socket on the outside of the prosthesis. Adjust the position of the strap on the leg for maximum comfort.
- Hold on to the support bar and flex the knee on the prosthetic leg while balancing on the sound leg. Try to flex as much as possible before returning the foot to the floor.

MODIFICATIONS

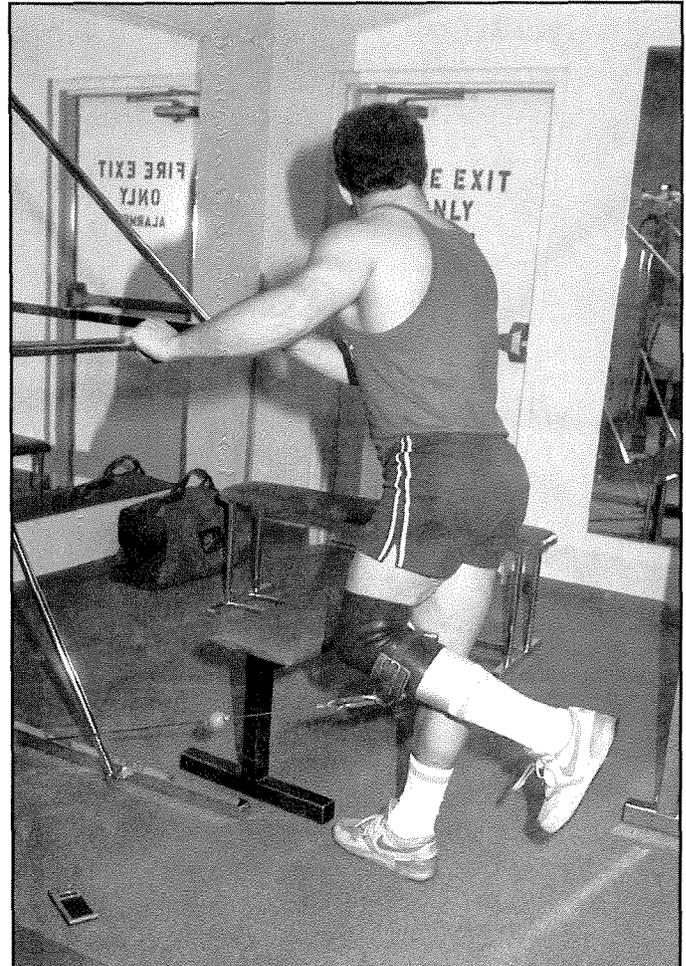
Many people find it difficult to do leg curls from a prone position with their prosthesis (Exercise 45) and find the standing position better suited for them. However, the leather cuff and D-ring pulley should not be attached at the ankle level for those with a short residual limb because flexing would produce undesired forces and excessive stress on the residual limb, and would also make the exercise more difficult. In order to concentrate on the hamstring muscles, the best attachment point is at the middle of the socket. If the residual limb is long, the cuff strap may be worn on the lower part of the leg.

SKILL LEVEL

Intermediate.

NOTE

Most people with below-knee amputation will be able to flex to a maximum of 90 degrees. Trim lines of the socket, length of residual limb, and suspension will be limiting factors. In certain cases, your prosthetist can make accommodations. If balancing on the prosthetic leg presents a problem, exercise the sound leg on the leg curl bench as shown in Exercise 45.



Albert Rappoport demonstrates the correct form for Leg Curls for a person with a short residual limb wearing a BK prosthesis.

EXERCISE 47. STANDING PULLEY HIP EXTENSION**PURPOSE**

Works the hamstrings and gluteus maximus.

PROCEDURE

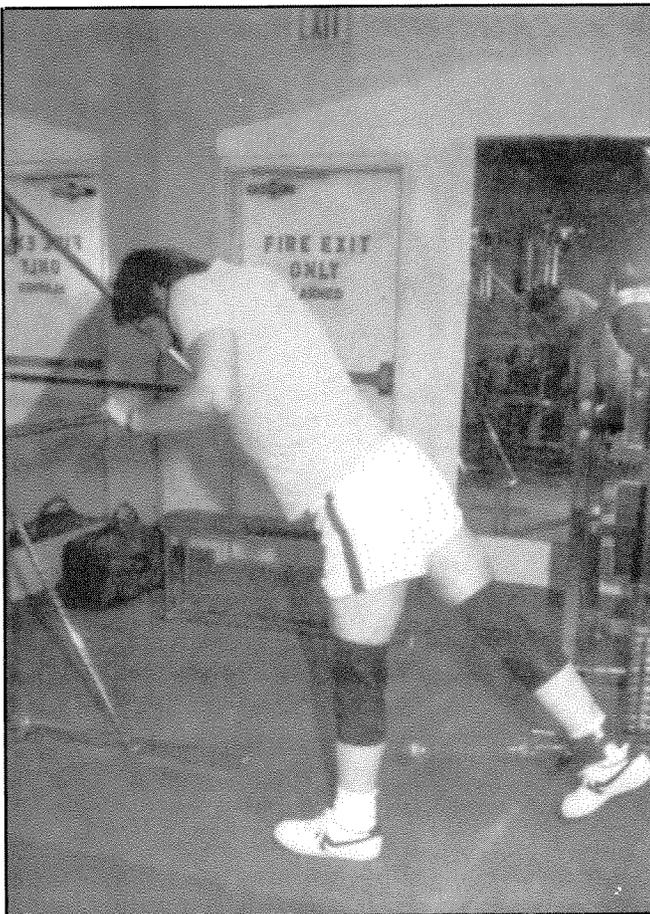
- Attach the ankle cuff in a comfortable position to the exercising leg. Face the weights and hold the handrail for balance and support. Keep the trunk stationary and the back straight.
- Start with the legs together and then extend the weighted leg backward as far as possible. The other leg remains planted on the floor for support.
- When the back leg is fully extended, hold for a few seconds and then slowly bring the leg forward until it is even with the other leg and in a standing position.

MODIFICATION

For those with a short residual limb, exercise is often more comfortable when the cuff strap is placed higher on the leg.

SKILL LEVEL

Intermediate to Advanced.



John Everett demonstrates the use of the standing pulley weights to exercise the hamstrings and gluteus muscles of the thigh. Everett places the cuff strap at ankle height because his residual limb is long.

EXERCISE 48. NAUTILUS HIP ABDUCTION/ADDUCTION MACHINE**PURPOSE**

Strengthens the abductor and adductor muscles of the hip. Improves endurance for walking and other ambulatory activities.

PROCEDURE 1: ABDUCTOR EXERCISE

- Before sitting down, adjust the thigh pads so they are on the outside of the leg rest as shown.
- Adjust the lever on the side of the machine to bring the leg rest portions together.
- When seated, secure the waist strap and place the legs inside of the thigh pads. Push against the thigh pads until your legs are as wide apart as they will go (see photo).
- Slowly bring the legs back together.

PROCEDURE 2: ADDUCTOR EXERCISE

- Adjust the thigh pads so they are on the inside of the leg rest.
- Adjust the lever on the machine to spread the leg pieces outward for a range of motion that is challenging but still comfortable, as shown in the photo.
- When seated, secure the waist strap and place the legs on the outside of the thigh pads.
- Press against the pads until they touch each other and the legs are at mid-line. Slowly let the legs retract out until they are at full spread position.

MODIFICATIONS

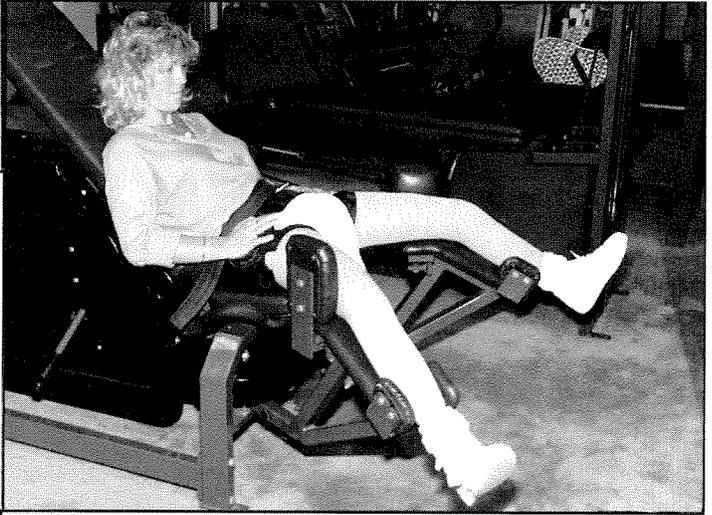
Weight resistance should be minimal for beginners. If you have never used this machine before, ask an instructor to show you how to change positions for abduction and adduction.

SKILL LEVEL

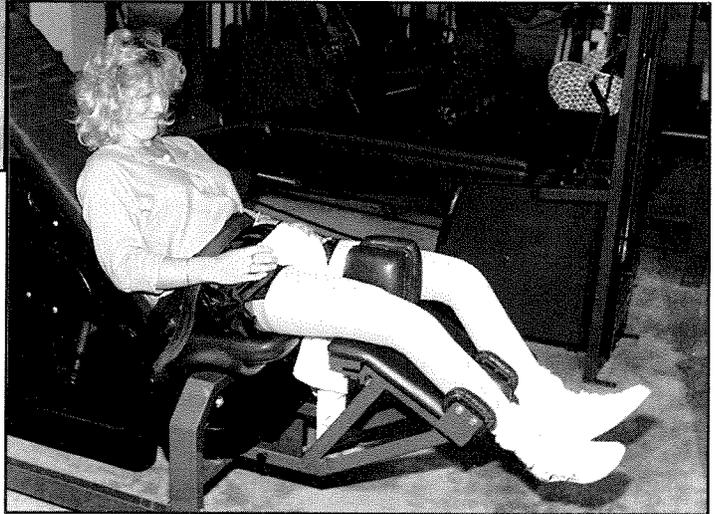
Intermediate.



PROCEDURE 1. ABDUCTOR EXERCISE



PROCEDURE 2. ADDUCTOR EXERCISE



EXERCISE 49. LOW PULLEY SINGLE HIP ABDUCTION**PURPOSE**

Exercises the abductors of the hips.

PROCEDURE

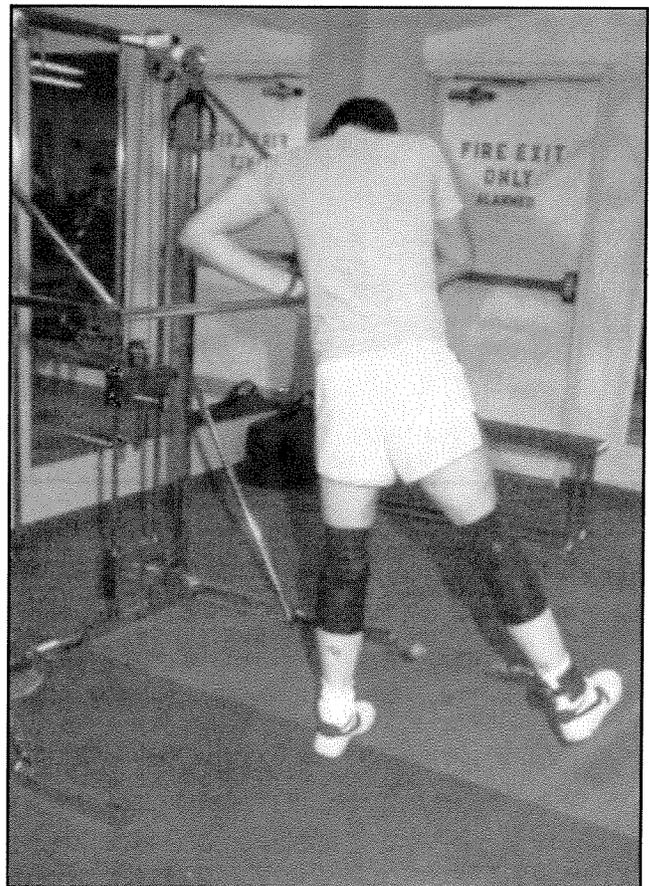
- Secure the cuff strap to the prosthesis of the leg furthest from the weights.
- Stand with the feet close together and pull the cable away from the stack of weights by extending the working leg out from the mid-line of the body, as shown. Hold for a count of two.
- Bring the leg back slowly (with a count of four) to the standing position before repeating the exercise.

MODIFICATIONS

For maximum workout benefits, place the cuff strap higher on the prosthesis for short residual limbs and lower for long residual limbs. Many people find it most comfortable to place the cuff strap around the prosthesis where the middle section of the residual limb is located. If standing is too difficult, try working the abductors from a seated position (shown in Exercise 49).

SKILL LEVEL

Intermediate to Advanced.



John Everett demonstrates the exercise, maintaining his balance by holding on to the handrail.

EXERCISE 50. LOW PULLEY SINGLE HIP ADDUCTION**PURPOSE**

Exercises the adductors of the hip.

PROCEDURE

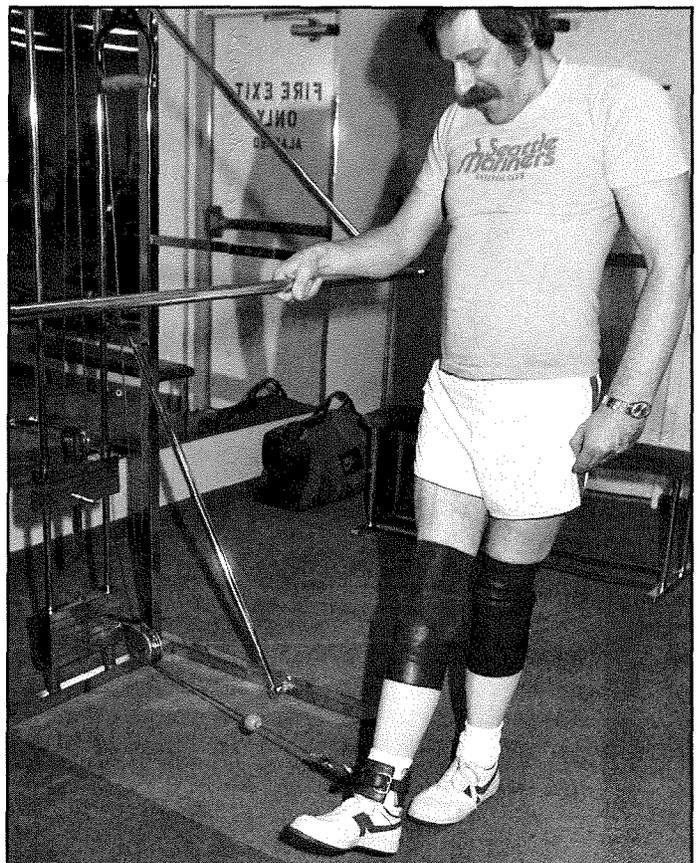
- Secure the cuff strap to the prosthesis of the leg closest to the weights.
- Stand with feet slightly apart.
- Move the strapped inside leg forward, away from the leg used for balance, so adequate clearance is available.
- Pull the cable away from the stack of weights toward the stationary outside leg until they meet, or until the working leg slightly passes the standing leg.
- Return the working leg to the starting position before repeating the exercise.

MODIFICATIONS

For maximum workout benefits, place the cuff strap higher on the prosthesis for short residual limbs and lower for long residual limbs. Many people find it most comfortable to place the cuff strap around the prosthesis where the middle section of the residual limb is located. If standing is too difficult, try working the adductors from a seated position (shown in Exercise 49).

SKILL LEVEL

Intermediate to Advanced.



John Everett demonstrates the exercise, again maintaining balance by holding on to the handrail.

EXERCISE 51. WEIGHTED STANDING CALF RAISE (NAUTILUS MULTIPURPOSE MACHINE)

PURPOSE

Develops the calf muscles, especially the two heads of the gastrocnemius. Strengthening the calf will help prevent premature muscular fatigue when performing daily activities.

PROCEDURE

- Adjust the weight to the desired resistance and place the attached belt around your waist.
- Position the sound leg with the ball of the foot on the first step, allowing the heel to hang over the edge of the step. Keep the prosthetic leg on the floor.
- Keep your head up and your back and knee straight during the exercise.
- Hold the support bars and raise up on your toes. Raise as high as you can and hold the position momentarily.
- Lower your foot as slowly as possible so that your heel drops well below the step.
- Raise back up to contract the calf muscle.

VARIATIONS

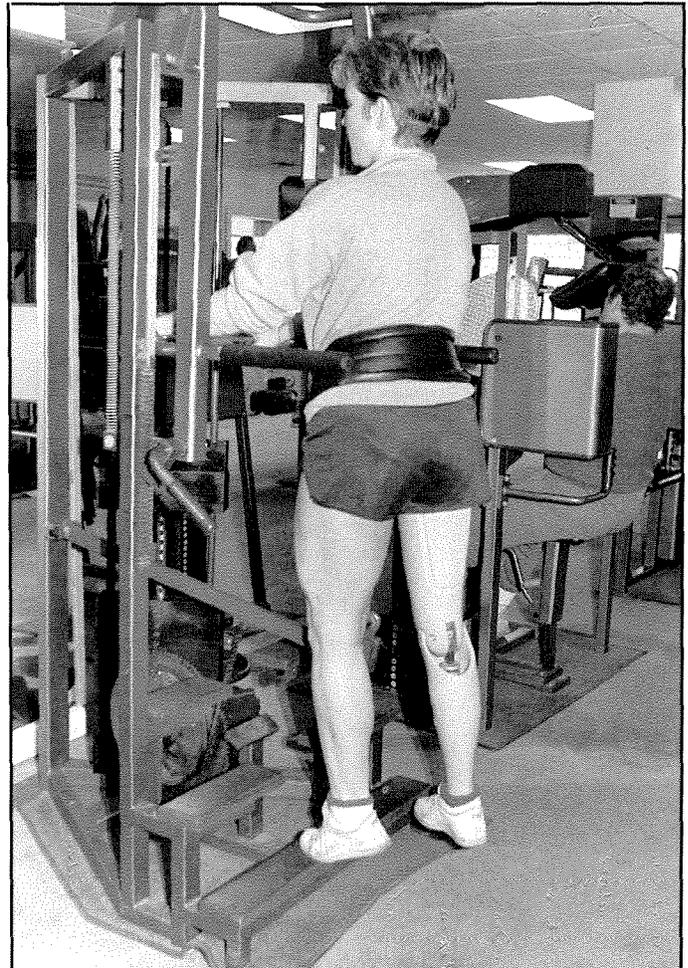
- Toes facing straight ahead works the main calf muscles.
- Toes facing in and heels out works the outer calf muscles.
- Toes facing out and heels in works the inner calf muscles.
- All three positions are necessary to achieve fully developed calf muscles.

MODIFICATION

The prosthetic leg is not placed on the step.

SKILL LEVEL

Advanced (primarily because only one leg is being used at a time).



Linda Pedersen works on the multipurpose machine to develop strength in her sound leg.

EXERCISE 52. SEATED ONE-LEGGED TOE RAISE**PURPOSE**

Develops gastrocnemius/soleus muscles. The seated toe raise is one of the best ways to develop the underlying soleus muscle.

PROCEDURE

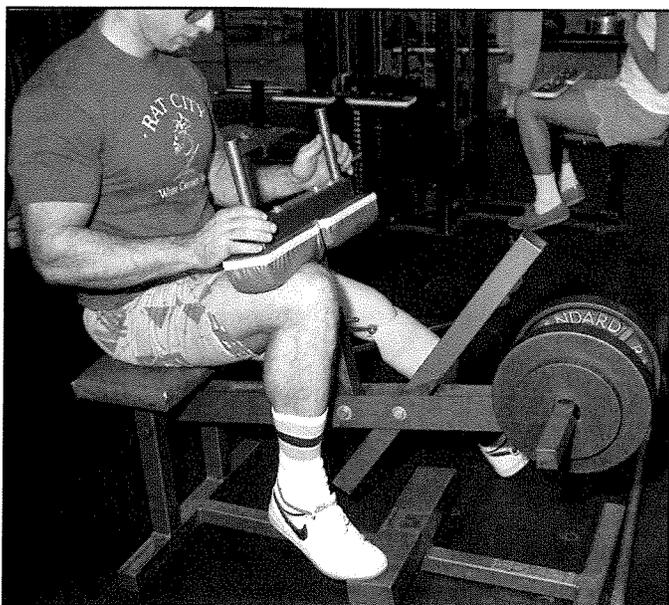
- Sit on the calf machine and adjust the upper leg pad so that it touches the thigh and is positioned just above the knee.
- Position the balls of the feet so they are directly below the leg pad.
- Push up thigh pad with calf muscle contraction and release the safety stop.
- Let go of the safety stop and lower your heel as far as is comfortable, trying to get a good stretch. Lower your heel to well below the foot rest.
- Raise up on your toes, bringing your heel up as high as you can.
- When you reach the highest position, hold that contraction momentarily before lowering the heel back down to the starting position.
- Try to get a complete range of motion on each repetition.
- Use only the calf. Do not pull with the hands or flex the thigh except on the last repetitions which you could not normally complete otherwise.

MODIFICATION

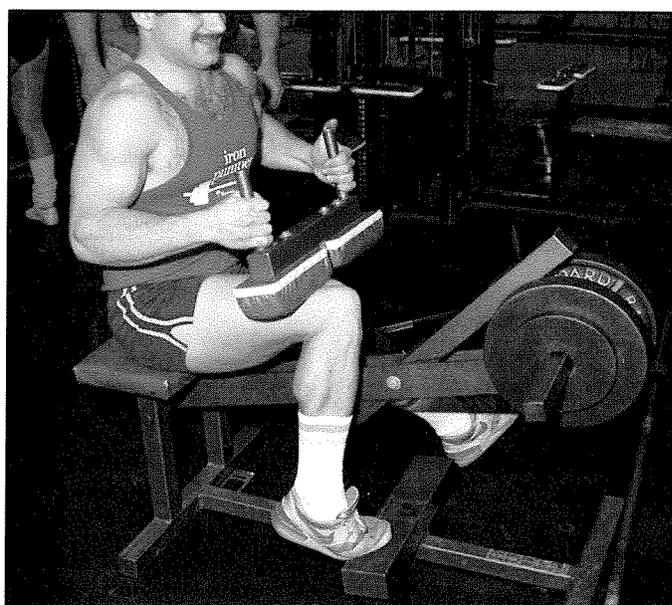
Keep prosthetic leg out to the side because it is not exercised.

SKILL LEVEL

Advanced.



Mike Nitz demonstrates the exercise with the toes pointed outward, thereby working the inner calf.



Albert Rappoport demonstrates the exercise with the toes pointed inward, thereby working the outer calf.