ELVeS™
Endo Laser Vein System

Rio, October 2nd to 7th, 2005

Abstract book
The Globalization in Phlebology

A worldwide negative attitude towards the globalization is present in many every-day life situations, starting from economical and cultural aspects involving also medicine.

On the other side, we may say that a positive globalization is taking place within Phlebology where, for chronic venous disorders (CVD), a common language - the CEAP- has allowed high standard levels of epidemiology, morbility and advanced diagnostic and therapeutic solutions.

As a matter of fact the term “renaissance of the Phlebology” isn’t infrequent within the Anglo-Saxon world. Renaissance, refers to a cultural rebirth, concept encompassed by the role of the Phlebology, is as a matter of fact an Italian expression: rinascimento. The term was imported in France by François I in the XVIth century, over one century after it was first started on Italian soil.

At present, Italian Phlebology is living a splendid period, enhanced by a great amount of ideas, quality research and clinical practice.

We all realize the important role, magnified within the past 15-20 years with the naissance of Scientific Societies in the USA such as The American College of Phlebology (1985) and The American Venous Forum (1988).

Like us, all those that deeply appreciate French culture and phlebology, will feel sorry to read, as in 2004, “is French phlebology on the decline?”. We believe that French phlebology will once again find “ses lettres de noblesse”.

Again we always admire British style and scientific methodology.

Still, many other phlebologies actually contribute to a positive globalization and the excellency of the XVIth World Congress of Union Internationale de Phlebologie, that takes place this year in Brazil under the guide of Angelo Scuderi, will be the best example.

This present Abstract Booklet is offered to the attention and discussion within the Rio de Janeiro Congress. It is meant to be a tribute towards all the work that’s done worldwide involving use of high technology, a resource that phlebology can’t do without for both study and treatment of varicose veins.

First, before any decision is taken on which technique is indicated, a pre-operative mapping using Duplex ultrasonography scanning should be done to know accurate patterns of venous reflux and to avoid diagnostic errors.
Second, today we must consider the new technologies on the treatment of venous reflux.

High-tech appeal of Laser is not only a solution for patients with stripping-phobia but a real new treatment with similar results around the world and because of it’s simplicity, high success rates, and lack of serious complications.

In this presentation we can find some aspects about the technique, the indication and the results: new development makes it possible to accurately apply the desired energy amount in joules per cm; lack of thermal skin damage; histopathological observations.

Endovenous laser treatment of the great saphenous vein seems to offer a safer alternative to traditional surgery of ligation and stripping; Laser can adequately treat also the short saphenous vein without risk of paresthesia, the Giacomini vein, antero-lateral vein, bifid great saphenous vein, posteromedial thigh vein incompetent as well as subulcer perforators. It may replace in the future various kind of present techniques.

Early and mid term results of endovenous laser treatment - today 3-6 years of follow-up - have been promising. However further prospective studies are needed.

The IEWG - International Endovenous laser Working Group has decided to work towards the investigation and widespread use of a new treatment for CVD by introducing a Registry, this being the most suitable tool for collecting data concerning such a technologically innovative procedure, well presented in Rio by Doctor Lowell S. Kabnick.

Giovanni B. Agus MD, PhD
Director of Institute of Vascular Surgery. University of Milan
The International Endovenous Working Group

The purpose of the International Endovenous Working Group is to promote and foster scientific advancement in the diagnosis and treatment of venous disease.

Our future objectives will include the following:

- Coordination of the International Network
- Studies and Clinical publications
- Standardization of Material and Procedures
- Clinical and Technological Development
- International Registries
- International Scientific Digest
- Marketing to Industry
- Public Education

The organization will be composed of all countries’ national endovenous working groups. At present: countries participating are: Argentina, Brazil, Belgium, Chile, England, Equador, France, Germany, Italy, Peru, and United States.

On behalf of the International Endovenous Working Group board of directors, we invite all physicians interested in the diagnosis and treatment of venous disease to develop a national endovenous working group.

Lowell S. Kabnick, MD, FACS
Giorgio Spreafico, MD
15th World Congress of UIP · Rio UIP 2005

Scientific Programme · Wednesday, October 5th

State of the art on Endo-Laser Veins treatments:
“The light at the End of the Tunnel”

- Chairman: J. Ferreira, Brazil
- Chairman: L. Kabnick, US
- Moderator: A. Scuderi, Brazil
- Moderator: E. Rabe, Germany

11.00-11.10  
G. Spreafico, Italy

11.10-11.20  
D. Kontothanassis, Greece

11.20-11.30  
ELVeS™ Treatment of the GSV: video presentation.  
A. Reichelt, J. Ferreira, Brazil

11.30-11.40  
ELVeS™ Treatment of the SSV: video presentation.  
D. Greenstein, UK

11.40-11.50  
ELVeS™ Treatment of venous ulcers.  
J. Gérard, France

11.50-12.00  
Pannier-Fischer, E. Rabe, Germany

12.00-12.10  
Endovascular Laser Treatment: Controversies.  
M. Duran, Ecuador

12.10-12.20  
Endovenous Laser Treatment: The effect of laser energy to perivenous tissues.  
W. Lahl, Germany

12.20-12.30  
ELVeS™ Future developments: computer assisted control of the pullback speed.  
Göckeritz, Germany

12.30-12.40  
International Endovascular Working Group (IEWG): Registry and Results.  
L. Kabnick, USA

12.40-13.00  
Questions and discussion.
ELVeS™

a unique and complete solution for the treatment of venous incompetence.

ELVeS™ (Endo Laser Vein System) from biolitec is a versatile, easy to use system that allows you to treat all conditions resulting from venous incompetence, with key benefits for your patients:

- Excellent clinical results
- Minimal discomfort
- Excellent aesthetic results
- A rapid return to normal activities

Quick and effective outpatient treatment of...

- Greater saphenous vein
- Small saphenous vein
- Reticular veins
- Branch varicosities
- Telangiectasia
- Spider veins

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- Treatment of a large cockeet’s perforating vein with a 980 nm laser - ELVeS™ technique
  in a patient with an open recurrent ulcer.
- Treatment of venous ulcers with a 980 nm laser - ELVeS™ and WHELL™ techniques.
Jocelyn A.S. Brookes

ELVeS™: The Interventional Radiologist’s Perspective
Personal Details
Date of Birth 3rd April 1963
Address The London Clinic
119 Harley St
London W1G 6AU
Telephone 0044 207 616 7693
E-mail jocelyn.brookes@uclh.org

Qualifications
1986 MB BS (University of London)
1991 MRCP (U.K.) Member of the Royal College of Physicians
1996 FRCR, Fellow of the Royal College of Radiologists

Career history
Dr Brookes started his radiology training in 1992 spending 1 year in full time research as Clinical Lecturer to the National Medical Laser Centre investigating MR-guidance in Interstitial laser photoagulation of liver and lung tumours. He also proposed and developed the technique of Post Mortem MRI scanning of fetuses as an alternative to autopsy which has now received government support for further study.
He became a Consultant at The Middlesex Hospital, UCLH in 1998 and has led the endovascular interventional service there since 2000.
Since 1999 he has been the Royal College Tutor running the local radiology training scheme. He has been involved in Endovenous laser ablation since visiting Dr R Min in New York in Jan 2001 (whilst on Honeymoon!), currently practising at the London Clinic as well as UCLH.
Dr Brookes is a member of the IEWG for Endovenous laser treatment.

Current research interests are
- Endovenous laser ablation for varicose veins
- Subintimal angioplasty
- Carotid Stenting
- Distal tibial angioplasty
- Non-invasive cardiovascular imaging
Recent publications


Laser ablation treatment for lower limb venous incompetence is a new technique which has been developing since the late 1990's following the pioneering work of Bone, Navarro, Min and Zimmet. (Refs 1-2).

Although the essential principles of endovenous laser-delivered thermal coagulative ablation are established, the treatment parameters continue to be a source of controversy and debate (patient selection, diagnostic methodology, use of sedation/anaesthesia, kit choice for puncture, wavelength, fibre diameter, power settings etc etc). (Refs 3-5). Here we review some of the procedural variance, problems encountered and suggestions regarding how to overcome these problems.

1. Difficult puncture

**Problem-Venospasm**
The kits contain a 19G needle and a teflon J-wire and most cases will not be a problem but the large vein demonstrated when standing may collapse on lying down or go into venospasm if touched by the local anaesthetic needle, in the nervous patient or after an unsuccessful first pass with the needle. Venospasm can be very painful and may preclude further intervention on that occasion.

**Solutions**
Consider using a tourniquet while examining to be removed when venous cannulation is achieved.
Try re-puncturing above the site of the venospasm (it can be very focal).
The nervous patient invites catecholamine-induced venospasm so consider mild sedation or even propofol infusion (with anaesthetist in the very fragile).
Small veins are best approached with micropuncture apparatus such as is available from Cook or Terumo with 21G needle and 0.18/0.25 wire. Reduce spasm from difficult wire passage by using a hydrophilic coated wire (Terumo 0.035 angled 145cm or “Roadrunner”).

2. Tortuous vein

**Problem-Hard to pass the wire**
A successful puncture may confounded by inability to pass the wire easily beyond the first few centimetres.

**Solutions**
If the wire is hard to pass up the vein due to tortuosity, try using a hydrophilic-coated wire Terumo wire. Remember to check the tourniquet is off as this may obstruct the wire in superficial veins. Turning the wire and cautious withdrawal and advance of the wire may pass the obstructing curve. Watch the tip with ultrasound and negotiate the curve under indirect vision. A softer thinner wire may help e.g. 0.018" Terumo. Advance the sheath to the point of obstruction and withdraw and advance the wire again (basic wire and catheter technique). If the vein proves too tortuous, consider treating the vein in segments or carrying out the case in Xray fluoroscopy with contrast (Slide/Fig 4).

3. Poor US views at groin

**Problem- I cant see anything!**
The safety of the endovenous technique depends on operator proficiency with transcutaneous ultrasound and ultrasound guided needle insertion. Clarity of scan view varies from patient to patient and knowledge of scanning parameter optimisation is essential.

**Solutions**
Remember to use the old techniques of tilting the table up or down as appropriate to exaggerate venous filling. Use basic ultrasound adjustments to optimise your image. (See slide 5 for list of features).

4. Sheath is hard to pass

This disappointing occurrence is usually due to either venospasm or vein tortuosity. See slide 6 for suggestions but remember basic catheter techniques and never try to advance the sheath without the guide wire.

5. Trouble seeing the end of the sheath/fibre

See section 3 above but also remember to use axial and longitudinal views.
Pre-measure your sheath against skin landmarks to know you are near to your target site. Inject saline (shaken) through the sheath as this will be highly visible on ultrasound. Consider re-booking for fluoro-guided procedure and use sheaths with a radio-opaque tip! e.g. Cook, check-flo performer. (See Slide/fig 8).
6. Fibre length relative to sheath

**Problem**
It is very important that the fibre tip is proud of the sheath tip to avoid melting the 2 together.

**Solution**
With loose fibres, pre-measure the fibre against the sheath before insertion using steristrip flag or adjustable torque device (eg Varilase).
Use ELVeS™ kit with fixed fibre protrusion luer lock or new option with adjustable luer lock. Always confirm your position immediately before treating with US.

7. Tumescent anaesthesia

**Problem**
unfamiliarity with technique.
Most practitioners have not done this before and have little experience of ultrasouns guided injection.

**Solution**
Seek personal training and watch it being done.
I use Marcain 0.5% 20mls in 60mls saline. I use the axial view (US) and make sequential injection with a 23G needle into the peri-venous fascia raising a ring of fluid around the vein.
Don’t be afraid to stop treatment and supplement if a section is missed.

8. Laser technique

**Problem**
“Recurrence” in the surgical sense is not associated with this technique but inadequate venous coagulation will result in failure of occlusion of the treated vein segment.

**Solution**
Increasing energy delivery (general consensus favours around 80J/cm) and tilting the patient head down during treatment favour success (Ref 6).

**Conclusion**
There are many stages to the procedure and many difficulties to be encountered while gaining experience and as the indications continue to grow (e.g. short saphenous, pelvic veins, venous ulceration). However, by continued professional discussion and endeavour we can improve on what is already a robust and efficacious technique (Ref 7).
1. **US-guided puncture**
   - Kit contains 19G needle and teflon J-wire
   - Problems:
     - collapse on lying down
     - venospasm
   - Hydrophilic wire (Terumo 0.035 angled 145cm) (Also “roadrunner”)
   - Micro puncture kit (Cook, Terumo) 21G puncture of cannula and 0.18 wire.
   - Tourniquet while examining (paediatric Fogarty)

2. **Tortuous vein** (hard to pass the wire)
   - Terumo wire. (Corkscrew manoeuvre with dry gauze)
   - Take the tourniquet off!
   - Use narrower wire e.g. 0.018" Terumo
   - Follow with US- (withdraw and advance)
   - Consider use fluoroscopy and contrast
     - Wire and catheter combination c.f. angio work for tortuous vessels

3. **Poor US views at groin**
   - Basic US image optimisation technique
     - Depth:
       - adjust for patient habitus
       - use least necessary to encompass target
     - Use the correct focal zones
     - use more and place at the correct depth
     - Turn down the Gain
     - Adjust the TGC sliders (Time Gain Compensation)
     - Try Harmonic or compound imaging (if available)

4. **Sheath is hard to pass**
   - #11 scalpel blade. Enlarge cut in skin
   - Corkscrew manoeuvre (slow and smooth)
   - Fix skin to avoid concertina effect
   - Venospasm can be very painful
     - wait 15mins or so
     - consider nitrates papaverine
     - NB Basic catheter technique
     - i.e. fix the wire while advancing the sheath
5. Trouble seeing the end of the sheath

- Optimise your US as described.
  - Remember to use axial and LS views
- Pre-measure your sheath against skin landmarks to get near to your target site
- Inject saline (shaken)
- Try fluoro and use sheaths with a radiopaque tip! (e.g. Cook, check-flo performer)

6. Fibre length relative to sheath

- Pre-mark using steristrip flag
- Use ELVeS™ kit with fixed fibre protrusion luer lock (new option with adjustable luer lock MS)
- Confirm with US (always)

7. Tumescent anaesthesia

- I use Marcain 0.5% 20mls in 60mls saline
- Use axial view (US)
- Blue needle 23G
- Lidocaine 1% undiluted at SFJ
- Don’t be afraid to stop and supplement if a bit is missed.
- Stop move back 1-2cm and try again (NB SSV)
- Relationship to bruising. LA vs GA, laser vs. RF

8. Laser technique

- 50J/cm vs. 80J/cm ask Lowell - I favour higher power
- Use Continuous Mode
  - (Min 2002), Kabnick(2004)-less bruising
- Taste of burning!

Conclusions

1. Learning curve
2. Share information
3. Develop the technique
4. See you in Rio?


Endovenous Laser Ablation of Perforators (ELAP) vs. Subfascial Endoscopic Perforator Dissection (SEPS) for chronic venous ulcers
Mr Bull is a Canadian-born graduate of the Vienna Medical School and had is training in surgery at the Municipal Hospital of Vienna-Lainz under Prof Denck. Part of his training took place in Heidelberg, Germany under the tutorship of Prof Allenberg. Mr Bull has been in private practice since 1993 and is consultant at the London Independent Hospital and Highgate, London as well as at the Evangelical Hospital of Vienna.

Mr Bull’s main field of interest has been the treatment of venous disorders and the development of new surgical technique. Starting with subfascial endoscopic perforator ligation in 1993 up to endovenous laser treatment in 2002, Mr Bull has been involved in implementing these procedures to a high standard.

Office
The Devonshire Street Vein Clinic
43, Devonshire St
London
W1G 7AL
Tel: 020 7323 2123
pbull@dr-bull.com

Praxis Sievering
Sieveringer Str 9
1190 Vienna
Tel: +43 1 328 8777
Fax: + 43 1 328 87777 28
Introduction
Endoscopic ligation of perforating veins (subfascial endoscopic perforating vein surgery [SEPS]) is valuable in treatment of venous ulcer. In the last years endovenous laser ablation of perforators have shown promising results.

Objective
This study was undertaken to determine the results of endovenous laser ablation compared to endoscopic subfascial dissection (ESDP) for perforator vein surgery in chronic crural ulcers.

Method
The authors evaluated prospectively a group of 18 patients subjected to 22 operations with perforator ligation on the lower extremities for chronic venous ulcer. Main outcomes measured included peri-operative complications, ulcer healing, and ulcer recurrence. All patients had duplex scan control at 1, 2, 4, 8, 12, 16 weeks.

Results
SEPS was performed in ELAP in 8 extremities, ESDP in 18. The endoscopic operation lasted on average 59 minutes, the endovenous one 35 minutes. The hospitalisation period were similar (3.1 days vs. 3.5 days after the SEPS). There were 5 persistent perforators in SEPS and 3 in ELAP, those 3 underwent further endovenous treatment in local anaesthesia at 2 and 4 weeks. Ulcer healing was 9 weeks for ELAP and 12 weeks for SEPS.

Conclusions
ELAP can adequately treat incompetent as well as subulcer perforators and seems to improve ulcer healing time. It may replace in the future SEPS however further prospective studies are needed.


Minor Subject Heading: Adult Humans Leg venous ulcer Ligation Middle Aged Vascular Surgical Procedures.

Comments
Evidence for benefit of surgical treatment of chronic venous insufficiency is at best disappointing. Venous insufficiency in its severe forms leads to skin changes which, in turn may be treated by surgical therapy. Superficial and perforating vein incompetence accounts for a substantial and correctable component of venous insufficiency in limbs with combined deep and superficial vein reflux and venous ulceration. These data indicate that surgical correction of this component significantly improves clinical symptoms and venous haemodynamics. Superficial and perforator ablation is an appropriate initial step in the management of combined deep and superficial incompetence.

Interventions are directed towards correction of the underlying abnormal venous physiology. This involves removal of varicose veins and ablation of incompetent axial veins and relevant perforating veins. In performing ablation of saphenous vein reflux, techniques include high ligation with stripping, radiofrequency ablation, endovenous laser therapy, and foam sclerotherapy. Incompetent perforator interruption can be accomplished surgically by subfascial endoscopic perforator surgery (SEPS) or controlled sclerotherapy using ultrasound. A variety of techniques have emerged to manage the varicose veins themselves. Surgical treatment of chronic venous insufficiency with high ligation in the groin and inversion stripping of the great saphenous vein to the knee combined with stab avulsion of varicose veins continues to be the standard in treatment of varicose veins. There are few comparisons of sclerotherapy of perforating veins with SEPS, but SEPS has become the most popular of surgical options.

The drawback in many cases however is due to the fact that incompetent perforator veins often are immediately in the vicinity of ulceration and make them non amendable to endoscopic approach. A recent anatomic review found an average of 21.9 perforating veins per calf which underscores how demanding perforator surgery can be. The presence of persistent insufficient perforating veins in our patients and our poor results with lateral SEPS procedures led us to study the possibility laser ablation of the perforating veins.
Preoperative assessment of the limb’s vascular status consisted of colour-flow duplex ultrasound imaging to locate vein valve incompetence, along with venous mapping. Percutaneous entry was achieved with a venous canula under direct ultrasound visualisation. Continuous pulse was applied and an average of 120 Joule per cm was applied along the vein.

There were 5 persistent perforators in SEPS and 3 in ELAP, those 3 underwent further endovenous treatment in local anaesthesia at 2 and 4 weeks. Ulcer healing was 9 weeks for ELAP and 12 weeks for SEPS.

Early clinical results have shown a promising outcome in patients with severe chronic venous insufficiency. This study demonstrated the effectiveness of the ELAP procedure when incorporated into the overall treatment strategy for patients with chronic venous insufficiency. Minimal postoperative complications accompanied by ulcer healing and relief of lower extremity symptoms were achieved for all the patients, underscoring the important role of incompetent perforator veins in the formation of chronic venous insufficiency.
BIBLIOGRAPHY

Endovenous Laser Ablation of Perforators (ELAP) vs. Subfascial Endoscopic Perforator Dissection (SEPS) for chronic venous ulcers

Philip Bull; Bernhard Gradl; Mathias Gruenbeck
Surgical Clinic Sievering, Vienna, Austria A-1190
The Devonshire Street Vein Clinic, London, UK


Danilo Castro

Endo Vascular Laser: GSV and SSV surgery; Complete, out patient, safe and with not scarring
Name
Danilo Castro M.D.
Phlebology & Aesthetic Surgeon
Clinica Echevarriarza, Montevideo, Uruguay

Born
May, 22th, 1954

Address
Echevarriarza 3284, Montevideo, Uruguay

Mail Box
dr_danilo_castro@hotmail.com
info@clinicaechevarriarza.com.uy

Web Page
www.clinicaechevarriarza.com.uy

Curriculum
- Assistant Surgeon, Surgery Clinic “F”; Clinical Hospital, Montevideo, Uruguay; 1981-1986.
- Assistant Investigation of Vascular Diseases; Clinical Hospital, Montevideo, Uruguay; 1982-1987.
- Clinical Surgeon; Police Hospital; Montevideo, Uruguay; 1985-1991.
- Private Practice, Phlebology & Cosmetic Surgery; Montevideo Uruguay: since 1981.
- Medical Director, Echevarriarza Clinica; Montevideo, Uruguay; since 1985.
- Medical Director, Castro-Beduchaud Medical Group; Montevideo, Uruguay: since 1999.
- Surgery National Premiun; Buenos Aires, Argentina; “Obstructive arterial disease in the lower extremities; Doppler Ecgography Evaluation”; 1987.
- President of the International Medical College of Laser Treatmens; 2005.
When of decide a technique GSV and SSV surgery, we have to decide to make with the reflux in SFJ and SPJ and the reflux from Incompetent Perforator Veins. Surgery endo luminal is last option developed in the treatment of GSV and SSV and particularly her you cash more, if it is known how to use combining it adequately.

The Endo Laser Vascular Surgery is an ambulatory treatment of varicose veins, minimally invasive, the fact that reflux eliminates the of SFJ and SPJ and GSV and SSV utilizing the energy of a diode Laser endo venous, directly be more than enough you suggest it. A real alternative of the classic is stripping.

Questions but you frequent

Do you substitute the other techniques of treatment of varicose veins?
Absolutely not. The has his maximum indication in the treatment reflux of SFJ and SPJ and GSV and SSV. You must tone in with another techniques, according to the patient’s pathology.

Do you eliminate all of the secondary and collateral varicose veins?
Absolutely not. When we have a flexuosa varicose vein, he is not possible to go it over with the optical fiber.

Do you have indication in the reticular varicose veins?
Just in those whose diametre allows the introduction of the optic fibre of 100 or 200µ. It is much more effective to treat it with sclerosing foam.

Do you solve in over 90% of cases the primary trans-lathes the reflux of SFJ, SPJ, GSV and SSV?
Yes, it solves more than 90% of those cases.

Is it an out patient surgery, that is performed in less than 60 minutes, with no scarring and with immediate recovery of the patient?
Yes, since it is minimally aggressive and it has a practically immediate recovery.

Advantages of surgery the VSI’s Endolaser
It is an ambulatory with local anaesthesia surgery: undoubtly, this is one of the main advantages, to be able to perform a so resisted surgery in an ambulatory way, without requiring hospitalization.
Quick and easy to realize, it is also an easy technique to learn. The difficult part is to indicate the correct technique in each case.
Microinvasive (minimal trauma): Right now patients you did not sole, they do not oppose the realization of a surgery of saphenous varicose veins, rather they request it of election.
Excellent results(clinical and aesthetic); in next pages, we will talk about the results which support our statements.

Disadvantages of endolaser surgery of the VSI.
Relapses of collateral varicose veins of the SFJ that do not appear with the SFJ binding escission: This is the main disadvantage, mainly when we diagnose SFJ varicoses veins. If we do not treat the SFJ colateral varicoses veins we run the risk to have relapse from these varicose veins applying just ENDOLASER. The optic fibre can not completely canalize these colateral relapses.
Relapses of collateral varicose veins of SFJ that do not appear with the binding scission SFJ: Evidently this is the bigger annoyance, all over when we diagnosed insufficient dependent varicose veins of SFJ. Else we treated the collateral guaranties of the SFJ, we risked to be relapsing of these varicose veins if we acted only with the Endolaser.
Relapses of varicose tortuous collateral guaranties that can not be canalized completely with the optical fiber.

Therapeutic optimal SCHEME

| IO + ISI | Just Endolaser |
| IO + ISI + IC | Endolaser + Müller’s Microsurgery |
| (insuff. Colaterals) | |
| IO + ISI + IP | Endolaser + Müller’s Microsurgery + Perforating Extraaponeurotic Surgery |
| (insuff. perforating) | |
| IO + ISI + IC + VR | Endolaser SI and of VR |
| (reticular varicoses veins) | + Müller’s Microsurgery |
ABSTRACT
Endo Vascular Laser: GSV and SSV surgery;
Complete, out patient, safe and with not scarring

Our experience
We will analyze 450 patients. All of them presented SFJ insufficiency of collateral saphenous (IC), but only 135 (30%) had perforating insufficiency (IP).
One group was only treated with ENDOLASER (32%) in others, we combined ENDOLASER with MÜLLER’S MICROSURGERY (68%).
To all the ones who had perforating problems, we solved them, performing a transcutaneous or endoscopic ligature.
The post operation ecography after 30 and 60 days of the 96% did not evidence ostial insufficiency and the 95% did not present internal saphenous insufficiency but in the 12% insufficiency of collateral varicose veins remained.
In patients treated with just ENDOLASER we observed that the 33% still had collateral varicose veins; in those in which we associated ENDOLASER with MÜLLER’S MICROSURGERY, we just had a 2% of collateral varicose veins permanence.
Therefore, associating ENDOLASER with MÜLLER’S MICROSURGERY, we obtain a 98% of effectiveness, in GSV, SSV and collateral varicose veins.

Conclusions
We are in the presence of an absolutely innovating technique for SFJ and GSV, SSV treatment
Quick, ambulatory, with no scarring. With an effectiveness of 95% in the treatment of these pathologies.
Concerning to saphenous collateral varicose treatment, we conclude that it is effective as long as the collateral varicose is not tortuous. In which case, it is necessary to associate the treatment to a MÜLLER’S MICROSURGERY to treat colaterals.
About the action of reticulars, we should follow the same scheme as in colaterals.

Comments
From 1999 up to the date ENDOLUMINAL SURGERY of VARICOSES VEINS has become to us the main treatment to solve insufficiency of SFJ and GSV.
It is necessary the combination with other procedures when we face collateral varicose veins and reticular varicoses.
So we can state that endoluminal surgery of GSV and SSV, combined with Müller’s Microsurgery or sclerosing foam solves more than the 95% of varicose difficulties.
Secondary varicose veins of perforating veins, which we generally solve with a direct ligature of the perforating, either transcutaneously or endoscopically, can be treated through a direct puncture with the optic fibre under ecographic vision.
This treatment has turned out to be successful in most of the insufficient perforations, which in our experience, have remained sufficient in more than the 98% during the first six months of ecographic pursuit.
As well as other microinvasive and innovating procedures, the endoluminal laser surgery has turned an aggressive, cruel and resisted surgery as stripping into a microsurgery procedure; practically painless and ambulatory with an effectiveness similar or even bigger than of the classical surgeries.
We agree with many authors who state that endoluminal surgery is to varicose veins surgery as angioplasty was to cardiac surgery.
Endo Vascular Laser: GSV and SSV surgery; Complete, out patient, safe and with not scarring

Danilo Castro M.D.
Phlebology & Aesthetic Surgeon
Clinica Echevarria, Montevideo, Uruguay
Endo Vascular Laser: GSV and SSV surgery; Complete, out patient, safe and with not scarring
BIBLIOGRAPHY

Endo Vascular Laser: GSV and SSV surgery; Complete, out patient, safe and with not scarring

Danilo Castro M.D.
Phlebology & Aesthetic Surgeon
Clinica Echevarriarza, Montevideo, Uruguay


Mario Duran

Endovenous Laser Treatment with 980 diode laser: follow up in two years in 670 procedures
CURRICULUM VITAE

Mario Duran

Dr Mario Duran
Vascular Surgeon

- Specialist of Vascular Surgery from Hospital Santa Casa da Misericordia São Paulo - Brazil (Year 1985).
- Post graduate studies at Mount Sinai Medical Centre of Miami (Year 1988).
- Member of the American College of Phlebology.
- Vice-president for Ecuador of the Latin-American Venous Forum.
- President of the “Sociedad Ecuatoriana de Cirugía Vascular, Capítulo Sierra”.
- Vascular Surgeon at the Hospital Metropolitan de Quito.
- Member of the UIP.
- Presentations on the specialty as invited professor given at Colombia, Mexico, Argentina and Brazil.
- Medical Director at Varilaser, specialized centre on Endo Vascular Treatment of Lower Limbs.
Introduction
To report the safety and efficacy of the 980 Diode endovenous laser, in the treatment of truncal varicose veins in a 24 month follow up period.

Method(s)
This study includes 670 procedures in 611 extremities in 426 patients with incompetence of 517 greater saphenous veins (GSVs), 110 small saphenous veins (SSVs) and 43 anterior-lateral tributaries veins (ALTs) treated with 980 Diode laser energy (Ceralas D15 Biolitec).

All veins were accessed with a stab wound/Mueller hook approach. A 600 micron bare-tipped laser fiber was passed through a previously placed catheter in the target vein, and positioned 1 cm below the superficial epigastric vein.

Tumescent anesthesia (200-300ml Lidocaine 0.1%) was delivered periveneously under ultrasound guidance. Diode laser energy at 980 nm was applied at 9-12 Watts in continuous mode, with a fluency of 50-60 joules/cm, and 2 mm/sec velocity.

Duplex ultrasound was used in the pre-op mapping, catheter, fiber tip position and post-op follow up controls.

The patients were instructed to restart their normal activities the day after surgery with an elastic bandage for two days and 20-30mmHg elastic support stockings for the following 14 days.

Patients were evaluated clinically and with duplex ultrasound at 2 days, 6 weeks, 3, 9, 12 months and yearly thereafter to assess treatment efficacy and adverse reactions.

Result(s)
Complete occlusion and fibrosis vs reabsorption of the treated veins were observed during the follow up examinations in all patients.

Of the 611 limbs; 112 were followed for at least 24 months, and 98% have remained closed or reabsorbed.

Conclusion(s)
Our experience in 24 months follow-up with the 980 Diode endovenous laser shows that this procedure is highly effective, fast and secure. Endovenous laser appears to offer these benefits with lower rates of complications and the advantage to avoid epidural or general anesthesia.

Comments
At this time June/2005 we have done 726 procedures, in axial veins (GSV, SSV and ALT). All the procedures were done with ablation of the varicose veins and tributaries and ligation of perforans if needed in the same operation.

We conclude that tumescent anesthesia is very important to reduce the lumen of the treated veins, maintain the tip of the fiber close to the endothelium and reduce the diameter of the vein.

Also, we consider important to deliver 50-60 joules/cm of energy in continuos mode along the treated veins.
Endovenous Laser Treatment with 980 diode laser: follow up in two years in 670 procedures

Dr Mario Duran
Vascular Surgeon
ELVeS™ 980nm Diode

- Transversal diameter measured most of the GSV or LSV 2-3 cm below the S-/o S-junction and distal to the saphenous
- Reflux documentation of the GSV, LSV, perforators, and deep venous system
- Measurement of the venous segment to be treated

7.

8.

9.

10.

11.

12.
Endovenous Laser Treatment with 980 diode laser: follow up in two years in 670 procedures
CONCLUSIONS

Physical examination is not enough to identify the extension of varicose vein reflux allowing to choose the best treatment. It is very important to complement with venous duplex ultrasound images before any surgical or sclerotherapy be considered.

Patients dealing with endovenous laser in the treatment of varicose vein reflux must have training with duplex US, because they will see the patient at their offices for the first time and should have the expertise to deliver nummocentesis during the procedure.

- It is important to give the necessary fluence of energy into the treated vein, in order to reach the goal of the treatment: reabsorption of the vein.

- For the 980 nm Diode, we have delivered 20-60 joules/cm².

- The modern treatment of varicose veins must combine various techniques: ELVeS®, microsurgery, and US guided foam when necessary.
BIBLIOGRAPHY

Endovenous Laser Treatment with 980 diode laser: follow up in two years in 670 procedures

Dr Mario Duran
Vascular Surgeon


Júlio Henrique Galelli Ferreira

ELVeS™, five years of experience
CURRICULUM VITAE

Júlio Henrique Galelli Ferreira

Júlio Henrique Galelli Ferreira, M.D.
Vascular Department
Hospital Parque Belém, Porto Alegre, Brazil

Name
Júlio Henrique Galelli Ferreira, M.D.

Address
Rua Dom Pedrito 317, Passo D’Aréia, Porto Alegre, Brazil

Phone
55-51-33611762

E-mail
drjulioferreira@ibf.med.br

Titles
- Cardiovascular Surgeon for the Conselho Federal de Medicina of Brazil.
- Vascular Surgeon in the following hospitals: Pronto Socorro Municipal, Mãe de Deus, Parque Belém, Ernesto Dornelles, Divina Providência, Petrópolis e Mãe de Deus Center in Porto Alegre, Brazil.
- Head of the Vascular Department of the Hospital Parque Belém in Porto Alegre, Brazil.
- Researcher of the Instituto Brasileiro de Flebologia.
- Member of the Sociedade Brasileira de Flebologia.
- Member of the Sociedade Brasileira de Laser em Medicina e Cirurgia.
- Member of the Sociedade Panamericana de Flebologia e Linfologia.
- Member of the Sociedade Panamericana de Trauma.
- Honorary member of Colégio Argentino de Cirúrgia Venosa y Linfática.
- Founder member of the “International Endovenous Laser Working Group”.
- Private clinic.
Objective
The objective is to report the experience of the Instituto Brasileiro de Flebologia in the ablation of the great saphenous vein (GSV) using Endovenous Laser (ELVeS™) in the period 2000 to 2004.

Methods
Single center, retrospective, open and not randomized review, only in great saphenous veins, with two doctors performing the procedure in pulsed and continuous mode. Not blind in terms of crossectomies. All patients had follow up with duplex-scan. All patients were treated under local anesthesia.

Equipment
Laser Source: 980 nm. diode laser (Biolitec Ceralas D 15)
Laser Delivery: 600 micron fiber from Biolitec introduced with a ELVeS™ kit under ultrasound control.
Ultrasound: Esaote Caris Plus.
Probe: 7mhz.

Discussion
Two hundred and forty six patients were treated. Of those, forty one were male and two hundred and five female.
In two hundred and nineteen patients a unilateral procedure was done, and in twenty seven patients a bilateral procedure was performed totaling two hundred and seventy- three great saphenous veins treated.
The diameter of the great saphenous veins treated was from seven to twenty six millimeters, with the majority of the cases around seven to eleven millimeters.
In seventy eight cases a concomitant crossectomie was done. Sixty two of these were at the beginning of our experience during a learning curve.
Until may 2004 in two hundred and forty nine cases the original protocol was followed, which was a pulsed mode, but after this date, the guidelines was changed to the continuous mode using a average of 60 to 80 joules/cm.
Of those two hundred and seventy three cases treated, the occlusion index in the first 24 hours was 100%.
8,79% of cases and this number increases to 9,52% (26 patients) in the second year.
Only two cases (0,73%) needed reintervention.
Some small complications occured.
All the patients had bruising, but much less than those caused by stripping.
One hundred and nine complained of a little pain, twelve medium degree of pain and no patients refers acute or stabing pain.
Two patients vomited in the early pos operative and two others developed superficial segmentar phlebite which was cured with conservative treatment.
There was no sign of edema, nervous lesion, hemorrhage, changes in pigmentation (Hiper or hipopigitations), deep venous thromboses or burns.

Conclusions
This review shows that the experience of the Instituto Brasileiro de Flebologia with ELVeS™ to treat sapheno femoral incontinence, has similar results to other services around the world and because of it’s simplicity, high success rates, and lack of serious complications until now, is deemed to be a safe way to treat this pathology, with many advantages for both patients and doctors.
ELVeS™ standardization showing international experience is necessary to obtain the best results.
SLIDES

ELVeS™, five years of experience

Júlio Henrique Galelli Ferreira, M.D.
Vascular Department
Hospital Parque Belém, Porto Alegre, Brazil
Jean Luc Gérard

Endovenous laser ablation of the small saphenous vein: risk of paresthesia?
CURRICULUM VITAE

Jean-Luc Gérard

Dr Jean-Luc Gérard
University Hospital Henri Mondor, Vascular Surgery Department Créteil, France

Name
Jean-Luc Gérard

Date of birth
19/09/1956 in Paris (France)

Current position
- Work in a University Hospital Henri Mondor Créteil (Paris XII) vascular surgery department.

Qualification
- Doctor in Medicine university Paris XII, bronze medal.
- Diploma in Angiologie 1996.

Member
- French Society of Phlebology.
- French college of vascular pathology.
- Union of angiology.
- Teacher in the teaching hospital Henri Mondor.
Introduction
During the traditional surgery of the small saphenous vein (SSV) the risks to damage the nerves is important and most of the surgeons avoid stripping the entire vein and carry out mostly just a high ligation resection.

Endovenous Laser Principle Treatment
Is based on a thermal process:
- conversion of light into heat
  - Light energy is targeted, absorbed by the haemoglobin and water, (for 980 nm) and transformed into heat.
- A transfer of heat
  - Firstly: the blood
  - Secondly: the vein wall
- Result: An alteration of the proteins constructing the entire vein wall (3 layers).

Previous Mapping
By ultrasound guidance
- To locate the nerves (sciatic nerve always visible in the popliteal fossa).
- To locate the termination of SSV
  - Separate
  - Common with gastrocnemius vein or giacomini vein

Endovenous Laser Vein System (ELVeS™)
- In a consulting room.
- Percutaneous introduction by ultrasound guidance from the lateral malleolus or at the lowest part incompetent vein.
- Local anaesthesia and never under spinal anaesthesia or general anaesthesia (the patient must be able to tell during the procedure his feeling).
- 600 µm or 360 µm fibre; 980 nm diode laser.
- Continuous mode.
- Power decreasing from the upper part (11 watts) to the lower part of the leg (2 watts).

Conclusion
- Endovenous laser in ambulatory in a consulting room
  - Efficient
  - Safe for the nerves
  - Slight invasive method
  - Slightly painful
- Attractive alternative method to varicose surgery because
  - Reduces the cost of the hospitalisation
  - Reduces the amount of time needed off of work

ABSTRACT
Endovenous laser ablation of the small saphenous vein: risk of paresthesia?
Dr Jean-Luc Gérard
University Hospital Henri Mondor, Vascular Surgery Department Créteil, France

Rio, October 2nd to 7th, 2005 • Jean-Luc Gérard
Endovenous laser ablation of the small saphenous vein: risk of paresthesia?

Dr Jean-Luc Gérard
University Hospital Henri Mondor, Vascular Surgery Department Créteil, France

1. **Endovenous Laser Ablation of the small saphenous vein:**
   - **Risk of Paresthesia?**
   - Dr Jean-Luc GERARD
   - Pr Claude GILLOT

2. **Objectives**
   - Endovenous laser 980 nm must be simpler compared to vein stripping
   - Advantages:
     - Ambulatory technique (versus in average 1 or 2 days of hospitalisation for stripping)
     - Less risk from a local anesthetic
     - Less complications (dysesthesias paresthesias)
     - No need for the patient to take much time off work (1 to 2 days compared to three weeks for stripping)
     - Reduced hospital costs

3. **Paresthesia**
   - Which nerves?
   - Where is the problem?

4. **To the ankle, above lateral malleolus**
   - Origin of SSV stuck to the sural nerve
   - À la cheville, au col de la malleole externe
   - Origine du tronc de la PVS, accolé au nerf sural

5. **Deep venous system**
   - Saphenous vein
   - Sural nerve
   - SSV stuck to SSV and wrapped around

6. **To the point of the calf**
   - À la pointe du mollet
Endovenous laser ablation of the small saphenous vein: risk of paresthesia?

**Slide 13:**
Deep vein insufficiency
Recurrent varicose veins
Anticoagulant treatment
Insuffisance veineuse profonde
Raleve varices
Patient sous traitement anticoagulant

**Slide 14:**
The endovenous laser principle is based on a thermal process:
- A conversion of light into heat
  - Light energy is targeted, absorbed by the Hemoglobin and water, (for 980 nm) and transferred into heat
- A transfer of heat
  - Finally: the blood
  - Secondly: the vein wall
- Result: an alteration of the proteins constructing the entire vein wall (3 layers)
- It’s not a direct heating of the vein wall by the laser

**Slide 15:**
Endovenous laser to the popliteal fossa
Nerves can be stuck or entwine to the vein but for a very short part (1 to 3mm)
- Check by scan if the crosse SSV is common with gastocnemian vein or displaced
- Local anesthesia
- Stop immediately when it urts (electric shock in the foot)
- Then wait and pull back the fiber for 1mm and shoot again

**Slide 16:**
Endovenous laser to the middle part of the calf
Nerves can be stuck to the vein but for a long part (1 to 3cm)
- Check by scan the position of the nerve
- Local anesthesia
- Stop immediately when it urts
- Then decrease power if it’s painful

**Slide 17:**
Endovenous laser to the bottom part of the leg
Nerves is always stuck and wrapped to the vein and for a long part
- Decrease progressively the power from the popliteal fossa to the ankle: (11watts at the popliteal fossa, 10 w upper part of the calf, 8 w middle part, 6 w lower part, 4 w and to 2 w at ankle)

**Slide 18:**
CONCLUSION
ENDOVENOUS LASER ABLATION OF THE SMALL SAPHENOUS VEIN COMPARED TO TRADITIONAL SURGERY
- SIMPLER
- SAFE
- Necessity of a minimum training
Oliver Göckeritz
Christian Wenzel

Computer assisted control of the retreat speed during the endoluminal laser coagulation by continuous control of the energy delivery
CURRICULUM VITAE

Oliver Göckeritz

Göckeritz O
Venenzentrum Elsterpark, Leipzig

- During the education each 6 month or more hospitations in vascular surgery, hernia surgery and endocrinology surgery at different university clinics of Leipzig, Aachen and Marburg.
- 1997 final course on sonographics.
- 1997 title medical specialist in surgery.
- 1997-2000 Education in traumatism at university clinic “Berufsgenossenschaftliche Unfallklinik Halle”.
- Since 2000 practice as a medical specialist in surgery in own Praxisklinik Surgery in Leipzig, main focus on vein surgery, hernia surgery, hand and foot surgery, sportmedicine, since 2003 with my wife, specialist in surgery and hand surgery.
- 2001 title specialist in sports medicine.
- Since 2002 Center of Vein Therapy “Venenzentrum am Elsterpark”, together with my partners Dr. S. Weishaupt, specialist in surgery, Dr. H.-C. Wenzel, specialist in dermatology and Dr. I. Wittig, specialist in internal medicine and angiology.
CURRICULUM VITAE

Christian Wenzel

Wenzel H.-C
Venenzentrum Elsterpark, Leipzig

- 12/1995 additionally title of “general practitioner”.
- 11/1995-6/1996 assistant at phlebology practice (dermatology) of Mrs. Dr. Zollmann in Jena, Hospitation at surgery clinic of Mr. Dr. Zollmann (in Jena), Main focus on vein surgery.
- 1996 final course Duplex Sonographics (W. Harvey Hospital).
- 1996 and 1998 Hospitation for several days at Dr. Hübner’s office in Aachen.
- Since 1997 Centre of Laser therapy in Leipzig (e.g. KTP-laser therapy of small vessels).
- Since 2000 in practice as a medical specialist in dermatology in Naunhof/Saxony, main focus on phlebology (e.g. colorcoded Duplex sonography, LRR function diagnostics).
- Since 2002 Center of Vein-therapy “Venenzentrum am Elsterpark” together with DM Oliver Goeckeritz (e.g. sclerogenic therapy, phlebectomy, ulcer therapy including laser, ELVES laser therapy).
Computer assisted control of the retreat speed during the endoluminal laser coagulation by continuous control of the energy delivery

Göckeritz O, Wenzel H.-C
Venenzentrum Elsterpark, Leipzig

The applied energy in joules per cm of the vein has proved itself as a control parameter of the energy delivery during the endoluminal laser coagulation of incompetent veins. Nevertheless, concerning the primary occlusion of the vein user and experience based variations of the retreat speed even with consistently defined laser power led to different results. By the precise computer assisted control of the retreat speed the preset energy amount can precisely be applied into the vein.

Conclusion
The use of the computer assisted control system eases and improves the endoluminal laser treatment of varicose veins. With continuous control of the applied energy amount in the continuous mode a reliable occlusion of the treated vein is reached with high patient security.

Patients, material, methods
In the last three years 1500 veins (700 Patients) have been treated with the ELVeS™ device. Until now 18 patients with an insufficiency of the Greater saphenous vein and 3 patients with an insufficiency of the Small saphenous vein have been promisingly treated with a new developed computer assisted control device going to be presented here. This new development makes it possible to accurately apply the desired energy amount in joules per cm with the aimed control of the retreat speed, via an optical and/or acoustic signal in the continuous mode. The occlusion rate with the 980 nm laser was 100%. Complications did not occur.

Results
With a duplex sonography control after 1 week a complete occlusion of the insufficient vein was reached with all patients. For the untrained user the use of the control system enables an easier appliance of the desired energy in joules per cm vein. Since the retreat speed of the desired energy amount is adjusted, the preset laser power in continuous mode is of circumstantial importance and can be freely determined by the user.
SLIDES

Computer assisted control of the retreat speed during the endoluminal laser coagulation by continuous control of the energy delivery

Göckeritz O, Wenzel H.-C
Venenzentrum Elsterpark, Leipzig
Computer assisted control of the retreat speed during the endoluminal laser coagulation by continuous control of the energy delivery.

7. In-between phases with increased retraction speed immediately after grabbing the fibre.

8. Visible decrease of length and number of in-between phases with increased retraction speed.

9. Large spread of speed despite to subjective equal traction feeling.

10. Results of Examination:
   - Strong local variation of applied energy density because of local variation of the retraction speed could be responsible for:
     - Side effects (e.g., haematomas, nerve injuries ...)
     - Incomplete closures or re-occlusion

11. Conclusion:
   - Proposals to improve the new method:
     - Optical and acoustic control of retraction speed leads to a significant consistently good energy transmission on the vessels.
     - Optimized energy transmission by technical coupling of retracting speed sensor and real-time controlled laser device.
David Greenstein

Endovenous Laser: the management of Giacomini Vein and Branches
CURRICULUM VITAE

Greenstein D, Bani Hani M, Moradessi K

Department of Vascular surgery Northwick Park Hospital, London UK

- David Greenstein is a consultant Vascular surgeon at Northwick Park Hospital, London.
- Mohammed Bani Hani is a Vascular Research Fellow at Imperial College, London.
- Kamran Moradessi is a Vascular scientist based at Northwick Park Hospital London.
Background
Superficial Venous insufficiency is a common condition affecting up to 25% of the adult population. To successfully treat varicose veins all points of significant venous reflux need to be identified and treated.

Recent expansion in the use of pre-operative duplex mapping of varicose veins has resulted in more complex venous surgery being performed. With the advent of endovenous laser ablation (EVLA) this technique has also had to become more complex in treating truncal varicose veins that do not stem from the greater saphenous vein (GSV) or short saphenous vein (SSV).

AIM
We present our experience of EVLA of Varicose veins stemming from the Giacomini, Antero-lateral vein, bifid long saphenous vein and posteromedial thigh vein.

Patients
200 consecutive underwent EVLA for symptomatic varicose veins. All patients underwent a full history and physical examination. In addition all patients underwent a detailed venous duplex scan in which venous duplex scan in which reflux in the GSV, SSV and deep veins were noted. In addition the scan examined for the presence of bifid GSV systems, noting at what level in relation to the sapheno-femoral junction the GSV becomes bifid. Whether there is reflux in one or both branches and in which branch a mid-thigh perforator joins. In addition reflux in the anterolateral vein posterior medial vein and Giacomini vein was noted. (figure 1).

Operative Procedure
Giacomini Vein and posteromedial vein.
For treatment of the Giacomini vein, The patients were in the prone position and fully awake. All procedures were performed under local anaesthesia. The short saphenous vein was percutaneously punctured in the lower third of the SSV. A 0.35 curved Terumo guide wire was introduced and under ultrasound guidance was steered in to the giacomini vein. As this vein has a variable termination in the deep system, the guidewire was followed as high as possible, if the giacomini vein terminated at the sapheno femoral junction, the patient was asked to turn on to their side or supine in order to follow the guide wire (the name for Giacomini vein is sometimes called the postomedial thigh vein in this circumstance). Because this vein is small and easily goes into spasm and its length can be long, it is decided individually whether to use a Biolitec introducing catheter or a 4 french Cook catheter to railroad over the guide wire.
A variable length 980nm diode laser (Biolitec) as passed within the sheath and the position checked in relation to the tip of the catheter and the deep system. Local anaesthesia (40 ml 1% lignocaine and 300 ml of saline) is then passed around the vein along its entire length including the SSV. Laser energy of 40-50 joules cm is applied along the whole length of vein.

Bifid Greater Saphenous vein and anterolateral vein.
All procedures are performed under local anaesthesia in the supine position. If a bifid GSV or anterior thigh saphenous vein is noted pre-operatively to originate from the sapheno-femoral junction and importantly is refluxing then it is treated. Occasionally a mid thigh perforator is noted to join the bifid GSV. To treat these collateral veins the main GSV is cannulated in the normal manner and the 980 nm laser fibre introduced. The second LSV is then percutaneously entered with a micropuncture set (Cook) and a sheath left in place. In the anterior thigh saphenous vein it is approximately 10 cm from the SFJ because the vein often branches at this point and also becomes very tortuous. In the true bifid LSV, the 2nd vein is punctured but as low down in the thigh as is technically possible so as to accommodate any perforator that my join it and a second laser sheath introduced (to avoid the risk of venospasm if applied later). Tumescence (40 ml of 1%lignocaine and 300 ml of saline) is then applied around both saphenous veins in the thigh. After closing the main
ABSTRACT
Endovenous Laser: the management of Giacomini Vein and Branches

greater saphenous vein using a 980nm fibre 50-80 joules/cm. The fibre is cleaned and passed through the 2nd sheath to the SFJ. Similar energy is then applied at 50-80 joules cm.

Results
For the vein of Giacomini all have been successfully closed using EVLA. No nerve injury or deep vein thrombosis has occurred. Pain usually settled quickly although in 8% it lasted beyond 2 weeks. 

In treating all thigh truncal veins treatment has been successful however in the very early experience a cutdown was often necessary for the anterior thigh vein as this vein easily went into venous spasm making percutaneous cannulation difficult. Since adopting the technique described above using the micropuncture set, cutdown is now very rarely required.

Conclusion
With development of EVLA and using interventional catheter based techniques, it is possible to treat most cases of primary varicose veins.
Endovenous Laser: the management of Giacomini Vein and Branches

Greenstein D, Bani Hani M, Moradessi K
Department of Vascular surgery Northwick Park Hospital, London UK

1. Background
- Expansion in Venous Duplex has resulted in more complex venous surgery
- To be effective treatment, EVLA has had to become more complex to treat most cases of primary and recurrent Varicose veins
- All Sources of reflux need treatment to maintain good long-term results

2. Varicose Veins Treated by EVLA
- Greater Saphenous Vein
- Short Saphenous Vein
- Bifid Greater Saphenous Vein and perforator
- Giacomini Vein
- Posterior Medial Vein
- Anterior Lateral Thigh Vein
- Clinically Significant Perforators

3. Patients
- 200 Consecutive Patients with primary Varicose Veins were assessed
- All Patients underwent a full pre-operative venous duplex scan
- All main stem, Collateral, perforator and deep veins were assessed

4. Operative Procedure
- Main stem veins were cannulated percutaneously
- Using a combination of micro-puncture set, variable sheath catheters and 0.35 Terumo Glide-wires, the refluxing collateral veins were also cannulated
- Tumesence was applied around all veins that underwent EVLA to cause vevospasm
- A 980 nm Biolitec Diode laser was used to ablate the vein (50-80 joules/cm)

5. Results
- All collateral veins were successfully ablated
- No nerve injury occurred in the Giacomini vein
- No Deep vein thrombosis occurred
- In the case of bifid greater saphenous vein more post operative pain was noted

6. Conclusion
- Using Catheter based interventional techniques it is possible to treat most cases of primary varicose veins
Endovenous Laser: the management of Giacomini Vein and Branches
Lowell Kabnick

EndoLaser Venous System (980nm) For the Treatment of Saphenous Venous Insufficiency: 7611 Limbs

RF Vs. Laser: Results
Lowell Kabnick

Lowell S. Kabnick, MD, FACS
Director - Vein Institute of New Jersey, Morristown, USA

Dr. Kabnick is a graduate of the George Washington University School of Medicine, and received his postdoctoral graduate school training at New York University, Bellevue and Long Island Jewish Medical Center. He continued his Advanced Vascular Fellowship at the prestigious Mt. Sinai Hospital in New York. He is currently a Senior Attending Physician in the Department of Surgery at Morristown Memorial Hospital. His practice is limited solely to venous diagnosis and treatment.

Major Teaching Experience
Procedural teaching of venous disorders to visiting MDs-Radiofrequency Closure and laser of the greater saphenous vein, microphlebectomy, laser/sclerotherapy. Surgical Residents from Morristown Memorial Hospital, Roosevelt Hospital Physicians Assistants. Medical Students at UMDNJ University Hospital.
ABSTRACT

EndoLaser Venous System (980nm) For the Treatment of Saphenous Venous Insufficiency: 7611 Limbs

Lowell S. Kabnick, MD, FACS
Director - Vein Institute of New Jersey, Morristown, USA

Purpose
The purpose of this group is to develop an international registry of patients who have had a procedure utilizing the 980nm wavelength laser. This registry has been developed for the purpose of studying patients with symptomatic chronic venous insufficiency and their responses to the endothermal ablation. Contributing to this registry now but not limited to are physicians from these following countries: Argentina, Brazil, Belgium, Chile, Equador, France, Germany, Italy, Switzerland, United Kingdom, and United States.

Methods
The nucleus of the IRWG is composed of physicians who are recognized as leaders in the venous field and who have used the 980nm laser for the treatment of CVI. All patients from the doctors’ or countries’ registries have been submitted for analysis. Analysis of the data will be scrutinized by a subcommittee of the IRWG.

Results
The US submitted 1933 limbs for Endovenous Ablation with 1799 limbs being treated for GSV insufficiency. There was a reported efficacy rate of 94.88%. Eleven other countries submitted data involving 5678 limbs. 5262 of this cohort were treated GSV with an efficacy rate range 91%-99%. The average closure rate for the total group was 96%. 76% of the registry’s patients had ecchymosis, 2.3% parasthesia, .5% burns, .3%DVT, and .023% PE.

Conclusion
At present, early registry data concerning the use of the 980nm laser for the treatment of saphenous vein insufficiency, reveals that the laser is efficacious and safe. With the development of the International Registry, questions posed concerning CVI in relationship to laser may be answered in a reliable scientific fashion. Furthermore, initially and in the future we expect to develop a consensus doctrine in the utilization of laser wavelength, power, energy and the timing of adjunctive procedures to treat chronic venous insufficiency.
RF Vs. Laser: Results

Lowell S. Kabnick, MD, FACS
Director - Vein Institute of New Jersey, Morristown, USA

Purpose
Minimally invasive procedures have been one of the drivers for manufacturers to develop devices for patient intervention. Because of the perception that less is better, the patients have looked or searched for physicians that perform these minimally invasive procedures, regardless of evidence based medicine. Most physicians have been slow to adopt these procedures while some have been quick to embrace.

The purpose of this presentation is to look at data using minimally invasive devices which were approved as early as 1999 for the ablation of the saphenous vein. My aim is to show that there is enough data to conclude that the endothermal devices used to obliterate the saphenous system should be considered the benchmark for the treatment of saphenous insufficiency and to point out the differences between the two classes of endothermal devices.

Methods
RF and laser registry data and single center data will be compared and contrasted. Understanding the inherent weaknesses with data gathering and authors’ conclusions, I will present the data as reported.

Results
Analysis of four year RF data (company registry) revealed a cohort of 916 patients (1120 limbs) treated. Clinical results revealed reflux free GSV veins at one year (375/419) 89%, two years (196/224) 88%, three years (96/112) 86%, and four years (62/72) 86%. Complications from RF treatment were: pulmonary embolism 0.1%, DVT 1.0%, skin burns (12/935) 0.8%, infection 0.2%, parasthesia at one week 12.3% at two years 4.9%. In single center reporting from the USA, efficacy results varied between 90% - 97%. Single center reports regarding laser reveal GSV closure rates from 93% to 99% with cumulative spawning one to four years. My experience is quite similar using the 980nm laser. In 275 cases (4m-24m), I have a 96% reflux-free rate. In my cohort, there was one parasthesia (disappeared in 3 weeks), 3 DVTs, no PEs, skin burns, or infections. Most patients had some degree of bruising which disappeared within two weeks and the discomfort was controlled with an anti-inflammatory agent.

Conclusion
Presently, although not widely dissimilar, laser appears to be more efficacious in controlling venous reflux. RF causes less discomfort and bruising than Laser. Laser, when used in the continuous mode, causes less bruising and discomfort than previously reported (pulse mode). RF is more complex to use in terms of setup, catheter-char accumulation, catheter cost, catheter pull-back time, and total procedural time.

Nonetheless, the above differences are real and physicians tend to make choices based upon information. It is my feeling that both modalities are a big advancement in the treatment of venous disease and should be the standard for the treatment of saphenous insufficiency.
EndoLaser Venous System (980nm) For the Treatment of Saphenous Venous Insufficiency: 7611 Limbs

Lowell S. Kabnick, MD, FACS
Director - Vein Institute of New Jersey, Morristown, USA
EndoLaser Venous System (980nm) For the Treatment of Saphenous Venous Insufficiency: 7611 Limbs

Conclusion

- The IRWG will be able to challenge the data to come up with:
  - Answers to many phlebological questions
  - Optimal power
  - Optimal J/cm
  - Anticoagulation vs. no anticoagulation
  - Staged phlebectomy
  - Uniform procedural methods
  - etc

Conclusion

- The generation of evidenced based medicine papers for publication
BIBLIOGRAPHY

RF Vs. Laser: Results

Lowell S. Kabnick, MD, FACS
Director - Vein Institute of New Jersey, Morristown, USA

1. Farley B. Data from the Vnus Medical Registry on radiofrequency Closure™, Dec 2004.
Dimitrios J. Kontothanassis

Mini Invasive Treatment of Varicose Veins On Patients with Liver Cirrhosis Waiting for Orthotopic Liver Transplants (OLTx)

Endovenous Laser Treatment of Varicose Veins: A Three Years Personal Experience
CURRICULUM VITAE

Dimitrios J. Kontothanassis

Dimitrios J. Kontothanassis M.D

Via Fossato 26/A
44100 Ferrara - Italy
tel: +39 3382464006
e-mail: dkontothanassis@yahoo.it

General education
Dimitris I. Kontothanassis was born in Thessaloniki, Greece on May 18th 1970. He graduated high school in July 1987 at which point he enrolled in the medical school at the University of Padova, Italy. He graduated with distinction from the University of Padova in 1996 with a final GPA of 99/110. In March 1996 he passed the European Union’s bar exam and enrolled in the Medical Society of Padova. Shortly after graduation, Dimitris Kontothanassis was named a resident in the University Hospital of Padova, reporting to the 1st surgery department of the hospital. In November 2001 he completed his residency requirement with distinction from the University of Padova, School of General Surgery, 1st dept. of Surgery and became a certified general surgeon. In September 2003 he was named a resident in the University of Verona reporting to the Department of Vascular Surgery. Dimitris Kontothanassis is fluent in Greek, Italian, and English, and also has good command of the French language.

Surgical experience
Since 1996, Dimitris Kontothanassis has participated in more than 500 operations as an assistant to a vascular surgeon and in more than 600 operations as an assistant to a general surgeon. He was the lead surgeon in more than 900 operations in the field of vascular surgery (carotid endarterectomies, varicose veins surgery, endovascular varicose veins surgery, aortic and venal aneurysm surgery) and in more than 120 operations in the field of general surgery.
Honors and Memberships
Dimitris Kontothanassis is a member of the following scientific societies:
- Italian Society of Vascular and Endovascular Surgery (SICVE).
- Italian Society for Vascular Pathology (S.I.A.PA.V.).
- Italian Society of Surgical Fisiopathology (S.I.FI.PA.C.).
- Italian Society for Ultrasound Diagnosis of Vascular Disease (G.I.U.V.).
- Triveneta Society of Surgery.

He was an honorary invitee to the world symposium on surgery which took place in Sendai-Tokyo, Japan, (13 April 2001) where he delivered a talk on techniques for carotid artery operations and received the award of best overseas young researcher.
He participated in the organization of the first national course of the Italian Endovenous Laser Working Group, which took place in Pisa, Italy (10-11 February 2005) and he organized the second course of the Italian Endovenous Laser Working Group (IEWG), which took place in Occhiobello (Rovigo), Italy (10-11 June 2005).

Teaching
Dimitris Kontothanassis has been teaching the laboratory portion of the surgery class at the University of Padova for the last five years. For the last two years, he has also participated in training younger residents in the use of ultrasound diagnostic equipment for the diagnosis of vascular disease. On January 2002 he received the title of Professor in Vascular Surgery at the school of General Surgery - 1st Dept. of Surgery, University of Padova, (Chairman - Prof. D.F. D’Amico).
Mini Invasive Treatment of Varicose Veins On Patients with Liver Cirrhosis Waiting for Orthotopic Liver Transplants (OLTx)

University of Padua, School of Medicine - Padua, Italy *
University of Verona, School of Medicine - Verona, Italy *
S. Mary’s Maddalen Hospital - Occhiobello - Rovigo - Italy *

Introduction
Endovenous Laser Treatment (ELVeS™) for varicose veins is a new promising procedure which may provide an alternative choice to those patients who are considered a high risk for traditional surgical treatment. We report on some of the first cases of patients with end-stage liver disease listed for liver transplant and undergoing ELVeS™ for long lasting venous insufficiency complicated by bleeding ulceration of the left inferior limb.

Methods
From September 2002 to May 2004 we treated 7 patients with liver cirrhosis waiting for liver transplant and also suffering from significant, chronic venous insufficiency of the inferior limbs (varicose great saphenous vein). Indication include pigmentation, eczema and distal ulceration which had been managed before the operation conservatively and with poor results. In one patient, limb ulceration healed only temporarily and partly due to her impaired coagulative status, bleeding occurred often. Five patients (3M /2F) had liver cirrhosis HCV correlated, 1 patient HBV correlated and 1 patient autoimmune correlated. Child Pugh classification was (A6 B7) in five patients, and B7 in two patients. The mean age of the patients was 54 years (range 43-63). Before starting the operation an echocolordoppler study was performed in order to exclude anatomical variants of the GSV, superficial thromboflebitis and deep vein thrombosis. All patients were treated under tumescent local anesthesia (60 ml of neutralized 0.25% mepivacaine hydrochloride) and ultrasonographic guidance with 810-nm diode laser energy, delivered percutaneously into the great saphenous vein (GSV) via a 600 µm fiber. The GSV was punctured at about 5 cm below the median condilus of the knee. Instrument settings were: power 12W, pulse duration 1 sec, interval between pulses 1 sec.

Results
Successful occlusion of the GSV was obtained with complete resolution of clinical symptoms soon after the operation. The patients experienced no adverse reactions after the treatment. At a 15 month mean follow-up they’re doing well and absence of flow in the treated veins was demonstrated by echocolor doppler study.

Conclusions
Endovenous Laser Treatment (ELVeS™) appears feasible and safe for the treatment of varicose veins even in high risk patients such as cirrhotic patients eligible for liver transplant.
Endovenous Laser Treatment of Varicose Veins: A Three Years Personal Experience

D. Kontothanassis *, A. Scuro **, A. Griso *, M. Mirandola *, C. Gavioli *, G. Camporese, *§
S. Scarpa *, L. Rampazzo *

University of Verona, School of Medicine - Verona, Italy *
University of Padua, School of Medicine - Padua, Italy *

ABSTRACT

Endovenous Laser Treatment of Varicose Veins: A Three Years Personal Experience

Introduction
Endovenous Laser Treatment (ELVeS™) for varicose veins is a new promising procedure. We report our findings based on three years of experience with patients in order to demonstrate the efficacy and safety of this technique.

Methods
From April 2001 to December 2004 256 varicose veins (236 great saphenous veins and 20 lesser saphenous veins), (184F /72M), were treated by the authors. The mean age of the patients was 60.42 years (29-83). The mean diameter of the treated veins was 7.2mm (4-14mm). We thoroughly informed patients about the procedure, operation risks, possibility of disease recurrence in case of recanalization of the vein, and the limited amount of available data on the long term efficacy of this technique, and the patients signed the written informed consent form. Before starting the operation an echocolordoppler study was performed in order to exclude anatomical variants of the GSV, superficial thromboflebitis and deep vein thrombosis. Under local anaesthesia (2 ml 1% Lidocaine) and ultrasonographic guidance, the GSV was punctured in 182 cases at about 5 cm below the median condilus of the knee, and in 54 case at about 5-10 cm above the Knee ; The LSV was punctured in 7 cases at the external malleolus and in 13 case at 10-15 cm above this. A J-guide wire was inserted into the GSV or LSV and positioned 1cm beyond the sapheno-femoral junction (SFJ) into the common femoral vein or in the sapheno-popliteal junction (SPJ) into the popliteal vein. A 5-F introducer sheath was positioned to cover the J-guide wire. The guide wire and the sheath were flushed and a 600 µm laser fiber (Biolitec°) was inserted at the end of the 5-F introducer sheath. The sheath was then withdrawn up to a site mark indicating the last 2 cm of the laser fibre. The correct position of the fibre tip was confirmed by direct visualization of the red transluminant light beam of the laser fibre through the skin. Tumescent local anesthesia (45 ml of 0.25% Mepivacaine hydrochloride, neutralized with sodium bicarbonate) was delivered along the perivenous space under sonographic guidance in order to avoid accidental puncture of the vein. In order to obtain a non-thrombotic occlusion of the vein, laser energy was delivered at 810 nm wavelength in 210 patients and at 980nm in 46 patients, using a 600 µm laser fibre. Instrument settings were: power 12W, pulse duration 1 sec, interval between pulses 1 sec.

Results
Immediate collapse of the GSV or LSV and absence of flow was assisted after the procedure and confirmed by echocolordoppler study. There was no damage of the femoral vein, no deep vein thrombosis, no skin burns, no paresthesias, no pain, no phlebitis and no other adverse reactions intraoperatively. Postoperative ecchymosis was minimal and observed in almost all patients. Two patients presented immediate recanalization after one week and one patient after 2 months (1,17%). Successful occlusion, defined as vein occlusion with absence of flow was noted in 233 GSV (98,8%), and 20 LSV (100%). Complete resolution of clinical symptoms became evident soon after the operation. The echocolordoppler study demonstrated absence of flow in the treated veins. At 7 days, two month, six month, 12 month and 18 month intervals the treated portions of the GSV were not visible on duplex imaging.

Conclusions
Endovenous Laser Treatment of the GSV seems to offer a safer alternative to traditional surgery (ligation and stripping). Early and mid term results of Endovenous Laser Treatment of incompetent greater and lesser saphenous veins have been promising. This minimally invasive technique appears to be safe, easy to perform, well tolerated, with lower rates of complication and the avoidance of general or epidural anaesthesia. Continued evaluation with a larger numbers of patients and longer-term follow-up are needed to further define the role of endovenous techniques as treatment alternatives in patients with chronic vein insufficiency.
Endovenous Laser Treatment of Varicose Veins: A Three Years Personal Experience

Dimitrios J. Kontothanassis M.D.
EXCLUSION CRITERIA
MORPHOLOGICAL
Excessive dilation

ANATOMICAL

IMMEDIATE RESULTS
100% VEIN OCCLUSION
0% intraoperative complications

RESULTS
Follow up 26 months (N=356 patients)
- Global Success 98.8%
- Occlusion GSV 98.8%
- Occlusion LSV 100%
- Thrombophlebitis 1.4%
- DVT 0%
- Skin Burns 0%
- Transient Paresthesia 2.6%
- Early Proximal Re-canalization 1.2%
- Late Proximal Re-canalization 0%
- Haematoic Sulfusion 20%
- Pain > 10 days 2.9%
Mini Invasive Treatment of Varicose Veins On Patients with Liver Cirrhosis Waiting for Orthotopic Liver Transplants (OLTx)

13. LATE RESULTS

14. GOOD INDICATION

15. BAD INDICATION

16. “Lessons Learned” after 3 years of experience

17. CONCLUSIONS

- Secure, efficient, minimally invasive technique
- Easy learning curve
- Unique and standardized method
- Reduced surgical and recuperative time
- Valuable alternative to traditional surgery especially for high risk patients
- High patient satisfaction
- Optimal results during follow up
- Good aesthetic results

In my experience “the gold standard” for the treatment of the lesser saphenous vein
Wolfgang Lahl

Thermometric investigations of the perivenous temperature during endovenous laser therapy of varicose veins
CURRICULUM VITAE

Wolfgang Lahl

PD Dr. Wolfgang Lahl
Department of vascular surgery, St. Willehad-Hospital Wilhelmshaven, Germany

- Priv-Doz Dr. Wolfgang Lahl.
- DOB 10.04.1942.
- Studied at Humboldt-University Berlin, Germany and completed one's degree as a medical specialist for surgery and vascular surgery.
- Since 1992 he is working as a chief physician in the department of vascular surgery at the St.-Willehad-Hospital Wilhelmshaven, Germany.
What influence does the thermal energy have during the endovenous laser treatment of varices on the perivenous tissue? Is a liquid protection necessary?

**Patients, material, methods**

In a study, 63 saphenous veins (great saphenous vein and/or small saphenous vein) were treated with the ELVeS™ endovenous laser system from biolitec AG (980nm diode laser). All the interventions took place in intubation anaesthesia; due to the fact that after the laser application a mini phlebectomy of the branch varicosities was usually carried out in ischaemia by means of Loevgist tourniquet (so called Hybrid procedure). The patients were divided into two subgroups. In the first group (30 saphenous veins, 22 x GSV, 8 x LSV) the perivenous tissue was separated from the saphenous vein through an injection with a physiological sodium chloride solution. The second group (33 saphenous veins, 27 x GSV, 6 x LSV) did not receive an injection of a physiological sodium chloride solution into the perivenous tissue. During the laser application the perivenous temperature was measured at the upper thigh 20 cm distal of the junction (Greater saphenous vein) or at the centre of the calf (Small saphenous vein) with a percutaneously inserted thermal element (Mon-a-therm Model 4070, Mallinckrodt Medical, Inc., St. Louis, MO 63042 USA). A laser power of 15W was initiated in a pulsed interval procedure (1.5sec laser pulse, 1.5sec interval with 3mm retraction of the probe). The aim of the examination was to measure the increase of the temperature of the perivenous tissue caused by the applied laser energy as well as to evaluate its effect on the local finding and the general condition of the patient.

**Results**

Due to the infiltration a decrease of the tissue temperature to 27.7°C, while without infiltration a tissue temperature of 31.3°C was measured. The infiltration caused an average temperature reduction of 3.4°C. In the group with a perivenous infiltration an average temperature rise of 5.5°C was measured under the laser effect, while in the group without infiltration 10.0°C was measured. The maximum temperature increase was 12.1°C (40.9°C tissue temperature) using a perivenous infiltration and 20.6°C (tissue temperature 49.8°C) without it. At the end of the laser effect 30.9°C was registered in the group with perivenous fluid and 35.9°C in the group without infiltration. Thermal skin damage was not observed. Isolated burning paraesthesia and indurations appeared in the Saphena region independent from the selected therapy form, whereas the former subsided after a couple of hours and the latter after a couple of days. A stronger disturbance of the subjective existential orientation could not be determined with any patient. A pain management was never necessary.

**Conclusion**

The study shows that in comparison with the temperatures at the distal end of the intravasal located laser fibre only a moderate perivenous heating occurs. This is tolerated without the application of a perivenous infiltration, since a change of the collagen is to be expected only at temperatures over 50°C and necrosis between 70°C and 100°C. This fact explains the low complication rate of the endovenous laser therapy. In contrast to the radio frequency method, where the heating of the tissue is caused by direct contact of the probe with the vein wall; the laser pulse produces gas bubbles through the absorption in blood, which transfer their thermal energy homogeneous to the blood and vascular wall. The authors have come to the conclusion that a general nidation of the vein in a perivenous fluid coating is not strictly required in order to avoid thermal damage of the perivenous tissue or post-operative complaints.
Thermometric investigations of the perivenous temperature during endovenous laser therapy of varicose veins

Lahl W, Jelonek M, Nagel Th
Department of vascular surgery, St. Willehad-Hospital Wilhelmshaven, Germany
Further observations:
- Clinical progress, the need of postoperative analgetics
- Local findings of the skin (photography)
- Coloured duplex sonography (venous diameter, reflux)
- Laboratory findings: WBC, CRP
- Time of return to the professional activity
  Follow-up: preop, 1. and 10. po. day, 8 weeks po., 6 months po.

Patients and methods
Division in two subgroups
ELT without perivenous tumescent fluid (TF)
- 27 GSV
- 8 LSV
ELT with perivenous tumescent fluid (TF)
- 0.5% NaCl
- 22 GSV
- 9 LSV

Venous Diameter

Laser distance | Number of impulses | Laser energy
--- | --- | ---
GS | LV | GS | LV

Patients and methods
- ELVeS™ Ceralas D 980 Diode laser (Bioitec AG, Bonn), 600µ Laser fiber
- All patients were operated under general anaesthesia
- Laser energy 15 W
- Pulse duration 1.5 s; 3 mm pullback
SLIDES

Thermometric investigations of the perivenous temperature during endovenous laser therapy of varicose veins

Patients and methods

- Temperature probe has been placed at the outer venous wall, aided by visualization of the aiming beam and duplex ultrasound.
- Temperature probe, attached to a temperature monitor, was used to monitor continuously the temperature 20 cm distal of the junction (GSV/LSV) during the laser procedure.
- Ending with minifemebectomy by blood emptying (Lotqvist-rollcuff) in order to avoid thrombophlebitis and to radical restoration.

13.

14.

15.

16.

Results

- Baseline temperature was measured at the outer venous wall before ELT
- without tumescent fluid 31.3°C / 88°F
- with tumescent fluid 27.7°C / 82°F
- the temperature reduction is 3.6°C / 38°F

17.

18.
Results

- 61 trunk veins occluded
- No thermic skin damage
- Seldom disturbance of sensibility (burns)
- Single few ecchymosis in course of GSV
- Very seldom pain therapy (Diclofenac)
- Returning to work in 1-7 days

Conclusion

- The Laser energy generates a significant thermal response of the pvenous space during the ELT without endangering the vitality of tissues.
- The pvenous temperature compared to the temperature at the tip of the laser fiber supports the theory of energy absorption by the hemoglobin and the regular surface damage of the vessel wall because of laser-induced steam bubble formation (Proebstle).
Felizitas Pannier-Fischer

Endovenous Laser-Treatment of the Small Saphenous Vein
CURRICULUM VITAE

Felizitas Pannier-Fischer

Dr. med. Felizitas Pannier-Fischer

Klinik und Poliklinik für Dermatologie der Rheinischen Friedrich-Wilhelm-Universität Bonn, Germany

Name          Dr. med. Felizitas Pannier-Fischer
Place of birth Bremen
Date of birth 9.10.1965
Nationality  German

Education
1971-1975  Grundschule der Clementinerinnen, Hürth
1982-1985  Ernst - Mach - Gymnasium, Hürth
1985-1986  Study of German and History, University of Cologne
1986-1989  Study of Medicine, University of Ulm
1989-1990  Study of Medicine, University of Bonn
1990-1993  Study of Medicine, University of Aachen
9.11.1993  Qualification as a physician

Profession
- 4/97-6/98 - German Medical Department of the Nato-Headquarters HQ Afcent, Brunssum, The Netherlands.
- 7/98-today - Dermatologische Klinik und Poliklinik der Rheinischen Friedrich-Wilhelms-Universität Bonn.
- 1999 - Posterprice of the European Chapter Meeting of the IUP in Bremen
- 2000 - Promotion as Dr. med. with the subject: Volume changes of the lower extremities in orthostasis.
- 2001 - Specialisation in Dermatology.
- 2002 - Specialisation in Phlebology.
- 2003 - Specialisation in Allergology.
- Since 1998 - Multiple scientific papers and publications in the field of phlebology.

Scientific projects
- Pathophysiology of CVI.
- Epidemiology of chronic venous diseases.
- Coordination of the Bonn Vein Study on epidemiology of chronic venous diseases.
- Compression-therapy.
- Foam sclerotherapy.
- Coordination and Initiation of Endovenous Laser treatment of varicose Veins.
- Endovenous Laser treatment of varicose veins.
Among the new aspects in the treatment of varicose veins, endovenous laser is one of the most promising. The treatment is based on the conversion of light into thermal energy through the absorption of laser-light by hemoglobin or water. Caused by the thermal energy there is a formation of steam bubbles in the treated vein causing a denaturation of tissue and a damage of the endothelial layer. As a secondary effect there is thrombotic occlusion and shrinkage of the vein. Most data was published concerning the treatment of the great saphenous vein.

To evaluate the endovenous laser in the treatment of saphenous veins the Bonn Study was performed as a prospective, open, not randomised study with a 980 nm laser. Pulsed pullback with 15 Watt and a pulstime of 1.5 seconds was used. All patients had compression therapy for three weeks and low molecular weight heparine prophylaxis for one week. After the intervention patients were controlled after 1 day, 8 days, 30 days, 180 days and 1 year.

89 patients, 27 male and 62 female, were included in the study. The mean age was 55 years, the mean weight 76 kg and mean height 171 cm. The body mass-index was 25,8 kg per m². 26 times a small saphenous vein was treated, 15 right and 11 left legs, mean age 57,4 years, mean BMI 24,2. 13 patients of this group where followed for at least 180 days.

The occlusion rate was 92,2%. Only in one patient with severe primary thrombocytopenia the treatment was not successful. The recovery time was very short and the patients returned to work after a mean of 0.6 days. We could show a significant improvement of quality of life using the CIVIQ score with an improvement in the summary score from 45.1 to 28.1. Only one patient showed paresthesia in the lateral ankle region which persisted after 180 days.

Endovenous laser-treatment is a very suitable method to treat small saphenous vein varicose veins. The energy (J/cm vein) needed to occlude the vein seems to be smaller than in great saphenous vein.

Although endovenous laser treatment of the saphenous veins is well established, most of the publications concern the great saphenous vein and a few literature is available about the small saphenous vein. The treatment of the small saphenous vein in general has some special aspects compared with the great saphenous vein. The anatomic situation in the junction has a wide anatomic variability and the recurrence rates after surgery seem to be higher in the small saphenous vein. For the radiofrequency treatment short saphenous vein is no indication.

Proebstle published in 2003 41 treated small saphenous veins with the 940 nm laser. Paresthesia occurred in 11% of the cases.

In our series of 26 treated small saphenous veins with the 980 nm laser the occlusion rate was high with 92.2 %. Only one patient with severe primary thromocytopenia was not successfully treated. The recovery time was very short and the patients returned to work after a mean of 0.6 days. We could show a significant improvement of quality of life using the CIVIQ score with an improvement in the summary score from 45.1 to 28.1. Only one patient showed paresthesia in the lateral ankle region which persisted after 180 days.

In our opinion endovenous laser treatment is a suitable method to treat small saphenous varicose veins. The occlusion rate is high and side effects are very rare.
Endovenous Laser-Treatment of the Small Saphenous Vein

Felizitas Pannier, E. Rabe
Klinik und Poliklinik für Dermatologie der Rheinischen Friedrich-Wilhelm-Universität Bonn, Germany
15th Word Congress

SLIDES
Endovenous Laser-Treatment of the Small Saphenous Vein


15. Endovenous Laser - paresthesia -

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Legs Treated</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proebstle</td>
<td>SSV</td>
<td>41</td>
<td>11.0</td>
</tr>
<tr>
<td>Bonn Study</td>
<td>SSV</td>
<td>23</td>
<td>7.7</td>
</tr>
</tbody>
</table>


- Only 4 patients did not return to work the next day
- The mean time for disability to work was 0.65 days
Rio, October 2nd to 7th, 2005 • Felizitas Pannier-Fischer

19.

Quality of life CIVIQ

all patients with endovenous laser, total score at T-1, T30 and T180 (n=49)

20.

Quality of life CIVIQ

GSV patients with endovenous laser, total score at T-1, T30 and T180 (n=10)

21.

Endovenous Laser
- superficial phlebitis -

<table>
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<th>Author</th>
<th>year</th>
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<th>%</th>
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<tr>
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<td>311</td>
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<tr>
<td>Min</td>
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<tr>
<td>GSV</td>
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<tr>
<td>SSV</td>
<td>2003</td>
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</tr>
<tr>
<td>Bonn Study</td>
<td>2003</td>
<td>107</td>
<td>0.0</td>
</tr>
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</table>

Comment: differentiation from induration or local pain?

22.

Endovenous Laser
- DVT rate -

<table>
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<tr>
<th></th>
<th>DVT</th>
<th>%</th>
<th>PE</th>
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<td>Navare 2001</td>
<td>0/40</td>
<td>0</td>
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<tr>
<td>Gerard 2002</td>
<td>0/20</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Chang 2002</td>
<td>0/252</td>
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<tr>
<td>Min 2003</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Proebstle 2003*</td>
<td>0/104</td>
<td>0</td>
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<tr>
<td>Proebstle 2003*</td>
<td>1/33</td>
<td>3.0</td>
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<tr>
<td>Perkowski 2004</td>
<td>0/203</td>
<td>0</td>
<td>0</td>
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<td>Timperman 2004</td>
<td>1/111</td>
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<td>Moers 2005</td>
<td>3/309</td>
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<tr>
<td>Bonn Study*</td>
<td>0/107</td>
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<td>0</td>
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</tbody>
</table>

* = Superior prophylaxis

23.

Bonn Study to evaluate endovenous laser in the treatment of saphenous veins, all patients

D-dimer – mean values (n=77) (Normal 0.3-5.0 µg/l)

24.

Bonn Study to evaluate endovenous laser in the treatment of saphenous veins, all patients

D-dimer – mean values (n=23) (Normal 0.3-5.0 µg/l)
Endovenous Laser-Treatment of the Small Saphenous Vein

**Bonn Study** to evaluate ELVeS™ in the treatment of saphenous veins

- Occlusion rate: 22/23 (95.7%)
- One patient with severe thrombocytopenia had no occlusion
- J/cm: 44 (SD 17)

**Summary**

- Endovenous Laser is a save alternative in the treatment of insufficient small saphenous veins
- Moderate pain and ecchymoses are the most frequent side effects
- Severe side effects are rare
- Paresthesia rate reaches 7%
- Occlusion rate is high with 96% in our patients

**Endovenous laser in the treatment of insufficient small saphenous vein**
BIBLIOGRAPHY

Endovenous Laser-Treatment of the Small Saphenous Vein

Felizitas Pannier, E. Rabe
Klinik und Poliklinik für Dermatologie der Rheinischen Friedrich-Wilhelm-Universität Bonn, Germany


Jorge Enrique Soracco

Treatment of Cavernous Haemangioma by endoluminal Laser application

Modern therapeutic alternative by endoluminal application of laser on the treatment of superficial venous incompetence of the lower limbs
Dr. Jorge Enrique Soracco
Hospital Militar Central Buenos Aires, Argentina

Dr. Jorge Enrique Soracco
Buenos Aires. República Argentina
54-011-4374-2549
jsoracco@fibertel.com.ar

- Médico cirujano.
- Especialista en cirugía vascular.
- Especialista en flebología y linfología (AMA).
- Especialista en cirugía vascular con orientación a flebología y linfología (CACCV).
- Médico de planta del Servicio de flebología y linfología del Hospital Militar Central.
Introduction
Virchow divided vascular abnormalities in: simple angiomas, cavernous angiomas and racemes angiomas. In 1982 Mulliken and Glowacki described a new classification based on biological, immuno-histochemical, radiological and haemodynamic differences.

So we can divide two big groups by: haemangioma and vascular malformations. The first ones are developed during childhood and grow by cellular proliferation and then involve spontaneously. The second are the product of alterations during vascular morpho-genesis and as a result are all congenital, could not manifest until youth or adulthood and are divided on: capillary, venous, arterial and lymphatic.

The objective of this communication is to present the treatment of vascular malformation under flow, which means pure malformations, using endoluminal laser under guided ultrasound.

From these vascular malformations the venous are the most frequent. They are formed by abnormal vessels of slow flow and walls formed by mature endothelium and deficient muscle; which lost its independency by communicating between them. They appear on areas with capillary which means any area of the body and could be varicosities or lobular.

They are frequent on skin and limb muscles, bone and liver depending on the symptoms and topography. The ones which are non accessible by direct exploration are diagnosed by the haemorrhage they can cause (e.g. on mucosa) or by compression (brain or spine). Only the skin ones are manifested from the beginning.

From the start they have a simple structure and when the surrounding vessels are transformed by atrophy of the wall, they get thinned and perforate becoming a “bad of blood” and receiving the name of cystic angioma, cyst haemangioma or blood cyst.

In all cases previous treatment needs to be assessed as well as the compromise of nervous system beginning by the treatment of the more symptomatic (haemorrhage, pain and tumour).

The indicated therapies have changed and radiotherapy, cryotherapy, electro coagulation and compression have been described with different results. The intra-lesion sclerosis gave good results on small and delimited lesions or with more sessions on larger lesions.

Surgery is a resource that has been frequent in our area with a large index of recurrence. More recently, with the advent of new technologies such as laser, a better knowledge of the light-tissue interactions and by studying favourable results on the treatment of varicose veins of the lower limbs, endoluminal application by eco-guided laser treatment of venous malformations has been used.

Materials and Method
We show the treatment of a male patient, 13-year-old, with a low flow vascular malformation and the left arm and hand. He had three previous surgeries with recurrence.

We used a 980nm diode laser (biolitec AG, Germany) under neurolepto-anaesthesia and with guided ecography.

For delivery of the energy a 400um fibre was used by inserting per-cutaneously applying powers between 8 and 12 watts in continuous mode according to the size of the lesion.

By ultrasound we observed the photo-thermal coagulation of the cavities. Elastic-compression was indicated for a period of 30 days.

Results
Up to date, after one year of this laser treatment, the patient presents no recurrence. Technically, the treatment is quick and well tolerated (no pain) with post-procedure haematomas but of fast resolution.

Conclusion
We believe this is a valid therapeutic alternative for this pathology that so far has results with very variable outcome. The procedure is simple, of low risk and with a better aesthetic resolution being also easy to re-treat if necessary.
ABSTRACT

Modern therapeutic alternative by endoluminal application of laser on the treatment of superficial venous incompetence of the lower limbs

Dr. Soracco Jorge E., Dr. López D’ambola Jorge
Hospital Militar Central Buenos Aires, Argentina

Introduction

The universally accepted techniques for the treatment of superficial venous incompetence of lower limbs are: sclerotherapy, ambulatory phlebotomies and saphenous vein stripping with sapheno-femoral ligation.

On the constant search for less invasive treatments to solve this pathology other techniques like eco-guided sclerotherapy, mono-polar electro coagulation, cryo-therapy and bipolar radiofrequency have been developed.

Thanks to a better understanding of light-tissue interaction and the advances on laser technology, back in 1998 a new endoluminal laser treatment for saphenous incompetence and its branches was introduced in Spain. We started applying this method by the end of 1998 publishing our first data by April and September 2000.

The objective of this presentation is to communicate our results on the treatment of superficial venous incompetence of lower limbs, internal saphenous systems and its branches by laser photo-thermal obliteration (“ELVeS”) of patients with sapheno-femoral and/or sapheno-popliteal incompetence diagnosed clinically and by eco-Doppler. We surgically ligated the cross and its branches treating the incompetence by laser.

Materials & Methods

We used a 15 watts diode laser of 980nm of wavelength (biolitec AG, Germany) and quartz flexible fibre optics from 220 to 600 microns of diameter delivering powers between 3 and 14 watts on continuous mode.

The whole incompetent length of vessel was treated (from distal to proximal on veins with valve incompetence) by inserting the fibre devices through an 18g needle. Dilated collaterals were treated using the same approach by per-cutaneous insertion adjusting power to the diameters and conditions.

On our private practice we treated 118 patients between May 2004 and May 2005, of which 78 were female and 40 male with an age range from 23 to 72 with a total of 198 internal saphenous veins and 62 external saphenous veins. On our previous communications, we worked with an 810nm laser but we found advantaged with the later wavelength being 980nm more selectively absorbed by the target and less power required for a successful application. Furthermore, the unit we are using presently allows the use of 220um fibres to treat smaller diameters of veins with an easier access.

Results

We consider as collateral effects the following: haematoma on the needle insertion site and sometime on portions of the length treated. Fibrosis can also remain for up to 6 months and transitory hypo-aesthesia of the short saphenous vein as a result of thermal damage of the saphenous nerve. Some hyper-pigmentation on patients with skins prone to this problem but with spontaneous resolution.

Conclusion

The endoluminal laser treatment of varicose veins is a valid therapeutic alternative to the conventional treatments and we found advantages on the results by using a 980nm laser. The post-operative time is reduced significantly with less pain and less haematomas, better aesthetic result and a faster return to normal activities. The rate of occlusions on the presented data is 98.35% so far which stimulates the continuity of development on this exciting method.
Treatment of Cavernous Haemangioma by endoluminal Laser application

1. Pre-treatment where scar from previous surgery and recurrence can be observed.

2. Post-treatment @ 24 hrs: Significant reduction of the malformation and improvement of the scar with smaller size of the arm and index.

3. Pre-treatment malformation.

4. Post-treatment @ 24 hrs.
Modern therapeutic alternative by endoluminal application of laser on the treatment of superficial venous incompetence of the lower limbs

Dr. Soracco Jorge E., Dr. López D’ambola Jorge
Hospital Militar Central Buenos Aires, Argentina

1. Insertion of the fibre / introduction devices.

2. Surgical resection of the cross and ligation with later fibre visualization.

3. The laser emission (980nm) is captured by the camera while the fibre is withdrawn during the laser application.
B I B L I O G R A P H Y

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Modern therapeutic alternative by endoluminal application of laser on the treatment of superficial venous incompetence of the lower limbs

Dr. Soracco Jorge E., Dr. López D’ambola Jorge
Hospital Militar Central Buenos Aires, Argentina


Endovenous laser treatment (ELVeS™) in saphenous vein insufficiency.
Preliminary study.
Carlo Spartera

Prof. Carlo Spartera
Department of Vascular Surgery, University of L’Aquila (Italy)

Born in Rome on 8th March, 1944, Prof. Carlo Spartera studied medicine at the University of Rome, graduating with honours in 1968. Specialising in Vascular Surgery, General Surgery and Urology, he practised medicine first at the School of Prof. Stefanini and then of Prof. Fiorani. Professor of Band II Vascular Surgery, at the La Sapienza University of Rome from 1982 to 1986. He was appointed Professor of Band II Vascular Surgery, at the University of L’Aquila in 1986. Since 1987 he has been Permanent University Professor of Band I Vascular Surgery, at the Faculty of Medicine and Surgery of the University of L’Aquila. Director of the Department of Vascular Surgery at the S. Salvatore Public Hospital, with an agreement made with U.L.S.S. No. 6 of L’Aquila (since 1988). Director of the School of Specialisation in Vascular Surgery of the Faculty of Medicine and Surgery at the University of L’Aquila (since 1989). Chairman of the Doctors’ Council of the Faculty of Medicine and Surgery at L’Aquila (1990-1998). Director of the Department of Surgical Sciences at the University of L’Aquila (since 1998) Vice-chairman of the Association of Band I Vascular Surgeons (since 1998). Representative of the Department Directors on the Academic Senate of the University of L’Aquila (since 2003).

He was a member of the Board of Management of the Italian Society of Vascular and Endovascular Surgery (SICVE) from 1998 to 2002. Italian representative on the Board of Management of the European Society for Vascular Surgery (ESVS) from 2000 to 2003. Italian representative of the International Association of Vascular Surgery (AIVS) from 1994 to date. He is currently part of international research programmes in association with leading scientific centres, taking part in several national and international scientific trials.

He is a member of the leading Italian and foreign scientific societies of vascular surgery.

Prof. Carlo Spartera’s surgical experience consists of over 6,000 operations in the sector of surgery on arteries, such as carotid arteries, abdominal and peripheral aorta aneurysms, with both technical and endovascular techniques, and in venous diseases, among which is laser treatment of varicose veins of the legs (ELVeS™). He was among the first Italian surgeons to perform operations on carotid arteries under local anaesthetic, providing a major contribution to improvement of the results in the difficult field of prevention of cerebral infarction.
Aim
The aim of this study is to verify the efficacy of this new method of treatment for chronic venous insufficiency.

Materials and methods
From 1/09/2002 to 30/09/2004 we have treated 150 patients with internal saphenous vein insufficiency with ELVeS™ treatment. The laser devise used has a diode source with energy emission to 810 nm. We performed the procedure in operative room in all cases. In the cases of percutaneous insertion, we used the ecodoppler intraoperative evaluation. The ecodoppler control was performed in all cases to test the endoluminal and sapheno-femoral cross right position. This is also confirmed by skin transillumination. General anaesthesia was used only in firstly 7 (4.6%) patients; peridural anaesthesia was performed in 38 (25.4%) patients while loco-regional anaesthesia in 105 (70%). In all cases in whom it was necessary, we performed flebectomies with Muller technique.

Results
In firstly two (6%) cases we observed an uncompleted but asymptomatic saphenous vein obliteration due to an incorrect technique. In 138 (92%) there was a completed saphenous vein obliteration at one month ecocolor doppler control and the ecocolor doppler vein identification was very difficult at 4 month follow-up. The firstly 21 (14%) patients have been submitted to six months ecocolor doppler control with completed obliteration of treated vein in all cases. At 12 months follow-up we have controlled 90 patients with a complete vein obliteration in 87 patients with symptoms free in 90 patients. At 24 months follow-up we have controlled 40 patients with 37 complete vein obliteration.

Conclusions
The modern surgery has the necessity to become the most “miniinvaded” as possible. The laser treatment, in our opinion and on the ground of literature data, may be the real reply to traditional surgery in chronic venous insufficiency because avoid the skin cuts, and their possible complications, with optimal early and late surgical results.

ABSTRACT
Endovenous laser treatment (ELVeS™) in saphenous vein insufficiency. Preliminary study.

Spartera C., Mastromarino A., Cucciolillo L., Petrassi C., Ventura M.
Department of Vascular Surgery, University of L’Aquila (Italy)

Rio, October 2nd to 7th, 2005 • Carlo Spartera
Endovenous laser treatment (ELVeS™) in saphenous vein insufficiency. Preliminary study.

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7. ELVeS® Procedure
   Percutaneous access
   Transillumination
   Careful preoperatively duplex vein mapping

8. ELVeS® Procedure
   Antitrendelenburg position

9. ELVeS® Procedure
   Indications
   Saphenofemoral and sapheno-popliteal pathologic reflux
   Vein diameter 8-12 mm
   No previous sclerotherapy of saphenous vein

10. Indications
    Saphenofemoral and sapheno-popliteal pathologic reflux
    Vein diameter 8-12 mm
    No previous sclerotherapy of saphenous vein

11. Inclusion criteria
   Patients with primary greater or external saphenous vein insufficiency
   Anatomical criteria:
   Vein diameter in supine position > 3 mm < 10 mm
   Vein distance from the ankle > 4 cm
   Knee with varicose veins extending above the knee
   No big collateral or perforating veins on saphenous course

12. Technical criteria
   Necessity of randomized trial
   *personal experience!
Endovenous laser treatment (ELVeS™) in saphenous vein insufficiency.
Preliminary study.
19. ELVeS™ Follow-up results

20. ELVeS™

Advantages

- Less surgical scars (groin)
- Less complications (haematoma, nerve injury)
- Best aesthetic results

Disadvantages

- Possible no vein obliteration
- Young technique (short follow-up)
- No randomized trial

21. ELVeS™

22. ELVeS™

ELVeS™ after two years experience, has been shown as a good alternative technique for treatment of various saphenous vein. It can use, in selective patients, a practicable therapeutic road, even if there are still some obstacles.
BIBLIOGRAPHY

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Department of Vascular Surgery, University of L’Aquila (Italy)


Giorgio Spreafico

How and why the endovenous laser works: histopathological observations on the great saphenous vein treated with a 980 nm laser - ELVeS™ technique

How and why the endovenous laser works: ultrasound and MRI imaging of veins treated with a 980 nm laser - ELVeS™ technique

Treatment of a large cockett’s perforating vein with a 980 nm laser - ELVeS™ technique in a patient with an open recurrent ulcer

Treatment of venous ulcers with a 980 nm laser - ELVeS™ and WHELL™ techniques
CURRICULUM VITAE

Giorgio Spreafico

Dott. Giorgio Spreafico
Dept. of Day Surgery, University-Hospital of Padova, Italy

Born in Reggio Emilia on 13/09/1949; Graduated in Medicine and Surgery in 1974 at the University of Padua.
Specialised in General Surgery in 1979 at the University of Padua; pass with honours in General Surgery in 1983; specialised in Vascular Surgery in 1984 at the University of Milan; specialised in Chest-Lung Surgery in 1989 at the University of Padua.

Intern student at the Special Surgical Pathology Institute at the University of Padua from 1972 to 1974; University Medical Intern with health-care assignments at the Special Surgical Pathology Institute from 1976 to 1979 and at the III General Surgical Medicine Institute from 1979 to 1982.
Head Assistant at the Department of Special Surgical Pathology and Clinical Teaching from 1975 to 1979; Medical Instructor for teaching Special Surgical Pathology and Clinical Teaching for the academic years from 1974 to 1978.
First Aid Service Assistant of the Dolo Hospital from 1975 to 1983.
Assistant of the General Surgery Division of the Dolo Hospital from 1983 to 1986; Joint Aid of the Division of General Surgery at the Dolo Hospital from 1986 to 1993. Associate Doctor of the 4th Institute of Surgical Medicine from 1994 to date.
Holder of free annual professional contract with the Padua Hospital Trust from 2000 to date.
Author or approximately 200 publications and abstracts of reports given at national and international Conferences.
How and why the endovenous laser works: histopathological observations on the great saphenous vein treated with a 980 nm laser - ELVeS™ technique

G. Spreafico*, A. Cecchetto**, R. De Caro***, V. Macchi***, A. Piccioli*, U. Baccaglini*
* Dept. of Day Surgery, University-Hospital of Padova, Italy
** Dept. of Pathology, University of Padova, Italy
*** Dept. of Anatomy, University of Padova, Italy

Purpose
In order to better understand the mechanism of the endovenous laser, 5 patients who had given their informed consent underwent, first endovenous laser treatment with the ELVeS™ technique using a 980 nm laser and, then, in the same surgical session, removal of the great saphenous vein trunk using an exovenous stripping technique. About 30 minutes passed between the endovenous laser treatment and stripping. The stripped trunk underwent histological examination. Samples were stained with H and E; Azan Mallory; Weigert-VanGieson.

Results
The poster illustrates several histopathological patterns of the effect of the laser on the vein wall. Specifically: contact of the optical fibre with the wall of the vein, the focal oedema of the media, modification of the intercellular cement, loss of the endothelium, separation and disruption of the hyperplasia of the intima, delamination of the media, alteration of the collagen, modifications of the cell nuclei of the media and the heat-induced thrombus.

Conclusions
It is important to try and get a better understanding of the effect of the intravenous laser on the vein, to identify some histological pictures of thermal damage to the vein; and to use this information for possible improvements of the intravenous laser technique.

To conclude
The effect caused by the 980 nm endovenous laser - ELVeS™ technique is extensive and in-depth damage to the vein wall, which triggers the process of sclerosing of the wall itself. The pathological lesion is not limited to the intima, which differentiates endovenous laser treatment from sclerotherapy. Demonstration of the denaturation of the collagen of the media is proof of in-depth penetration of the heat into the vein wall and can explain the reduction of its diameter, as observed in the post-operative ultrasound, through the mechanism of shrinkage of the collagen.
ABSTRACT
How and why the endovenous laser works: ultrasound and MRI imaging of veins treated with a 980 nm laser - ELVeS™ technique

G. Spreafico*, A. Gongolo**, I. Shariat Razavi***, L. Kabnick****, U. Baccaglini*

* Dept. of Day Surgery, University-Hospital of Padova, Italy
** Dept. of Radiology, Hospital of Dolo, Italy
*** MRI Consultant, Hospital of Dolo, Italy
**** Veins Institute, New Jersey, USA

Purpose
To understand the effect of the 980 nm laser - ELVeS™ technique - on vein wall and to evaluate evolution of the treated vein in time.

Materials and methods
Top-of-the-range echocolordoppler equipment (Siemens Elegra with Sie-Scape panoramic imaging and multifrequency linear array 5-13 MHz and Esaote Technos with multifrequency array 5-10 MHz) and MRI (Philips Intera Omni 1 T with dedicated synergy coil, using T1 weighted spin-echo images and T2 weighted turbo spin-echo images) were used. The treated vein was examined from the junction ( or from the uppermost point treated) as far as the point of entry of the optical fibre. 150 patients were examined with the echocolordoppler, 10 patients by MRI and 8 using both methods, in a follow-up period comprised between 48 hours and 24 months after treatment. 75 patients were examined on several occasions at various stages of the follow-up period.

Results
Several patterns of the saphenous trunk, of the junction and of the thrombus examined using US and RMI techniques, will be described and several hypotheses for interpreting the images will be discussed.

Conclusion
Top-of-the-range echocolordoppler and MRI can open a window enabling the results of the endovenous laser technique to be “seen” in greater detail, so as to understand its mechanism better and optimise the intervention.

Conclusions
The use of high-band ultrasound equipment and NMR makes it possible to obtain detailed information on the effect of the intravenous laser on the blood, on the vein wall and on the perivenous tissue.

At the level of the femoral saphenous vein junction, the laser treatment produces an anatomical and haemodynamic result, that can be classed into three types, I-II and III.

The classification of the result according to these parameters should make it possible to monitor the progress over time of the various types of result and, if necessary, adapt the laser technique in order to obtain the desired result.

At the level of the trunk, various aspects are seen both by the endoluminal thrombus and the vein wall. In this case, also, identification of some patterns should help choose the best technique for performance with the intravenous laser (for example: continuous versus pulsed; optimum Joules dosage) and permit X-ray images to be connected to clinical results.
In the treatment of venous ulcers, stopping reflux from incompetent perforating veins can contribute towards lowering venous hypertension and therefore towards accelerating healing of the ulcers and lowering the rate of recurrence.

The poster presents the case of a 39 year-old man who had already undergone removal of the great saphenous vein in the past, suffering from an internal malleolar ulcer recurring for the fifth time (CEAP: C6s Ep Ap18 Pr) and presenting a large (14 mm) refluxing Cockett’s perforating vein near to the ulcer.

The perforating vein was occluded using the ELVeS™ endovenous laser technique with a 980 nm laser and a 360 micron optical fibre. The ELVeS™ technique is very simple and consists of: ultrasound guided puncture of the perforating vein, introducing the optical fibre through the needle, checking its position with ultrasound, local anaesthesia under ultrasound guide and firing of the laser.

The patient was treated as an out-patient under purely local anaesthesia and was able to resume his personal activities and job immediately. The echocolordoppler examination, 48 hours later, showed that the perforating vein was occluded and the posterior tibial vein, from which perforator originated, was open and competent. 20 days after treatment of the perforating vein the ulcer had healed. In the meantime, the patient complained of no particular problems and was able to continue his physically demanding job.

To conclude, endovenous laser treatment can help to accelerate healing of the ulcer and to lower the rate of recurrence. By comparison with other available techniques for treating perforating veins, it is definitely less invasive and less expensive than surgery (whether open Linton, or endoscopic, SEPS, procedure) and more effective than sclerotherapy, which in our experience does not lead to particularly good results with direct and large-diameter perforating veins.

**Conclusions**

The intravenous laser (ELVeS™ technique) can be a useful and effective instrument for the treatment of forms of severe chronic venous insufficiency, such as the venous ulcer (C6), for example. For this condition, the intravenous laser makes it possible to obtain thermoablation of saphenous trunk - collateral and perforating veins. This case shows treatment in the outpatients’ department of a large Cockett perforating vein (14 mm caliber), the cause of a repeatedly relapsing venous ulcer.

The ELVeS™ technique is simple, non-aggressive, effective and can be carried out in the outpatients’ department.

In this case, the intravenous laser seemed to us the best technique compared to surgery (more aggressive and expensive) and sclerotherapy (less effective).
ABSTRACT

Treatment of venous ulcers with a 980 nm laser – ELVeS™ and WHELL™ techniques

G. Spreafico*, JL. Gérard**, G. Magi***, E. Giraldi*, U. Baccaglini*

* Dept. of Day Surgery, University-Hospital of Padova, Italy
** Hopital Henri Mondor, Paris, France
*** Casa di Cura San Giuseppe, Arezzo, Italy

Purpose
To evaluate the possibilities, the results and the methodologies for using the 980 nm laser with the ELVeS™ and WHELL™ techniques for local and aetiological treatment of venous ulcers.

Materials and methods
For local treatment the 980 nm laser was used via the transdermal route (WHELL's technique) for debridement and biostimulation of the ulcer. For aetiological treatment, the 980 nm laser was used via the endovenous route (ELVeS™ technique) to block reflux in the saphenous veins, in the perforating veins and in the collateral feeding veins of the ulcer. 55 patients were treated in the period September 2001-March 2005, 28 male and 27 female, age ranging from 39 to 93 (mean age 70).

25 patients had open ulcers and 30 healed ulcers. 55 patients underwent ELVeS™ treatment in order to occlude the great saphenous vein (38), the short saphenous vein (12), the perforating veins (4) and the feeding veins (10). In 9 patients more than one segment of vein was treated in the same session. 5 patients underwent local WHELL™ treatment, in 4 of whom as the only treatment and in 1 associated with endovenous treatment. Of the 25 open ulcers, 1 ulcer failed to heal. 1 patient had recanalization of the treated vein. No major complications occurred.

Conclusion
The 980 nm laser has proved itself as a simple technique, both for transdermal (WHELL™ technique) and endovenous treatment (ELVeS™ technique) for out-patients. It can be carried out and is accepted also by elderly patients. The results are excellent in terms both of healing of the ulcer and of occlusion of the treated segments of the saphenous vein, with a very low rate of complications.

Conclusions
The ELVeS™ technique is a procedure already widely used in the treatment of cases of saphenous reflux, with excellent results in terms of efficacy and safety.

The ELVeS™ technique can be used in patients with ulcer, to treat the reflux in the saphenous trunks, and in the perforating and collateral veins (feeding veins).

The ELVeS™ technique can be performed both in Day Surgery and in the outpatients’ department; under local anaesthetic; with low morbidity (no major complication) and minor complications that are small and infrequent. It is well-tolerated by the patients, who do not see it as a surgical operation, and can be performed when there is an open ulcer, in obese patients, in anticoagulant patients and in the elderly.

The WHELL™ technique is a therapeutic approach under assessment, to obtain the debridement and biostimulation of the ulcer and to control the pain. In this technique the very interesting features are its easy use, the absence of side effects, and the low unit cost.
How and why the endovenous laser works: histopathological observations on the great saphenous vein treated with a 980 nm laser - ELVeS™ technique

G. Spreafico*, A. Cecchetto**, R. De Caro***, V. Macchi***, A. Piccioli*, U. Baccaglini*

* Dept. of Day Surgery, University-Hospital of Padova, Italy
** Dept. of Pathology, University of Padova, Italy
*** Dept. of Anatomy, University of Padova, Italy
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* Dept. of Day Surgery, University-Hospital of Padova, Italy
** Dept. of Radiology, Hospital of Dolo, Italy
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G. Spreafico, E. Giraldi, U. Baccaglini
Dept. of Day Surgery, University-Hospital of Padova, Italy
Treatment of venous ulcers with a 980 nm laser - ELVeS™ and WHELL™ techniques

G. Spreafico*, J.L. Gérard**, G. Magi***, E. Giraldi*, U. Baccaglini*

* Dept. of Day Surgery, University-Hospital of Padova, Italy
** Hopital Henri Mondor, Paris, France
*** Casa di Cura San Giuseppe, Arezzo, Italy

1. Why use the laser at 980 nm in curing venous ulcer?
   - To cure the haemodynamic disorder with ELVeS™ intravenous technique
   - To cure the ulcer with WHELL™ transdermic technique

2. ELVeS™ Technique
   - Laser with diodes at 980 nm (Ceralas 15D)
   - ELVeS™ kit for intravascular procedure
   - ELVeS™ step-by-step procedure
   - Thermoablation of reflux vein segments (saphenous trunks – perforating veins – collateral veins)

3. WHELL™ Technique
   - Laser with diodes at 980 (Ceralas 15D)
   - Bundle with 7 mm spot
   - Reduction of the ulcer’s bacterial load
   - Debridement
   - Biostimulation
   - Pain control
**ELVES™ MULTICENTRE CASE HISTORY**

G. Magi – Italy – Vascular Surgeon

H. Gerard – France – Medical phlebologist
Very elderly patients – Operation performed in the outpatients’ department

G. Spreafico – U. Baccaglini – E. Giraldi – Italy
General and Vascular Surgeons
Obese and difficult patients – Operation performed in Day Surgery

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**ELVES™ TECHNIQUE**

**CASE HISTORY**

- Period: September 2001 – March 2005
- 55 Patients – Average age 70 years
- 28 men – 27 women
- C5 : C6
- Treated vein
  - Large saphenous vein 38
  - Small saphenous vein 12
  - Perforating vein 4
  - Feeling vein 10

---

**RESULTS**

- 64 veins treated
- 63 occluded
- 1 rechannelled
- (follow up from 1 to 36 months)
- 25 C5
- 24 scarred
- 1 non-scarred
- (at max 12 months)
- 54 C5 + C6 scarred
- 0 relapsed
- Complications
  - DVT 0
  - Paresthesia 5
  - Skin burns 0

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**CONCLUSIONS**

Therapeutic approach
- Effective
- Safe
- Performed in outpatients’ department
- Mini-invasive
- With moderate rates of complications
- Tolerated by the patients
- Particularly suited to difficult patients

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**SINGLE-CENTRE CASE HISTORY**

- Preliminary experience
- Technique:
  - SPOT: 2-3 cm in diameter
  - Continuous 7 watt, if need
  - Tolerated: around 100 J CM
- End point: pain assessment
  - VAS scale and use of analgesics
  - Appearance of the ulcer
  - Measurement of the ulcer

---

**CONCLUSIONS**

Technique under assessment but
- Simple
- Painless
- Inexpensive
- Supports other techniques of debridement and pain control
- Worth studying for the aspect of biostimulation