The Centre for Strong Medicine

FIT FACTS Series

The Management of Venous Stasis

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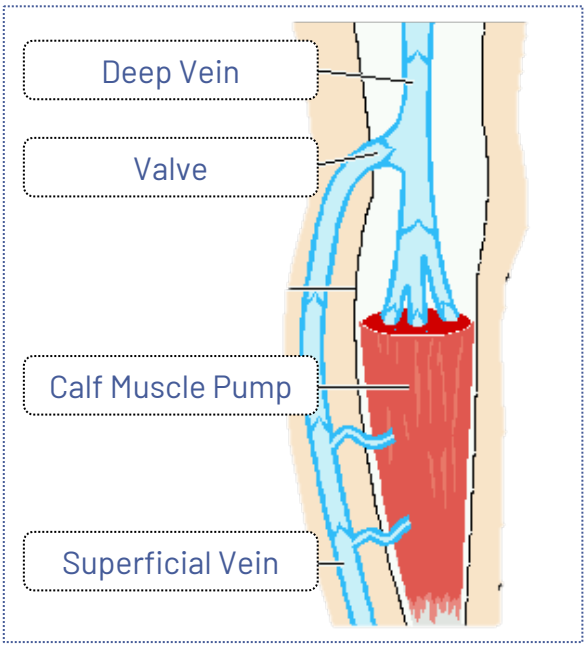
What is the Peripheral Venous System?

The peripheral venous system is part of the blood circulatory system that includes superficial and deep veins. It stores the blood and returns it back to the heart from the arms, legs, hands and feet.[1]

Blood circulating in the lower limb needs to be pumped against gravity to be returned to the heart.



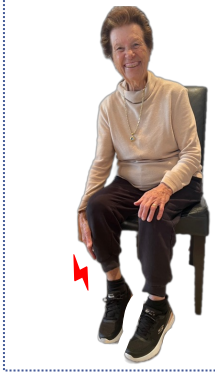
This process is facilitated by valves in the veins and contraction of the calf muscles, Gastrocnemius and Soleus, functioning as muscle pumps. Calf muscle contractions also help stimulate the return of fluid via a network throughout the body that drains fluid called the lymphatic system.[1-2]

What is Venous Stasis?

Venous stasis occurs when blood returning to the heart from the lower limb is impaired and the pressure within the veins is increased.[1-4]

Signs and symptoms of venous stasis include:

- Leg pain
- Aching
- Cramping
- Fatigue
- Heaviness
- Restlessness
- Discomfort
- Itchiness
- Swelling (oedema)
- Skin changes in the leg
- Dilated veins (varicose veins).[1,3]



Leg pain

Varicose veins

What Can Venous Stasis Lead to?

Venous stasis can lead to:

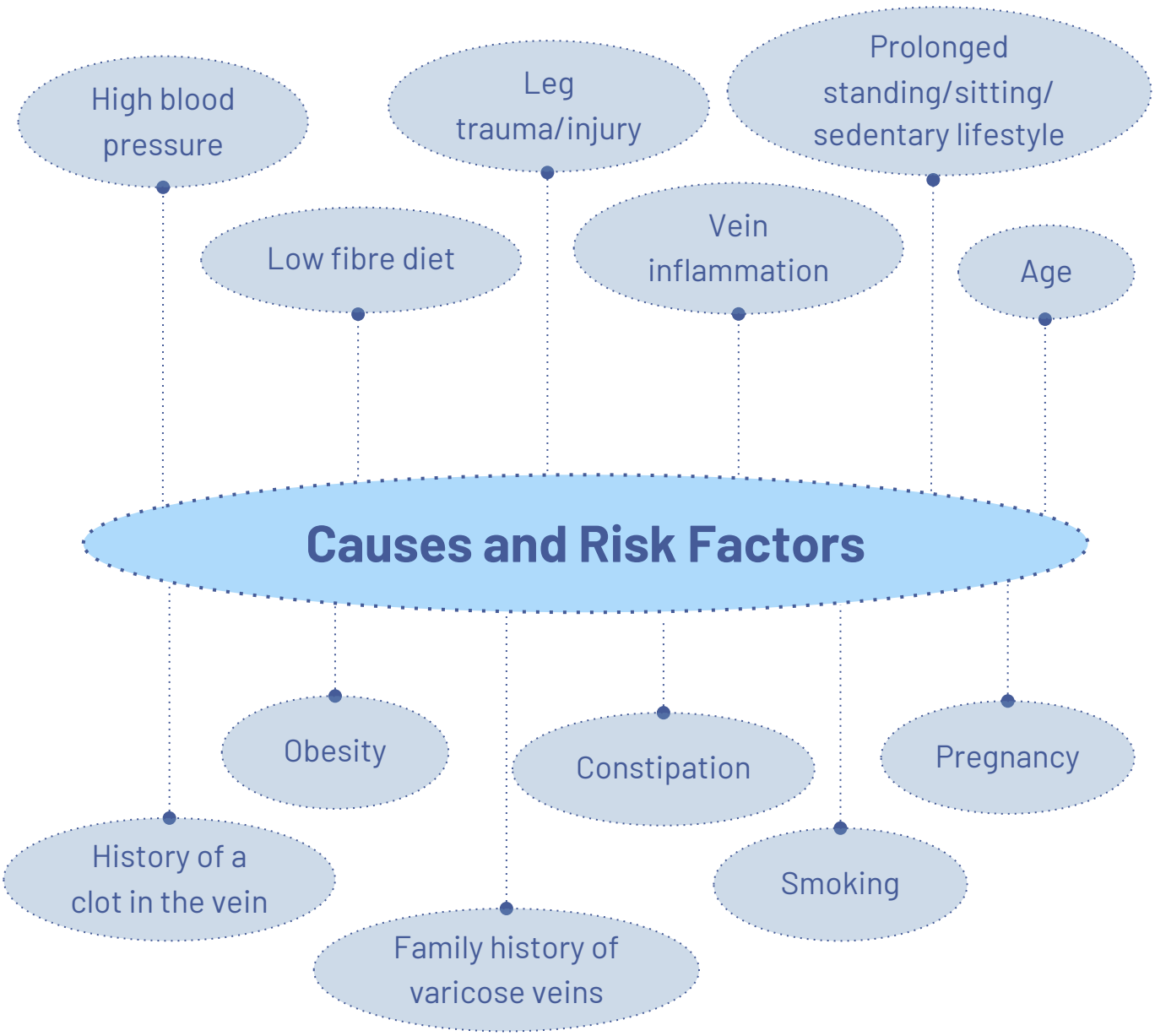
- Loss of sensation or dry, itchy skin
- Bacterial skin infection (cellulitis)
- Mobility impairment
- Poor balance leading to falls
- Low blood pressure when going from a sitting or lying position to standing (orthostatic hypotension)
- Depression over body disfigurement
- Masked weight loss and malnutrition as fluid retention hides muscle and bone loss
- Blood clot in the deep veins within the leg (deep vein thrombosis)
- Blood clot that blocks an artery supplying blood to the lungs (pulmonary embolism)
- Treatment using blood thinners or diuretics (fluid pills)
- Delayed wound healing which can lead to ulcers and cellulitis
- Decreased quality of life.[1,3]

Cellulitis

Wound

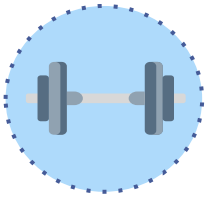
What Causes Venous Stasis?

Multiple factors lead to venous stasis.[1,3-6]



How is Venous Stasis Treated?

The main form of treatment is non-invasive therapy to reduce symptoms and prevent progression or secondary complications of venous stasis.[1]



Both aerobic and resistance exercise are a powerful form of treatment as muscle contractions help with the return of fluid through the lymphatic system.[1-2,4,6-7]

Lower body resistance training improves calf muscle pump function therefore, assists venous return and decreases symptoms. It can also increase muscle mass to offset the wasting of calf muscles caused by venous-stasis-related mobility impairment, which can lead to poor strength, balance and function.[1-2,4,6-7]

Pain caused by venous stasis is sometimes treated with opioids or gabapentin. However, the use of opioids leads to sedation and constipation which further worsen venous stasis. Therefore, it is important to discuss alternative pain-relieving strategies with a doctor.

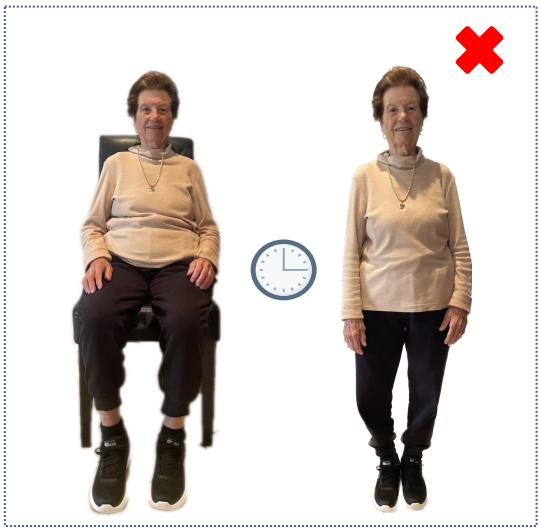
How is Venous Stasis Treated?

Additional forms of non-invasive treatments to reduce symptoms and prevent progression or secondary complications of venous stasis include:[1]

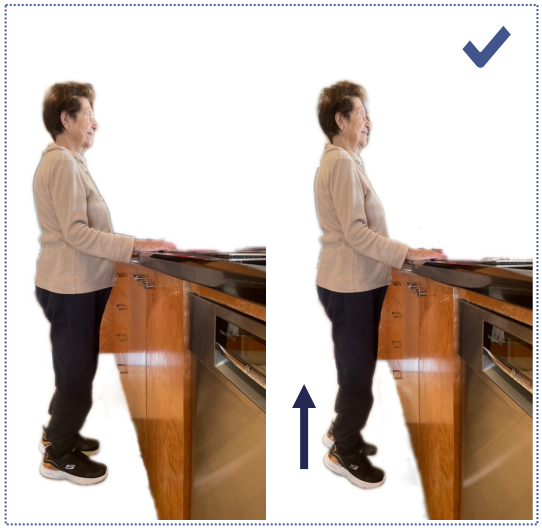
Compression stockings help improve venous stasis symptoms and skin appearance by lowering venous pressure.[5,6] It is important to ensure they are the correct size by reviewing them with a doctor. In addition, if you have peripheral vascular disease, avoid compression stockings as they can further decrease blood flow to the lower legs and feet.

To reduce short-term swelling (oedema) and pain, diuretics (fluid pills) can be prescribed. However, it is important to note these medications can be inappropriately prescribed and are not suitable for long-term management.[8]

Tips to Manage Venous Stasis



- Avoid standing or sitting in one position for extended periods of time as a lack of movement can lead to circulation problems
- Perform balance and strength training to improve circulation and prevent falls.



- When standing at the sink, cooking, brushing teeth, etc., perform standing calf raises
- Hold onto a steady surface such as the kitchen bench or sink for safety.

Tips to Manage Venous Stasis

It is important to prevent constipation as it slows lymphatic flow through the pelvis and worsens venous stasis.

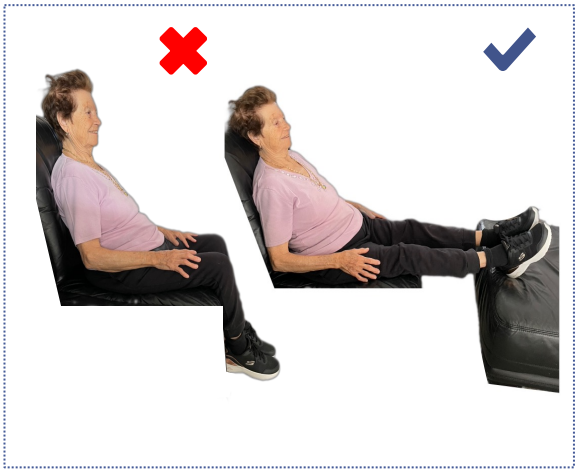
- Undertake a drug review completed by a doctor to remove unnecessary drugs that cause constipation such as iron, calcium and drugs that block the activity of a certain neurotransmitter called anticholinergic drugs or replace non-steroidal anti-inflammatory drugs or calcium channel blockers if possible with other agents
- Add water, fibre, whole grains, bran, and dried fruits such as prunes to diet
- Increase activity throughout the day and reduce sedentary time.

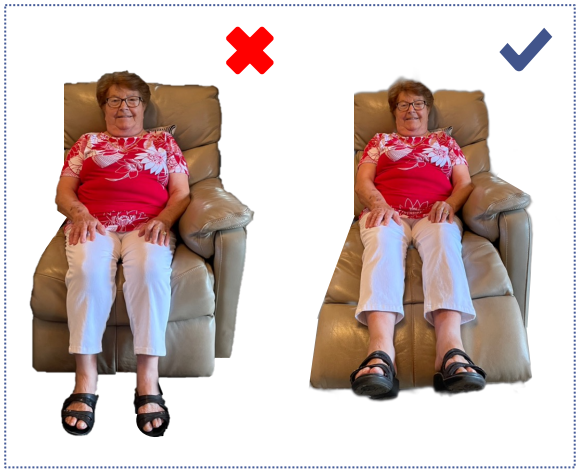
Tips to Manage Venous Stasis

Other key non-invasive treatments to help treat and manage venous stasis includes:

Sitting [2,7]

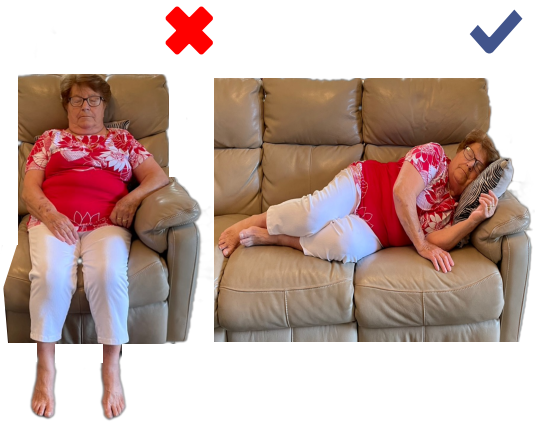
- Decrease sitting time
- Minimise sitting with the legs down as it cuts off circulation in the groin and keeps fluid in the legs and feet. Instead, elevate the feet while sitting
- When sitting, do calf raises alternated with flexing toes towards head as much as possible if feet cannot be elevated
- Sit reclined rather than an upright position.



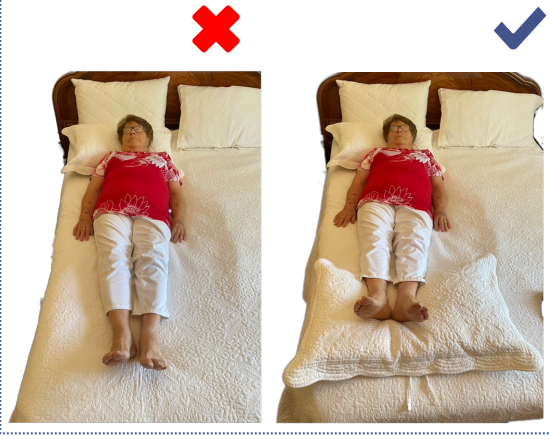


Tips to Manage Venous Stasis

Sleep[2,7]



- Nap lying down rather than in a chair



- Sleep with the feet on a pillow or place the foot of the bed on shock blocks

Caution: This should be avoided if you have significant reflux, chronic heart failure, peripheral vascular disease, sleep apnoea or COPD

- Before getting out of bed, complete calf raises for 30 seconds to minimise falls risk and low blood pressure when going from lying down to standing.

Tips to Manage Venous Stasis

It is important to maintain skin health and avoid trauma to the skin to prevent injury, ulcers and infections.

Skin health [2,7]

- Keep skin well moisturised with a lanolin-based cream
- Protect skin with soft socks
- Do not walk barefoot
- Inspect feet daily to watch for lacerations, scratches and/or infections in the legs and feet
- Dry between toes to prevent fungal infections
- Keep nails trimmed with a podiatrist.

! **Caution: Do not trim nails yourself**

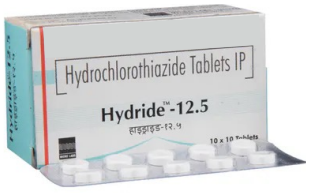
Alternative Treatments for Venous Stasis

If the treatment measures mentioned previously do not work the following treatments are considered:

- The use of compression stockings to help improve symptoms and skin appearance[6]
- Surgery such as removing varicose veins (venous ligation surgery) and heat to reduce varicose veins (venous laser surgery)[6]
- To remove water or excess fluid within the body, medications known as diuretics can be prescribed

! **Caution: These medications can be inappropriately used**

- Evaluation by a doctor for blockage of lymphatic drainage due to other causes for example, a tumour.



Prevention Treatment Post-Surgery

To prevent post-surgery deep vein thrombosis and pulmonary embolism the following treatments can be utilised:

- Wear compression stockings
- Take blood thinning medication including low molecular weight heparin and dextran
- Wear inflatable leg garments filled with compressed air (pneumatic compression devices).[7]

! This is also especially important following a:

- **Hip fracture**
- **Abdominal surgery**
- **Airline flight**
- **Any extensive period of bed rest.**

Venous Stasis Exercises: Calf Raises

An important exercise is calf raises as they help strengthen the calf muscles labelled below.

Calf Muscles

There are two major calf muscles in the lower leg:

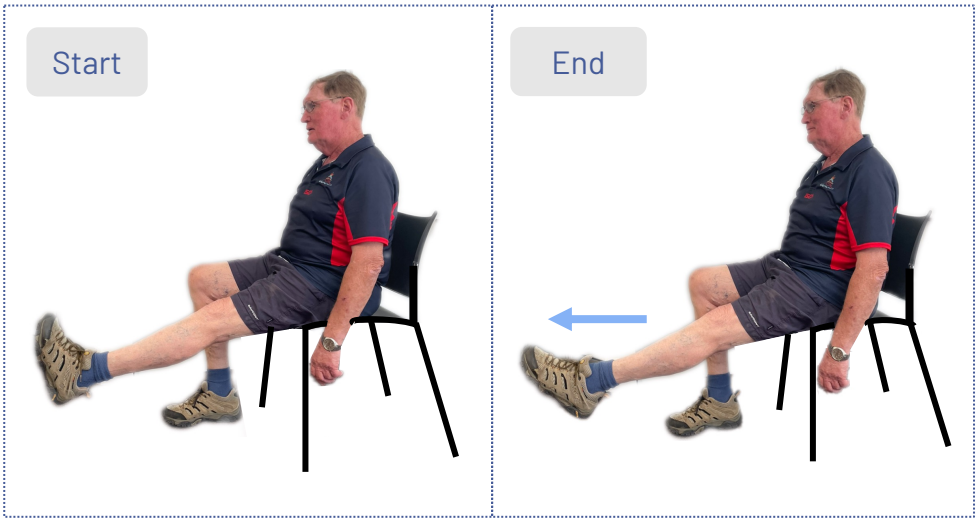
1) A deeper muscle called Soleus which works to assist with posture
2) A larger muscle located on top that produces power and movement, Gastrocnemius.

Due to the position and main functions of these muscles, when the knee is bent Gastrocnemius involvement is limited during the calf raise exercise. Keeping a straight leg, however, activates both muscles, allowing for larger muscle pump action. This is important for venous stasis as it allows for greater circulation and return of fluid through the lymphatic system.

Venous Stasis Exercises: Calf Raises and Foot Flexion at Home

- The exercises are listed according to level of difficulty
- Complete the exercise to full range of motion possible
- Progress accordingly as tolerated
- If you feel too unsteady, complete seated exercises.

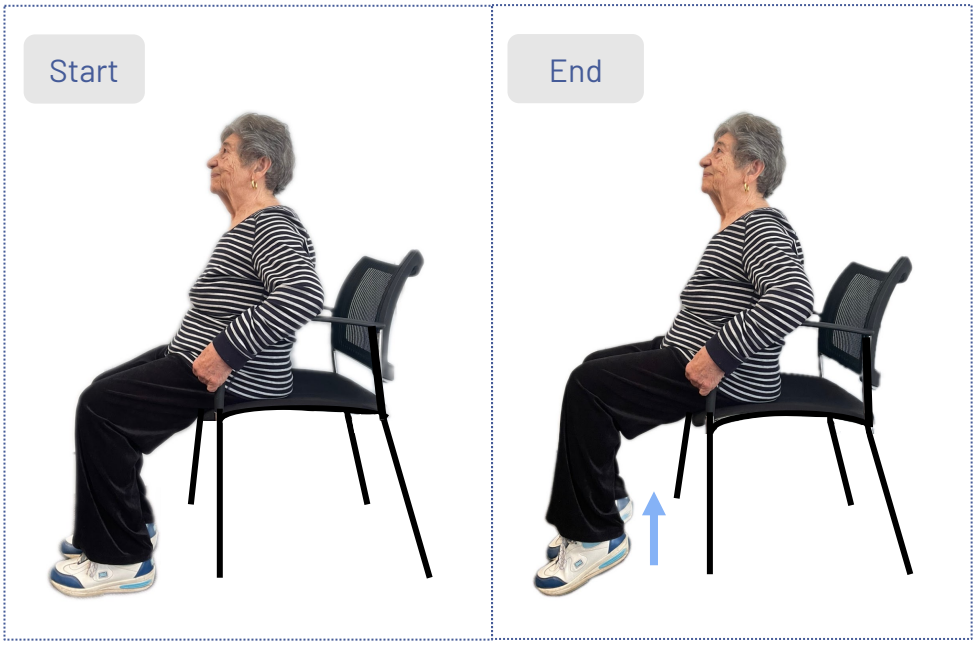
1



- ✓ Sit up tall in the middle of the chair (do not arch back or lean back)
- ✓ Straighten leg directly in front with the toes pointing up towards you and pause for 1-2 seconds
- ✓ Take 3 seconds to point your toes as far as you can
- ✓ Pause at the end position for 3 seconds
- ✓ Take 3 seconds to pull toes up towards you as far as you can
- ✓ Pause at the start position for 3 seconds
- ✓ Repeat 8 times on each side for 3 rounds.

Venous Stasis Exercises: Calf Raises at Home

2



- ✓ Sit in the middle of the chair
- ✓ Sit up tall (do not arch back or lean back)
- ✓ Place feet together and pause for 1-2 seconds
- ✓ Rise up on the toes as far as you can for 3 seconds
- ✓ Pause at the end position for 3 seconds
- ✓ Lower down to the starting position for 3 seconds
- ✓ Repeat 8 times for 3 rounds.

Perform exercises 1 and 2 once or twice daily and whenever possible whilst sitting.

Complete on a long plane, train, bus or car trips.

Venous Stasis Exercises: Calf Raises at Home

When standing, complete calf raises in three positions to strengthen all parts of Gastrocnemius.

3

! Watch for knee pain. Bend the knees slightly to decrease pain.

Position 1: Straight

Start

Position 1: Straight

End

Position 2: Everted

Position 3: Inverted

- ✓ Hold onto a sturdy chair or fixed surface, for example, a counter for support
- ✓ Place feet together, stand up tall (do not arch back) and pause 1-2 seconds
- ✓ Rise up on the toes as far as you can for 3 seconds
- ✓ Pause at the end position for 3 seconds
- ✓ Lower down to the starting position for 3 seconds
- ✓ Repeat 8 times in each position.

Venous Stasis Exercises: Calf Raises at Home

4

- ✓ Hold onto a stable surface for example, a handrail and/or wall for support
- ✓ Place the balls of the feet on the edge of the stair/platform
- ✓ Stand up tall, straighten legs (do not arch back) and pause for 1-2 seconds
- ✓ Rise up on the toes as far as you can for 3 seconds
- ✓ Slowly lower down to the starting position for 3 seconds (be careful not to lean back or stick your bottom out)
- ✓ Repeat 8 times for 3 rounds.

Venous Stasis Exercises: Calf Raises at Home

5

- ✓ Hold onto a stable surface for example, handrail and/or wall for support
- ✓ Stand on one foot and place the ball of the standing foot on the edge of the stair/platform
- ✓ Stand up tall, straighten leg (do not arch back) and pause for 1-2 seconds
- ✓ Rise up on the toes as far as you can for 3 seconds
- ✓ Slowly lower down to the starting position for 3 seconds (be careful not to lean back or stick your bottom out)
- ✓ Repeat 8 times for 3 rounds on each side.

Perform exercises 3, 4 and 5 once or twice daily and whenever possible whilst standing.

Complete on a long plane, train, bus or car trips.

Take breaks on long car trips and stand up to perform this exercise or in the aisle of long plane trips.

Venous Stasis Exercises: Calf Raises at the Gym

On the leg press machine, complete calf raises in three positions to strengthen all parts of Gastrocnemius.

Position 1: Straight

Start

Position 1: Straight

End

- ✓ Place feet on the edge of the foot plate
- ✓ Push out, straighten legs and pause for 1-2 seconds
- ✓ Rise up on the toes as far as you can for 3 seconds
- ✓ Pause at the end position for 3 seconds
- ✓ Slowly lower down to the starting position for 3 seconds.

! Watch for knee pain. Bend the knees slightly to decrease pain.

Position 2: Everted

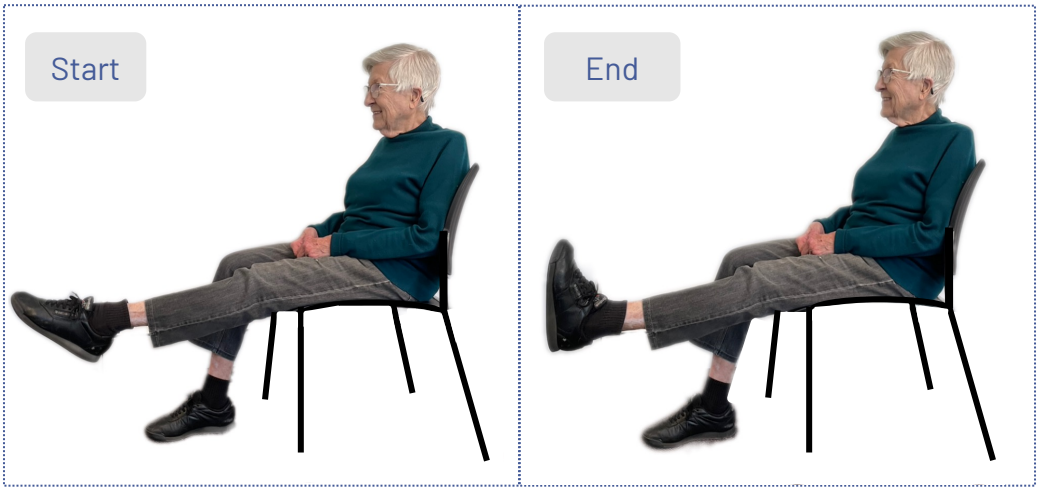
Position 3: Inverted

Repeat 8 times in each position.

Venous Stasis Exercises: Foot Flexion at Home

- The exercises are listed according to level of difficulty
- Complete the exercise to full range of motion possible
- Progress accordingly as tolerated
- If you feel too unsteady, complete seated exercises.

1



- ✓ Sit tall, look forward and pull shoulders blades down and towards the spine
- ✓ Straighten leg directly in front with the toes pointing towards the ground and pause for 1-2 seconds
- ✓ Pull toes up towards you as far as you can for 3 seconds
- ✓ Pause at the end position for 3 seconds
- ✓ Slowly lower down to the starting position for 3 seconds
- ✓ Repeat 8 times on each side for 3 rounds.

Venous Stasis Exercises: Foot Flexion at Home

2

- ✓ Sit tall, look forward and pull shoulders blades down and towards the spine
- ✓ Place a folded towel or non-elastic strap at the ball of the foot, keeping the knee straight or slightly bent as shown and pause for 1-2 seconds
- ✓ Push heel away from the body as far as your ankle allows for 3 seconds
- ✓ Pause at the end position for 3 seconds
- ✓ Lower down to the starting position for 3 seconds
- ✓ The strap should not be used to pull the toes upward, instead, it should act as an anchor point or resistance to push the heel forward
- ✓ Repeat 8 times on each side for 3 rounds.

Perform exercises 1 and 2 once or twice daily and whenever possible whilst sitting.

Complete on a long plane, train, bus or car trips.

Venous Stasis Exercises: Foot Flexion at the Gym

On the knee flexion machine and using the dorsiflexion equipment, complete foot flexion.

Start

End

- ✓ Place feet slightly apart
- ✓ Straighten legs
- ✓ Place the black pads on each foot and pause for 1-2 seconds
- ✓ Pull toes up towards you as far as you can for 3 seconds
- ✓ Pause at the end position for 3 seconds
- ✓ Lower down to the starting position for 3 seconds.

Repeat 8 times for 3 rounds.

Please contact **Professor Maria Fiatarone Singh AM, MD, FGSA, FRACP** and our friendly staff if you would like more information on exercise management for Venous Stasis or any other medical questions you may have.

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