

**Prevention or Reversal of Deep Venous Insufficiency and Treatment:  
Why Are Spider Veins of the Legs a Serious  
and A Dangerous Medical Condition?**

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**ABSTRACT**

Spider veins (also known as spider hemangiomas) unlike varicose veins (dilated pre-existing veins) are acquired lesions caused by venous hypertension leading to proliferation of blood vessels in the skin and subcutaneous tissues due to the release of endothelial growth factors causing vascular neogenesis.

More than 60% of the patients with spider veins of the legs have significant symptoms including pain, itching, burning, swelling, phlebitis, cellulites, bleeding, and ulceration. Untreated spider veins may lead to serious medical complications including superficial and deep venous thrombosis, aggravation of the already established venous insufficiency, hemorrhage, postphlebotic syndrome, chronic leg ulceration, and pulmonary embolism. Untreated spider vein clusters are also responsible for persistent low-grade inflammation; many recent peer-reviewed medical studies have shown a definite association of chronic inflammation with obesity, cardiovascular disease, arthritis, Alzheimer's disease, and cancer.

Clusters of spider veins have one or more incompetent perforator veins connected to the deeper veins causing reflux overflow of blood that is responsible for their dilatation and eventual incompetence. The spider veins are, therefore, a manifestation of venous insufficiency. The medical literature shows that superficial venous insufficiency can cause deep venous insufficiency; and the treatment of superficial venous insufficiency leads to recovery of deep venous insufficiency. We have recently published our results showing that complete and aggressive treatment of superficial venous lesions accomplishes better results as compared to patients in whom spider veins were left untreated. (Ahmad *et al.* Prevention or reversal of deep venous insufficiency by aggressive treatment of superficial venous disease. *American Journal of Surgery* 2006; 191:33-38.)

An effective method of treating the symptomatic spider veins is the use of electromagnetic energy in the form of intense pulse light, laser, and more recently a combination of laser and radiofrequency.

Since the majority of patients with symptomatic spider veins have associated venous insufficiency, it is recommended that in addition to the treatment of spider veins, saphenous venous insufficiency be treated utilizing endovenous laser ablation or inversion PIN (perforation-invagination) stripping along with high ligation.

In conclusion, the entity, spider veins of the legs, is not a cosmetic condition because this disease is frequently associated with venous insufficiency and disabling symptoms. Thus, comprehensive management is mandatory. Chronic inflammation associated with spider veins may lead to many degenerative diseases such as cardiovascular disease, diabetes, arthritis, Alzheimer's disease, and cancer in later life. Early and aggressive treatment of spider veins is justified because it improves or reverses the deep venous insufficiency thus preventing the possible serious complications in the future.

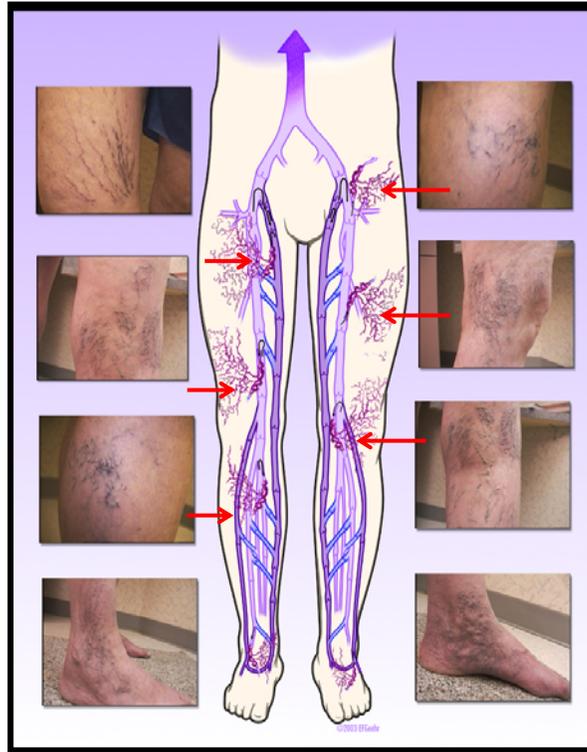
**INTRODUCTION**

Venous disease of the lower extremities is a prevalent condition in United States and Europe.<sup>1, 2</sup> The exact incidence of spider veins of the legs is not known. At least one study has reported the incidence in women to be more than 50%.<sup>50</sup> Spider veins (also known as spider hemangiomas) of the legs are acquired lesions caused by venous hypertension, which leads to proliferation of blood vessels in the skin and subcutaneous tissues of the legs. Venous hypertension is the direct result of venous insufficiency. High pressure in the tissues causes the release of endothelial growth factors from fibroblasts and adult endothelial stem cells, present in the skin and subcutaneous tissue, causing neogenesis of blood vessels.<sup>20, 21</sup> Varicose veins, on the other hand, are due to dilatation of the pre-existing veins in the legs, and should not be confused with spider veins. The underlying cause of varicose veins is also venous hypertension.

It is well known that the spider veins are associated with incompetent perforator veins connected to the superficial or the deep veins of the legs. Clusters of spider veins have one or more incompetent perforator veins connected to the deeper veins.<sup>3-9</sup> If there are multiple clusters of spider veins in the legs, they can cause a large amount of reflux blood flow in the wrong direction causing extra burden to the deep veins from overflow of this blood, thus leading to the progressive dilatation of the deep veins. Once dilated, the deep veins remain incompetent. Spider veins are, therefore, a manifestation of venous insufficiency. The medical literature shows that

superficial venous insufficiency can cause deep venous insufficiency; and the treatment of superficial venous insufficiency leads to recovery of deep venous insufficiency.<sup>11-15</sup> Spider veins, just like varicose veins, are superficial venous lesions and can be responsible for both superficial and deep venous insufficiency.

Figures 1 and 2 demonstrate how the spider veins of the legs are connected to the deep veins, where they cause or perpetuate previously established deep venous valvular insufficiency. If left untreated, deep venous insufficiency will continue to deteriorate and will eventually causes serious complications.



*Figure 1. Spider Veins and their connection to the deep veins. Arrows point to the areas of leakage of blood into spider vein complexes*



*Figure 2. Spider vein cluster resembling hemangiomas.*

More than 60% of patients with spider veins of the legs are known to be symptomatic. The symptoms may be so subtle that the patient may not complain until asked.<sup>10,17</sup> Symptoms associated with spider veins include:

- Pain
- Itching
- Burning
- Swelling
- Phlebitis
- Cellulites
- Bleeding
- Ulceration

Untreated spider veins may lead to serious medical complications, including:

- Superficial and deep venous thrombosis
- Aggravation of the already established venous insufficiency
- Hemorrhage
- Postphlebotic syndrome
- Chronic leg ulceration
- Pulmonary embolism

Symptomatic patients with spider veins have a tendency towards obesity, due to lack of physical activity. Obesity is known to cause low-grade inflammation. Untreated spider vein clusters can also cause persistent low-grade inflammation; many recent peer-reviewed medical studies have shown a definite association of chronic inflammation with diabetes mellitus, cardiovascular disease, arthritis, Alzheimer's disease, and cancer.<sup>40-44</sup>

## MATERIAL AND METHODS

In 1999, we established a protocol for the treatment of superficial venous lesions that consisted of the following:

- Color Duplex Scan (Fig. 3) with the patient in an upright position with measurements of the size and reflux of superficial and deep veins.
- For the treatment of saphenous vein incompetence, high ligation and partial selective PIN (perforation invagination) stripping of the saphenous veins (replaced with endovenous laser ablation with or without high flush ligation in November 2004).
- Varicose veins treated with ambulatory micro-phlebectomy in multiple sessions.
- Spider veins treated with trans-cutaneous intense pulse light and/or ND: YAG laser in multiple sessions 2-3 weeks apart.
- Calf exercises – detailed instructions were given to patients – to build up calf muscle pumps.
- Compression stockings (20-30 mm mercury pressure, groin high in most patients).
- A thorough education in venous disease (established a web site for patient education).
- Diet and supplements (optional) – detailed instructions were given to patients.
- A follow-up color Duplex scan every six months

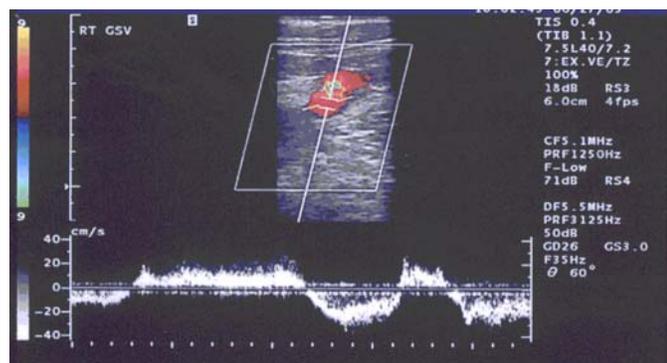


Figure 3. An example of a color duplex scan of a patient with incompetent right greater saphenous vein (proximal)

*Table 1 Duplex scan venous measurements of a patient with both superficial and deep venous insufficiency*

06/27/2005	Right		Left	
	Size mm	Reflux/Sec	Size mm	Reflux/Sec
<b>Saphenofemoral</b>	<b>13.0</b>	<b>1.8</b>	<b>10.1</b>	<b>1.2</b>
<b>Common femoral</b>	<b>13.3</b>	<b>0.5</b>	<b>15.4</b>	<b>0.6</b>
<b>Superficial femoral</b>	<b>9.6</b>	<b>0.0</b>	<b>5.1</b>	<b>0.0</b>
<b>Popliteal</b>	<b>11.6</b>	<b>0.2</b>	<b>9.3</b>	<b>0.0</b>
<b>Short saphenous</b>	No reflux		No reflux	

Between 1999 and 2006, we have treated 3000 patients with varicose and spider veins. The majority of these patients had symptomatic spider veins. The incidence of combined superficial and deep venous insufficiency in patients with symptomatic spider veins was more than 95%.

We treated symptomatic spider veins with electromagnetic energy in the form of intense pulse light and laser. We did not use sclerotherapy because we feel that it is not very effective, it is associated with many complications such as skin necrosis, ulceration, nerve damage, and it has a very high recurrence rate.

Since the majority of patients with symptomatic spider veins had associated venous insufficiency, they were treated with inversion PIN stripping and high ligation or endovenous laser ablation with or without high ligation of the saphenous veins.

## **DISCUSSION**

The results of our aggressive treatment of the superficial venous lesions of the legs, including the spider veins, showing that total elimination of the spider veins of the legs adds to the prevention and improvement of the deep venous insufficiency was published in the American Journal of Surgery in 2006.<sup>34</sup> Since the publication of this article, we now have available an additional 200 patients with color duplex scan follow-up. The results of treatment in this collective group of patients are very similar to the ones reported in the article, thus making us realize that the treatment and elimination of the spider veins is a crucial part of the therapy of venous disease of the legs. The summary of our paper is as follows: Our patients fell into two distinctive groups. The first group, the aggressive-treatment group, underwent therapy of varicose and spider veins in addition to high ligation and partial PIN stripping of the long saphenous veins, and the second group, classified as receiving less-aggressive treatment, did not receive treatment of the spider veins but did receive treatment of the saphenous vein reflux with high ligation and PIN stripping. The patients who received complete therapy, showed a decrease of the size and reflux closure time of the valves of the deep veins in more than 80% of the cases. In comparison, in the patients who received incomplete therapy (spider veins left untreated), a follow-up duplex scan showed a decrease of the size and reflux closure time of the valves of the deep veins in less than 18% of the cases.

We have recently treated a few patients who had developed chronic post-phlebitic legs due to recurrent episodes of DVT. These patients were treated with percutaneous endovenous laser ablation of the greater saphenous veins in our office under local anesthesia and sedation. Some of these patients had untreated spider veins of the legs, which we believe had caused deep venous insufficiency that eventually lead to post-phlebitic legs.

Figures 4 and 5 are photos of 68-year-old man who had been suffering from chronic venous insufficiency, recurrent ulcers, cellulites, and severe edema, for several years. Prior to seeing us, he was being treated conservatively – leg elevation, compression and pump therapy – without any noticeable clinical improvement. Following bilateral endovenous laser ablation of the greater saphenous veins in two stages over a period of one year, he showed marked improvement of his symptoms and complete reversal of deep venous insufficiency due to a significant decrease in the size of the deep veins of his legs – a direct result of removal of superficial venous reflux.



Figure 4. Before EVLT of greater saphenous.



Figure 5. After EVLT of greater saphenous.

Table 2. Duplex scan measurements of the size and reflux of the deep veins, demonstrating bilateral saphenofemoral and deep venous valvular insufficiency

09/02/2004	Right		Left	
	Size mm	Reflux/Sec	Size mm	Reflux/Sec
Saphenofemoral	8.9	0.8	11.3	0.6
Common femoral	18.3	0.8	15.0	0.8
Superficial femoral	10.1	0.4	8.2	0.2
Popliteal	12.6	0.3	9.9	0.2

Table 3. Duplex scan measurements of the size and reflux of the deep veins, demonstrating total reversal of deep venous valvular insufficiency following bilateral EVLT procedures

07/12/2006	Right		Left	
	Size mm	Reflux/Sec	Size mm	Reflux/Sec
Saphenofemoral	EVLT ON 06/21/2005		EVLT ON 06/22/2006	
Common femoral	10.5	0.0	14.3	0.4
Superficial femoral	7.9	0.0	6.6	0.0
Popliteal	8.0	0.0	7.9	0.0

Tables 2 and 3 show duplex scan measurements of the size and reflux of the deep veins and demonstrate total reversal of deep venous valvular insufficiency following bilateral EVLT procedures, proving that the treatment of superficial venous insufficiency improves the deep venous incompetence by causing a decrease in the size of the deep veins.

Figures 6 to 9 show various presentations of patients suffering from spider veins that had been left untreated.



Figure 6. Bleeding spider vein.



Figure 7. Spider veins resulting in ulceration and bleeding.



Figure 8. 66-year-old female with multiple clusters of spider veins causing chronic edema of leg



Figure 9. 22-year-old woman with multiple extensive clusters of spider veins of legs and bilateral superficial and deep venous insufficiency.

Aggressive and complete treatment of the superficial venous lesions of the legs is essential to prevent or improve deep venous valvular insufficiency. The destruction of spider veins results in the obliteration of incompetent perforators, thus eliminating a major source of reflux overflow of blood into the deep veins. Over time, this could decrease the size of the deep veins and result in improvement of valvular function. It is, therefore, very important to treat venous insufficiency at all levels. If any one of these sources of venous incompetence is left untreated, deep venous insufficiency continues to worsen, increasing the risk of developing superficial thrombophlebitis, deep venous thrombosis (DVT), and eventually postphlebotic syndrome. Hospitalized patients with venous insufficiency are especially at high risk of developing DVT and pulmonary embolism.<sup>34</sup>

## CONCLUDING REMARKS

Spider veins of the legs is not a cosmetic condition because this disease is frequently associated with venous insufficiency and disabling symptoms. Thus, comprehensive management is mandatory. Chronic inflammation associated with spider veins may lead to many degenerative diseases such as cardiovascular disease, diabetes, arthritis, Alzheimer's disease, and cancer later in life. Early and aggressive treatment of spider veins is justified because it improves or reverses the deep venous insufficiency thus preventing the possible serious complications in the future. Even patients with late stages of chronic venous insufficiency may benefit from treatment of superficial venous reflux.

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