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Give your life a leg up.

Current treatments for
varicose veins

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VARICOSE VEIN ANATOMY 101

How does blood circulate in the legs?

The blood circulation system in the leg is made up of:

- Arteries which take blood from the heart to the leg
- Veins which take blood from the leg back to the heart
- Capillaries which are the very fine vessels between the arteries and veins, and feed the skin

Arterial flow is generated by the heart which acts as a pump.

The venous flow is generated by the calf muscles, valves and low pressure in the abdomen and the chest.

What are the two vein systems?

There are two systems of veins in the leg.

The **deep** system, runs through the muscles of the thigh and calf and carries virtually all of the blood out of the leg back to the heart. It never becomes varicose.

The **superficial** system lies between the muscles and the skin.

The superficial veins are the ones that can become varicose.

They carry less than 2% of the blood out of the leg and back to the heart and one can remove, or block off as many superficial veins as required without any compromise to venous flow from the leg.

How do the vein valves work?

Both the deep and the superficial veins have valves which should only allow flow out of the leg back to the heart.

They are “one way valves” so when you stand up, the valves should prevent the blood from flowing back down into the leg.

Venous flow relies on these valves to carry blood back to the heart.

The calf muscle acts as a pump for the deep system, but return of blood in the superficial system is passive, there is no pump for these.

How do varicose veins develop?

Varicose veins develop when the valves in the superficial system stop working, allowing blood to flow down the leg. This places high pressure on veins below.

Generally, it is one or more of the “axial” veins (great saphenous vein, small saphenous vein and the anterior accessory saphenous vein) where the valves fail.

The axial veins themselves are often not varicose.

However, the tributaries (branches) of the axial veins are not designed to take the high-pressure so therefore they dilate, and they lengthen.

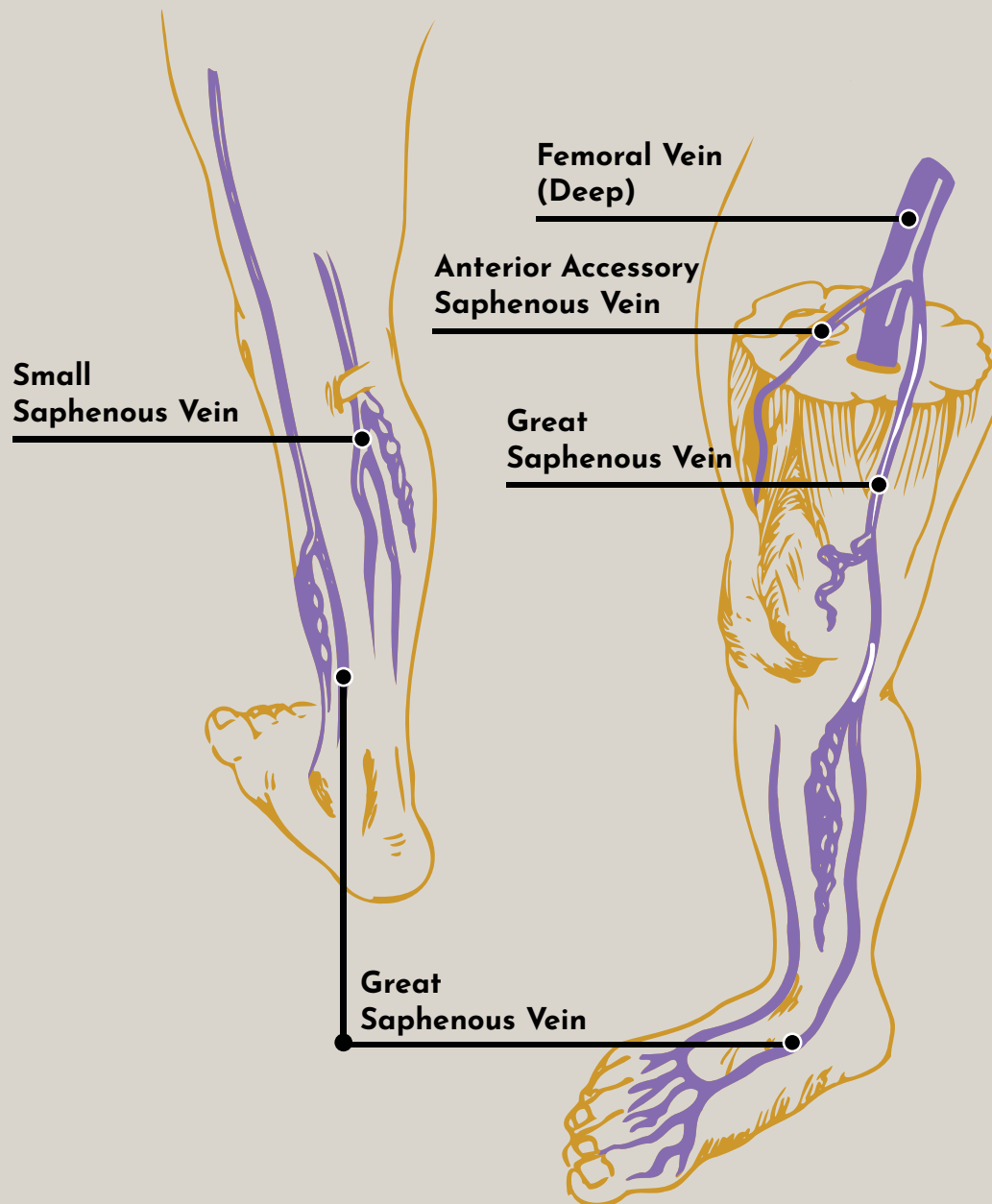
But because they have to fit into the same space, they become tortuous (twisted). This causes varicose veins.

A VARICOSE VEIN IS A SUPERFICIAL VEIN WHICH HAS BECOME DILATED AND TWISTED.



It's not just women who are at risk of varicose veins.

Male occupations such as building, carpentry, electrical, retail work, desk jobs – essentially any job linked to long periods of stationary sitting or standing - are also linked to varicose veins.



How does my doctor know which veins should be treated?

Before treating the varicose veins, your doctor needs to determine which veins or veins are responsible for the varicose veins.

This is done by performing a venous duplex scan.

It is an ultrasound scan similar to the one used in obstetrics.

Treatment of varicose veins relies on either removing the vein or blocking it off.

It needs to be done in two steps.

The **first step** is to manage the axial vein which is feeding the varicose veins. These veins can include the great saphenous vein or small saphenous vein, or the anterior accessory saphenous vein.

Often more than one vein is involved. Sometimes it is related to pelvic veins or perforators. These veins are generally quite large and difficult to block off.

Treatment of the axial veins requires much greater “energy” than treatment of the varicose veins.

In the past, the axial vein which was responsible for the varicose veins was physically removed.

This was called “stripping” and is not usually performed anymore.

These days, the veins can be closed using heat called thermal ablation (such as endovenous radiofrequency or endovenous laser) or glue (cyanoacrylate).

The **second step** is to manage the actual varicose veins themselves.

This can be done by removing the vein (avulsions) or by injecting the vein with a solution that irritates it (sclerotherapy) and causes it to go into spasm and then heals as a thread of scar tissue (sclerosis).

SPIDER VEINS AND VARICOSE VEINS

YOUR TREATMENT OPTIONS

Got vein problems? You're not alone

Sometimes individual veins don't work the way they should, or they stop working entirely. Problems with leg veins are very common.

In fact, about half of all Australian adults have this kind of problem with their veins.

The good news is it's usually very treatable.

The most frequent vein problems are:

Spider veins – small and close to the skin, they can look either red or blue. Their scientific name is telangiectasia, but they're better known by their nickname because they often spread out like a spider's web.

Reticular veins – slightly larger and further under the skin, these are the ones that feed into spider veins.

Varicose veins – the largest of the three, they look blue and knobby and often bulge out from the skin.

The symptoms caused by these vein problems can include heaviness, burning, aching, stinging, itching, throbbing, 'restless legs' and cramps.

What happens if varicose veins aren't treated?

Without treatment vein disease is likely to become worse over time. Pain, discomfort and swelling can increase and more serious complications can develop, including phlebitis (inflammation of the vein), blood clots, dermatitis, pigmentation, lipodermatosclerosis (LDS) and vein ulcers.

What treatments are available?

State of the art treatments we offer at our practice are 'minimally invasive', meaning they are quick and safe, with much less disruption to your routine and much speedier recovery.

HALF OF ALL
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At Art of Vein Care, we offer multiple different treatments for vein conditions including injection sclerotherapy (smaller veins) and ultrasound guided sclerotherapy (larger veins).

We also offer thermal ablation or radiofrequency (a form of thermal ablation similar to endovenous laser).

Our services also include glue procedure and occasionally microphlebectomy where some veins are removed in conjunction with these treatments.



SCLEROTHERAPY OF VARICOSE VEINS

What is it for?

Injections (sclerotherapy) are used for varicose veins where there is no large feeding (axial) vein. If there is a feeding vein, then it needs to be treated and blocked off before considering sclerotherapy. Injections can also be used for spider veins (telangiectasia), recurrent varicose veins (veins that have returned after surgery) and occasionally early varicose veins.

How does it work?

There are 2 common sclerosants that are used. They are Aethoxysclerol and Sclerovein (STS). These are soap solutions and cause an irritation in the wall of the vein. The irritation results in the inner lining sloughing away and absorbing. The vein collapses down and over the following months becomes a thread of invisible scar tissue (sclerosis).

How is it done?

Numbing cream can be used, but needs to be applied at least 1 hour before.

If you would like to use the cream, please ask for a script.

The procedure is done lying down.

The sclerosant is mixed with air through a special filter, which creates a fine foam making the solution more effective. An ultrasound is used to "see" the veins and guide the needle into the vein so the injections are done very accurately.

After the Procedure

The nurse will put the stockings on you, and you will need to rest with the legs up for 30 mins to allow the veins time to collapse.

Walk for 45 minutes each day.

Ideally wear the stockings 24 hours/day.

- **If you are having trouble at night, take them off, but wear the stockings whenever you are out of bed.**
- For showering, use a plastic bag, or have 2 stockings and replace the wet one while lying on the bed. Wear the stockings for 1 week.

Expect

- Temporary stinging or burning for a day or two
- Bruising in injection area
- Spiders may become dark and angry and settle in a few weeks
- Tender lumps disappear after 3-6 months
- Any trapped blood needs to be removed
- The legs may ache for a few days

Complications

- Pigmentation, matting, DVT, swelling, ulcers, migraine.

For more detailed information on complications and precautions see P12

Number of treatments

The varicose veins should completely disappear. The spiders will not disappear completely but should improve by about 60-80% or more depending on the number of treatments.

If you want more resolution, then more treatments will be necessary.

RADIOFREQUENCY ABLATION OF VARICOSE VEINS



What's it for?

This technique is used for patients where the varicose veins are being fed by a large, relatively straight superficial vein (such as the great or small saphenous vein).

It is a form of "thermal ablation" (similar to endovenous laser).

The radiofrequency is used for the "feeding vein".

The varicose veins are closed by injections done at the same time.

What's involved?

The procedure is done using local anaesthetic.

The vein is entered using a needle. A wire is then passed into the vein and a tube (called a sheath) is placed in the vein.

The radiofrequency catheter is then threaded into the sheath and the tip is positioned near the groin at the point where the vein needs to be closed. This is done using ultrasound.

The full length of the vein is made numb with a series of injections along the vein. The heat is delivered via radiofrequency as the vein is held closed. This is confirmed on the ultrasound.

Once the top is closed, the full length of the vein is ablated in a series of steps where the catheter is pulled back until the whole of the vein is closed. The varicose veins are then closed by sclerotherapy. This takes approximately 60 mins.

After the Procedure

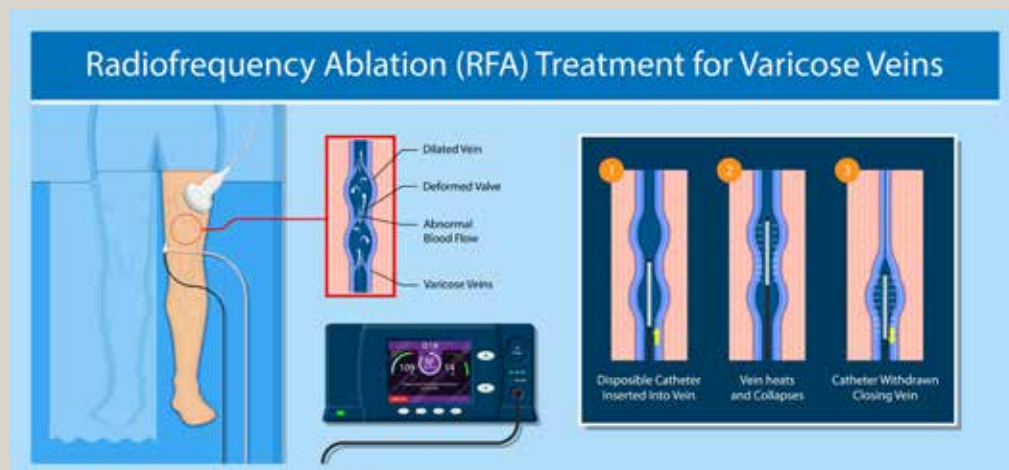
- A full-length compression stocking will be fitted
- It can be taken off at night especially if you have any pain
- Wear this for 1 week
- You will rest for 30 minutes immediately after the procedure with the leg up on a couch
- 45 minutes of walking each day for 1 week
- Follow-up duplex ultrasound test before post procedural review
- Review by your AVC doctor in approximately 2 weeks.

Expect

- Hard tender lumps where the varicose veins used to be
- Bruising
- A pulling sensation on the inner aspect of the thigh

Complications

- Pigmentation
- Phlebitis
- Deep venous thrombosis. This is seen in approximately 1 in 500 people. An ultrasound is performed at 2 weeks post procedure to check for this complication.
- Swelling of the leg or ankle
- Patches of numbness
- Skin burn





GLUE ABLATION

OF VARICOSE VEINS

What's it for?

This technique is used for patients where the varicose veins are being fed by a large, relatively straight superficial vein (such as the great or small saphenous vein). The glue is used for the “feeding vein”. The varicose veins are closed by injections done at the same time.

What's involved?

The vein is entered using a needle with local anaesthetic.

A wire is then passed into the vein and a tube (called a sheath) is passed over the wire and the top of the sheath positioned just below the main valve in the groin.

There is no need to make the vein numb (unlike radiofrequency or laser).

The glue catheter is then threaded into the sheath and the tip is positioned at the point where the vein needs to be closed. This is done using ultrasound.

The glue is delivered from a syringe while the vein is compressed closed. This is confirmed on the ultrasound. Once the top is closed, the glue is used to close the full length of the vein in a series of steps where the catheter is pulled back until the whole of the vein is closed.

The varicose veins are then closed by sclerotherapy.

This takes approximately 60 mins.

After the Procedure

If you have had injections at the same time, then a full-length compression stocking will be fitted.

It can be taken off at night especially if you have any pain.

- Wear this for 1 week
- Rest for 30 minutes with the leg up on a couch
- 45 minutes of walking each day for 1 week
- Follow-up duplex ultrasound test before post procedural review
- Review by your AVC doctor in approximately 2 weeks

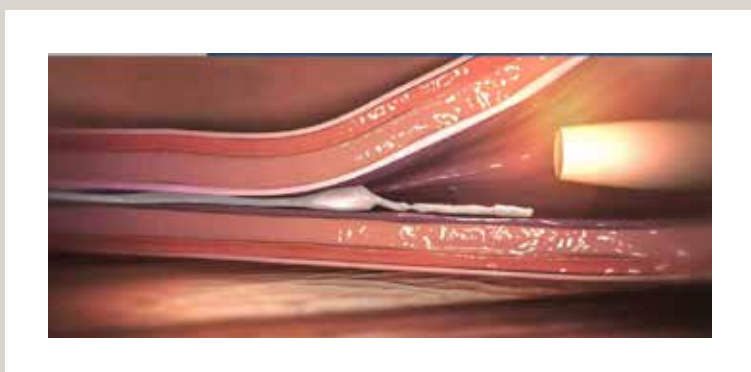
Expect

- Hard lumps where the varicose veins used to be
- May get “pulling” on the inside of the thigh
- Some aching
- Bruising

Complications

- Pigmentation
- Phlebitis
- Deep venous thrombosis
- Swelling of the leg
- Skin ulcers
- Numbness in patches, sometimes on the inside or outside of the foot
- Allergic reactions including anaphylaxis (very rare)

For a more complete list of complications see page 12



TREATMENT FAQs

How will my doctor decide upon my treatment pathway?

At your first appointment we will carefully assess your medical history and do a thorough physical examination, with close attention to your areas of concern. This is usually followed by a duplex scan (similar to a pregnancy ultrasound) to precisely map out the cause of the problem.

We will then explain the findings and discuss treatment options with you. There is plenty of time for questions, so ask away. You'll get detailed written information to take away and read through again at your convenience.

Is it really okay to eliminate veins – don't I need them?

Varicose veins and spider veins are veins that have stopped working.

They are part of the superficial venous system (the system of veins immediately under the skin). The superficial system carries only a tiny amount of blood back to the heart.

The work of carrying blood back to the heart is done by the deep venous system (the veins running through the leg muscles) and they never become varicose.

Getting rid of varicose veins doesn't harm your circulation, it improves it.

How will treatment interfere with my work or usual routine?

With sclerotherapy, the only effects on your daily routine are that you will need to wear a special compression stocking for one week.

It's important to walk regularly. You should however, avoid intense physical exercise and repeated lifting of heavy loads for four days after each treatment.

You should avoid long-distance travel (trips longer than four hours) for four weeks after treatment.

This is to minimise the risk of developing deep vein thrombosis.

With thermal ablation and glue, the effects are the same as for sclerotherapy but additionally, some people may want to take off 24-48 hours depending on your normal work/routine.

How long does each treatment take?

Most sessions take between 30 and 90 minutes depending on one or two legs involved and the complexity of the issue.

How much pain can I expect with these procedures?

Because we're all individuals, the discomfort felt varies from person to person.

The needles used for injection are extremely fine (smaller than acupuncture needles).

Many people hardly feel them at all. The injected solution can sting slightly but only for a few hours.

With radiofrequency (RF) thermal treatment, local anaesthetic is used to avoid discomfort.

If you are happy to come in 1 hour before the treatment, we can arrange for numbing cream to be used. It won't prevent all the discomfort, but it will help! Glue treatment does not need anaesthetic.

What is the estimated number of treatments I need?

This varies from person to person and is determined by the condition of your veins.

The estimated number of treatments will be given to you in writing along with the estimated cost to enable you to decide whether to proceed.



How successful should my treatment be?

The degree of success depends on many factors including your age, the severity of the disease and how quickly you heal.

Other factors include significant medical conditions, how well you follow post-treatment instructions and the number of injection sessions.

It's possible to almost completely eliminate varicose veins, but complete clearance is unlikely for spider veins. Treatment should restore an even and uniform appearance to the legs.

An improvement of up to 60- 80% percent can be expected within three to six months.

But this will depend on the number of treatments.

Initially the treated legs may look worse, due to bruising and trapped blood, however this will disappear over a number of weeks.

It must be noted that even with the most skilled therapist there is a very small group of people whose veins do not respond adequately to treatment.

How do I prepare?

Because a particular form of iron build-up can cause post-treatment pigmentation, we advise stopping taking iron supplements two weeks before your treatment.

Blood thinners do not need to be stopped before treatment. Some clinics suggest stopping the oral contraceptive pill for up to a month before treatment to decrease the very small chance of thrombosis, but at our practice, we do not feel it is warranted.

(see precautions page 12).

Will the treated veins come back?

Treated correctly, no, those veins should not come back.

New veins may develop over time. But whether this happens at all and how quickly depends on your personal genetic make-up, on how much standing you do each day and on other factors such as starting the contraceptive pill, becoming pregnant and obesity.

In order to deal with this problem, we recommend surveillance using yearly duplex scans (ultrasound) to see whether there are new varicose veins developing.

If there are, they can be treated by sclerotherapy before they become a problem.

If after 4 or 5 years there are no new ones, the surveillance can be stopped.

Should someone drive me home?

It is not necessary if you are having just sclerotherapy.

With RF, you may have some numbness from the local anaesthetic.

It will wear off after several hours.

If you find this concerning, then having someone to drive you home is advisable.

While migraine reaction to treatment is rare, it's best if you suffer migraines to have a friend bring you to the treatment appointment and take you home.

Can I have treatment during pregnancy?

No, sorry. It's true that if you already have varicose veins pregnancy is likely to make them worse.

However, experts agree that treatment is best performed before or between pregnancies.

Veins can be managed by wearing compression stockings. It may be inconvenient, but it is strongly advised!

What about HRT?

There is a very small risk associated with treating varicose veins while on HRT (9 extra cases per 10,000 women compared to non HRT users*). But it is generally very well tolerated and can be used during treatment.

Source*: The British Medical Journal - <https://www.sciencedaily.com/releases/2019/01/190109184722.htm>



YOUR POST-TREATMENT CHECKLIST

DOs AND DON'Ts TO GET THE BEST RESULT



- ✔ **If cotton balls or foam were placed** under your stocking you can remove them the day after treatment.
- ✔ **Wear your compression stocking** 24 hours a day for one week. It's doing a very important job .
- ✔ **Wearing the stocking** will not only give you a better overall result, it will reduce bruising and swelling and decrease the small risk of developing deep vein thrombosis. Do not cut or alter it.
- ✔ **You should shower in the stocking** and wear it to bed.

However, if you develop pain in your foot or heel at night, especially if the pain wakes you, you must remove the stocking once you are in bed, and put it on again in the morning before you get up. There are some tips and tricks to help you deal with showering:

1. You can buy special plastic leg covers from equipment providers such as Independent Home Care Supplies and Chemist Warehouse.
 2. Alternatively, you can get out of the shower, dry the rest of yourself, then use a hair-dryer to dry the stocking.
 3. If you have an extra stocking; place a towel, a face-washer and your spare stocking on a bed or sofa before you get in the shower. After you get out and have dried the rest of yourself, lie on the towel and remove the wet stocking. Dry off your leg with the face-washer, then put on the dry stocking.
- ✔ **Wear gloves.** Getting the new stocking on is tricky, but you can make it easier by wearing rubber gloves (for better grip and you are less likely to damage the stocking with your nails).

- ✔ **Using the silk insert** provided, make sure the leg is completely dry and use talcum powder on the leg to help the stocking pull up more easily.
- ✔ **Walk!** There was a good reason we got you walking straight after treatment. Walking reduces the pressure in the treated veins and can ease aching that can occur after treatment. It's very important that you make time to walk for at least one block of 45 minutes each and every day for the next two weeks. Walking reduces the risk of complications.
- ✔ **It is fine to have sex.**
- ✔ **It's ok to cross your legs.** Crossing your legs as a cause of varicose veins is a myth. There is no evidence supporting it!



- ⊗ **Avoid prolonged standing** and when you sit, put your legs up (for instance on a footstool) if you can.
- ⊗ **Avoid power walking** two days after treatment. Mild to moderate exercise is a better alternative e.g. gentle walking, golf, easy stationary bike riding, low impact work chores and household chores.
- ⊗ **Avoid intense physical activities** for four days, especially those which make you hot e.g. running, squash, tennis, contact sports or aerobics. Avoid repeated heavy lifting for the first four days after treatment.

WHAT TO EXPECT POST TREATMENT

WHAT YOU MIGHT EXPERIENCE AFTER SCLEROTHERAPY, RF, GLUE OR MODIFIED PHLEBECTOMY

Stinging sensation: some stinging may be experienced at the time of treatment. This settles in minutes - many find the treatment almost painless.

Bruising: this will disappear over a couple of weeks.

Darkening of spider veins: this is common and is a sign of successful therapy. It fades over the following few weeks. Some darkening is due to trapped blood just under the skin. It will need to be drained with a needle to prevent staining.

Tender lumps: this is due to blood trapped along the course of the treated veins. It is harmless but

may make the veins more noticeable in the first few weeks. Trapped blood can be drained at follow-up appointments, but even without this, persistent lumps will usually disappear, although most lumps will be gone in 6-12 weeks.

Aching legs: this can occur in the first few days after treatment. It is more common when larger veins are treated and is usually relieved by walking. You can take pain relief if needed.

A “pulling” sensation: this may follow RF/glue. It is due to the vein shortening and lasts several days. It is improved by doing more walking.

PAIN RELIEF

- Pain and heaviness may be noticed in the first few days after treatment. This is often more noticeable at night. It's usually due to muscle congestion and inflammation. The good news is, it's a sign the healing has begun. If you need to, take either 2 x Nurofen (or generic ibuprofen) or 2 x Voltaren Rapid 25mg tablets and take a short walk.
- Alternatively, if you had radiofrequency (RF) or glue treatment you may notice some inner thigh discomfort at day three. There may also be considerable bruising. If needed, take either 2 x Nurofen (or generic ibuprofen) or 2 x Voltaren Rapid 25mg tablets.
- Or if you had either RF treatment or glue treatment, the area treated may have a “pulled muscle” feeling tight/stiff/achy and tender. This will gradually improve over the two weeks. If you need to, take over-the-counter pain medication such as Nurofen or Panadol.

NOTE: Nurofen and Voltaren are anti-inflammatories. They generally should not be used by people with kidney disease, stomach ulcers and certain other conditions. If you're unsure whether you can use these medications or if they give you side-effects such as indigestion, use Panadol (or a generic paracetamol) instead.

Never exceed dosages on the medication packaging.

REVIEW

- Sclerotherapy and RF/glue patients usually return to be reviewed two weeks after treatment and your appointment should already have been booked for you. If you do not have an appointment, please contact the clinic to arrange one.
- Wear or bring your stocking to every appointment.
- If you are having difficulties or have any post-treatment concerns you can ring the clinic during office hours, or you can e-mail us. We regularly check all e-mails and respond up to 9:00pm.

IMPORTANT: If you develop persisting soreness of the calf which isn't relieved by walking, unexplained shortness of breath or stabbing chest pains please **contact your doctor immediately or go to your nearest hospital Emergency department.** These symptoms may indicate deep vein thrombosis.

POSSIBLE COMPLICATIONS OF SCLEROTHERAPY/ RF/GLUE/MODIFIED PHLEBECTOMY

Even with experienced doctors, side effects are possible.

Here is a comprehensive list of incidence and complications of vein treatments.

Pigmentation: (incidence 1 in 10)

This causes brown marks on or near treated vein areas; common when treating spider vein clusters. Pigmentation usually fades gradually, disappearing completely within 3-12 months. Topical laser is promising for rare, persistent cases.

Wearing compression stockings and having trapped blood removed at follow-up appointments also help.

Matting: (incidence 1 in 20)

The development of extremely fine networks of spider veins, usually on outer and inner thighs. It usually resolves spontaneously, and may rarely require further injection treatment.

Matting is more common with extensive surface veins and in overweight people with poor muscle tone. It can also follow microphlebectomy.

Swelling of the leg or ankle: (incidence 2 in 100)

Generally settles with time. Wearing the compression stocking and regular walking will help.

Phlebitis: (incidence 3 in 100)

This causes tender, red, swollen areas along the line of the treated veins, due to trapped blood. Phlebitis is treated

with anti-inflammatory medication and improves with walking and compression

Deep Vein Thrombosis: (incidence 1 in 500 for RF, 1 in 2,000 for sclerotherapy)

DVT is a clot in the deep venous system, not in the treated varicose veins.

It's rare if the compression stocking is worn exactly as directed and regular daily walking is maintained.

If your individual risk for DVT is higher than normal, preventative treatment will be advised.

DVT may lead to clots in the lung (pulmonary embolism), which can be life-threatening.

See page 14 for more on DVT red flags.

Ulcers of the skin: (incidence 9 in 1,000)

Rare, usually appearing as small, painful sores two weeks post sclerotherapy injection.

These sores heal slowly and leave a scar (which can be excised if unsightly).

Ulcers are more common in people who smoke. Ulcers are generally not seen with RF or glue, unless sclerotherapy is done at the same time.

Numbness: (incidence 3 in 1,000)

Rare and temporary, usually located down the inner part or back of the calf.

With injection treatment, it is caused by nerve irritation near an injected vein and can last up to three months. With RF procedures, numbness is expected for a few hours due to local

anaesthetic. However numbness from heat interference with nerve function can less commonly occur, lasting up to 18 months.

Migraine: (incidence 1 in 1,000)

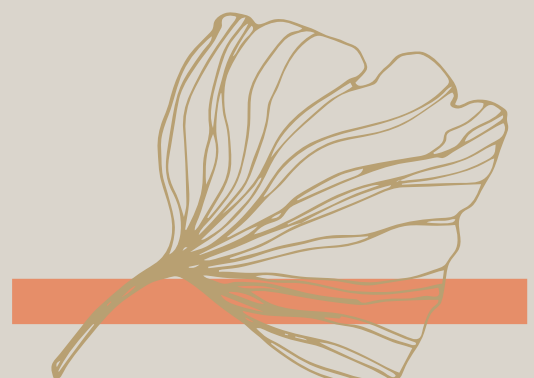
Visual disturbances lasting a few minutes when receiving injection sclerotherapy are rare. This may be followed by the onset of a headache. Migraine has not been reported with RF or glue.

Allergic reactions: (3 in 10,000)

Reactions to either the sclerosant or the local anaesthetic are rare but may be life-threatening. Should you feel any abnormal sensations during treatment such as generalised itchiness, nausea or shortness of breath, tell your AVC doctor immediately.

Other extremely rare complications include:

- Intra-arterial injection or significant muscle and skin damage caused by needle placement
- Temporary hair growth at sclerotherapy sites
- Skin burn due to heating process in RF (prevented by putting fluid between the catheter tip and the skin).





Precautions

Pregnancy and breast feeding

Sclerotherapy, glue and radiofrequency ablation should be avoided when pregnant or breastfeeding as the effects of the treatments on the developing baby or in breast milk are not known.

HRT and Contraceptive Pill

There is some very small risk for treating varicose veins during HRT treatment (9 extra cases per 10,000 women compared to non HRT users*). But it is generally very well tolerated and can be used during treatment. However both HRT and the contraceptive pill have been implicated in slightly increased risk of DVT whether you have treatment or not.

HRT increases DVT risk by three times, compared to those who don't take it.

It takes four weeks off the medication to bring the risk down to normal. Please discuss with your doctor.

Source*: The British Medical Journal <https://www.sciencedaily.com/releases/2019/01/190109184722.htm>

DID YOU KNOW?

High heels are OK for special occasions but constant wearing of uncomfortable fashion shoes can put extra pressure on your veins by impeding pump function and raising venous pressure in the lower legs. This can worsen existing veins.

Similarly shapewear compresses organ and impedes blood flow, and has even been linked to the possibility of DVT. Make sure it doesn't cut in to you and don't wear shapewear every day.



Consent Review

- Before your treatment, you will be given a consent form to acknowledge the following:
- Some additional treatments may be required
- The degree of success of treatment has been explained and includes factors such as age, disease severity, healing rate and other health conditions.
- It is reasonable to achieve almost complete clearance of varicose veins, but total spider vein clearance is unlikely - although an 60-80% reduction in 6 months is usual.
- That veins treated by sclerotherapy, RF and glue should not return but new veins or spider veins may form.
- That even in the hands of experienced therapists, a small number of people don't respond to veins treatment.

TRAVEL RELATED VEIN PROBLEMS

What is travel related VTE, DVT and PE?

Venous thromboembolism (VTE) refers to deep venous thrombosis (DVT) and pulmonary embolus (PE).

The main issue with the veins and travel is the possible development of a DVT and the associated possibility of a pulmonary embolus.

Deep venous thrombosis is a condition where a blood clot develops in the deep veins of the leg (those veins that run through the muscles and which you can't see).

When a DVT develops, there is a possibility that part can break off and travel to the lungs. If that happens, a person can become very ill and very rarely the condition is fatal.

What is my chance of developing one?

The chance of developing a VTE increases with travel time.

With regards to aeroplane travel, the risk is generally considered very low on aeroplane trips less than 4 hours.

Flights longer than 4 hours are considered "long haul". Even with long haul flights, the incidence of travel related VTE is very low. In flights of greater than 4 hours the rate appears to be approximately 1 in 5500.

In 5 prospective studies the incidence of VTE after travelling for more than 8 hours showed an incidence of one in 200.

Why might I develop one?

The chance of developing VTE is increased in people with pre-existing conditions. These include obesity, hormone replacement therapy,

pregnancy, genetic predisposition to clots such as a family history or factor 5 Leiden, cancer or other serious illnesses. If you do not have any pre-existing conditions then the risk is significantly lower.

There are risk factors which are much easier to manage such as dehydration (excessive alcohol intake leads to dehydration although the evidence for this is poor) and immobility.

Studies suggest that adults who are either taller than average or shorter than average are both at risk, possibly because of the position in the seat, especially on aeroplanes.

This may result in unusual posture.

How do I know if I have one?

Typical symptoms of DVT include pain or tenderness, particularly in the calf, lower limb swelling either with or without redness.

A pulmonary embolus can lead to chest pain (particularly when you take a deep breath), cough or coughing blood and breathlessness.

What would I need to do if I have these symptoms?

If you have these symptoms, and you are on an aeroplane, you need to notify the staff.

Diagnosis of a DVT is made by ultrasound, and diagnosis of a pulmonary embolus is made by either a CT scan or possibly a nuclear scan. Either way the tests would need to be done in a hospital.

If I have a pre-existing condition or am at risk is there something I can do to prevent it?

There is no strong evidence, but helpful strategies include:

- Frequent walking, and calf muscle exercise such as flexing and extending the ankles
- Sitting in an aisle seat which makes moving around the plane easier
- Using properly fitted class II below knee graduated compression stockings. These generate significant ankle compression.
- The current guidelines do not recommend the use of an anti-thrombotic such as aspirin.
- There is no good evidence to support drinking more water than the usual daily intake (to counteract dehydration).
- In people who are at high risk and considering a long haul flight, there is a place for either prophylactic doses of anticoagulation or possibly full anticoagulation. Speak to your doctor.

What is anticoagulation therapy ?

This relies on balancing the possible complications against the likelihood of VTE. This would need to be discussed with a doctor. Pharmaceuticals that could be considered include Clexane (either daily or twice daily subcutaneous injection) and one of the novel oral anticoagulants such as Rivaroxaban or Apixaban. Those at particularly high risk could consider a duplex scan.



VENOUS ULCERS

What are venous ulcers?

An ulcer is a break in the skin which fails to heal.

If it is not healed within 6 weeks, then it is a chronic ulcer.

In Australia approximately 80% of ulcers that occur on the leg, are venous (in other words, caused by problems with the veins). The remaining 20% comprise ulcers related to skin cancer, infections, injuries etc.

What causes them?

They are caused by high pressure in the veins of the leg. The high pressure is related to:

- Valve problems in the veins just under the skin (superficial system). This may be associated with varicose veins
- Valve problems in the veins running through the muscles (deep system). This can happen following a DVT (deep venous thrombosis)
- Veins in the pelvis being compressed
- Obesity makes it more difficult for blood to flow back to the heart from the legs
- Pregnancy leads to hormonal changes which alters the efficiency of the valves; as well as the foetus causing flow obstruction

What are the symptoms?

- Skin problems related to ulcers include eczema, pigmentation, staining, itching and scarring in the fat layer called lipodermatosclerosis (LDS).

- Ulcers can bleed and minor injury such as a bump can cause an ulcer to flare.
- When valves are not working the return of blood is more difficult, and high pressure in the venous system alters the way the blood runs through the skin.
- This causes leg swelling, which is another common symptom.
- Ulcers can be very difficult to heal and may persist for months or years.
- Chronic leg ulcers are common and become more frequent with age.

Where do they occur?

On the lower leg, usually above the ankle on the inside of the calf or foot, often after minor injury.

How are they diagnosed?

These veins are investigated by a venous duplex scan, carried out by a trained vascular technologist. Occasionally a dye test (venogram) then is needed.

How are they treated?

- If the cause is superficial veins (varicose veins), then they need to be treated.
- If the deep system is the issue, then compression using bandages or stockings is the most effective treatment. If the pelvic veins are compressed, then that can also be treated. The cause may be a combination of the above. Each needs to be addressed.

If obesity is an issue, then weight loss is strongly advised.

Antibiotics should only be used if there is clear evidence of cellulitis (infection of the surrounding skin).

The key is compression in association with treatment of associated varicose veins.

Can they be cured?

Only if the cause is treated completely, and if the skin has not been so damaged that it can fully recover.

If the cause is purely from varicose veins, and if they are treated completely, then yes one can cure a venous ulcer.

Unfortunately the skin does not always recover completely, so it remains vulnerable and may break down with a minor injury.

The deep system is very difficult to cure.

How can I prevent a venous ulcer?

Prompt and aggressive management of a DVT has been shown to decrease the chance of damage to the deep valves. Early treatment of varicose veins is important especially if there is any evidence of significant raised pressure such as pigmentation, staining, eczema, itching, swelling etc.

Wearing good quality class II compression (25-35mmHg) in people with a history of DVT or who have the signs above can be helpful.



WEBSITES

Independent advisory:

UK NICE Guidelines for Vein Management - <https://www.nice.org.uk/guidance/cg168>

Australian Society of Vascular Surgery - <https://www.anzsvs.org.au/patient-information/>

Industry sites:

VenaSeal Glue - <http://https://www.youtube.com/watch?v=XjCA4uK7mzg>

Closure Fast Frequency - <http://https://www.youtube.com/watch?v=XjCA4uK7mzg>



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