vascular professional

news & articles for phlebologists

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Considering the Walls

UGLA – Ultrasound Guided Laser Ablation A field report about a self-developed high-level technique for EndoVenous Laser Ablation (EVLA)

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It has been almost two decades since the laser started entering the world of varicose vein surgery. Ever since the early days, when the technology was still in the bud, we had to work with something that was unknown, not unlike exploring the unknown cosmos. We knew the anatomy, we knew what had to be done, but now the approach was no longer from the outside, external, but from the inside. Now we had to adopt this new way of reasoning and thinking.

With the internal approach our eyes were no longer the ultimate tool, we needed a better insight. And this is where the ultrasound enters the stage. Thankfully, along with laser technology, ultrasound tech improved as well. And without it, I firmly believe, the EndoVenous Laser Ablation (EVLA) would not be what it is today – a world dominating method.

As with every novel and unexplored technology, we early adopters of EVLA, would often have discussions at congresses, professional meetings and even privately, to determine the best way to use the laser, but also the ultrasound. In the beginning, ultrasound was merely a tool to guide the laser. This had proven to be a gross understatement to what the ultrasound means to laser surgery.

I decided from the beginning to dedicate myself fully to this, at the time, future-like technology and have been doing nothing but EVLA ever since. Due to this, I accumulated a vast wealth of experience and little-by-little created protocols which now help me ensure that I provide every patient with the best possible outcome and guaranteed success. One of the protocols is dedicated to the use of ultrasound during the process of ablation itself. I have dubbed it UGLA.

UGLA is short for Ultrasound Guided Laser Ablation. It's a high-level technique that I use in my EVLA operations on a daily basis and that is a tool that helps me ensure that veins I operate on are definitely going to be permanently obliterated. If applied correctly, the ultrasound can not only help guide the laser probe, but also help with monitoring ablation, improving vein-wall-to-probe contact, optimization and equivalent distribution of energy, avoiding probe carbonization and many other detrimental features.

Previously, it was thought that the amount of energy delivered to the vein wall should be related to the diameter of the vein seen while performing diagnostic ultrasound examination, but this kind of application of the laser has several downfalls. Firstly, it is not the lumen of the vein we are ablating, it is the wall, and the thickness of the wall is often NOT in correlation with the diameter. > fig. 1

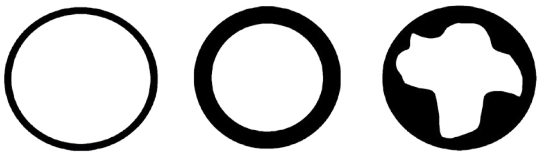

fig.1 > Differences in vein wall thickness

Of course, to ensure successful ablation the entire thickness of the wall needs to be ablated. Thus, relying on diameter rather than wall thickness will inevitably lead to recanalization of ablated veins and unwanted results.

Using UGLA, I can successfully monitor the ablation while it is happening and be certain that the entire wall had been ablated before continuing further. > fig. 2

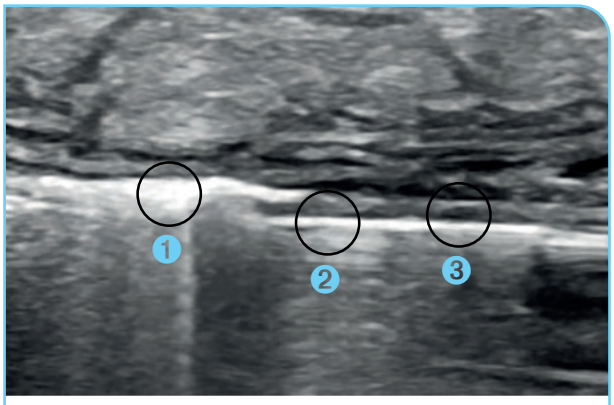

fig.2 > UGLA visualized
❶ Ablated wall ❷ Laser fiber ❸ IMT

This has another implication – not all parts of the vein have the same wall thickness! By continuous monitoring I can actively adjust the speed at which I pull back the laser. At thicker parts I would need to move slower, and at thinner, of course, more rapidly. Even if I, for any number of reasons, don't ablate the full thickness of the wall, I immediately notice this and am able to return to that segment to fully ablate it, once again ensuring a perfect result. Methods which calculate the speed of pullback according to vein diameter and preadjusted laser energy output are far less flexible as they can not react to changes in the wall intima.

Undoubtedly, there are many – post-thrombotic veins, aneurisms, dilations, branching, etc., and all are covered with this technique. My experience has been that the amount of energy needed for successful ablation equals 10J/cm for every 0.1mm of Intimo Medial Thickness (IMT). > fig. 3

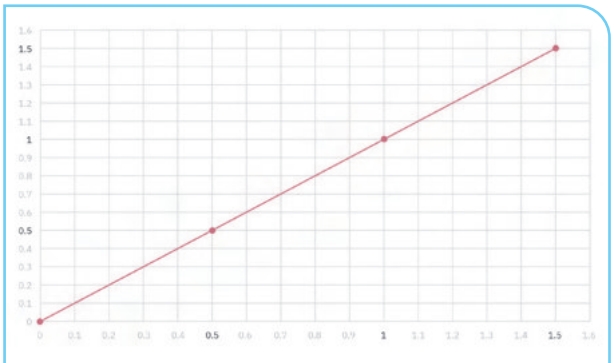

fig. 3 > IMT and energy output correlation

UGLA also implores using the ultrasound probe by putting pressure on the operated vein and in that way improving contact between the laser probe and the venous wall – implicating better and more successful ablation.

The post-thrombotic vein has been a stumbling block for many an operation. The deposits of old thrombotic masses and intraluminal septa can hinder the spreading of laser waves or, very specifically, cause laser probe carbonization. Both will undermine the efforts of the surgeon and must be avoided at all costs. Delivering more energy by slowing down pullback speed and ensuring the entire thickness of the wall, including the parts with old thrombotic masses, will solve the first problem. Furthermore, visualizing the process with UGLA easily helps me see when the tip of the laser has carbonized. If I act at this moment, I can easily clean the tip of the laser and return to the operation, but otherwise this process would render the laser fiber useless!

Personally, I believe that I would not be at the level I am today had I not developed this protocol. Formulating UGLA was certainly one of the bigger steps as a phlebologist, a devotee to laser vein operations. Colleagues have recently had a chance to see my presentations and my enthusiasm for the matter, as the results I have had are just amazing. Hopefully, I will be able to reach many developing, but also experienced colleagues around the globe.

Laser Crossectomia

On the laser side, my most notable improvement is called laser crossectomy. It is mostly self-explanatory, as it is well known that crossectomy is the evacuation of the terminal fragment of the great saphenous vein with ligation of the base of the deep vein. So, this is crossectomy, but done with a laser.

The importance of this technique stems from, not only the idea of performing a perfect procedure, but mainly from the goal of preventing the recurrence of varicose veins, also known as REVAS. The recurrence is one of the most painful topics for both patients and surgeons. Even though patients at my clinic know and are informed that the risk of REVAS is present, no matter how well the operation is performed, it is nevertheless disheartening to them to see new varicosities on the operated leg.

On the topic of REVAS, there are many scientific publications and reviews. Many of these publications conclude that REVAS most often originate from the stump of the saphenous vein, if crossectomy is not performed. The first centimeter from the SFJ of the great saphenous vein can have as many as ten tributaries! That is a very high number of possible weak points for venous insufficiency.

SFJ is the most complex and proximal point of the superficial venous system of the leg and also it's main crossroad. The tributaries that form the junction include the superficial iliac vein, superficial epigastric vein, then, from the pelvis, obturator vein and superficial and deep pudendal veins, followed by the anterior and medial accessory saphenous veins, which are often found inside a fascial fold, and finally a large number of submillimeter veins that drain the surrounding lymphatic nodes. What were previously thought to be neovascularizations are actually dilations of these small veins caused by increased pressure if a GSV stump is left.

First laser techniques and protocols indicated that the starting point of ablation should be 2cm away from the SFJ. The reason for this was obviously fear of deep vein thrombosis and, of course, pulmonary embolism. While the fear is well-founded, and we should always be wary of such complications, the biolitec ELVeS Radial fibers have proven to be very safe in this regard. Since the radial fiber shoots laser beams at 90 degrees, perpendicular to the laser, there is no fear of propagation into the deep vein, even if the ablation starts very proximally to the SFJ. With this technique not only do we prevent the stump from even appearing, we can also successfully remove stumps as short as 1cm and, in that way, help patients with recurrent varicose veins.

That is exactly what I decided to start doing. By placing the tip of the laser as close as 0.1mm away from the common femoral vein, I could perform a crossectomy with the laser and still not be worried about deep vein thrombosis.

The risk doesn't increase as the precision of today's laser is measured in microns. The equipment of choice is always the biolitec ELVeS Radial fiber. > fig. 4

fig. 4 > ELVeS Radial 2ring Fiber

This was a major breakthrough and since I started doing my operations this way, I never looked back. My team is happier, my patients are happier thanks to the fewer recurrences happening, and naturally, I am happier as well.

Laser crossectomy technique is performed by introducing the laser fiber into GSV and placing the laser tip as close as 0.1mm to the line of CFV. > fig. 5a, fig. 5b

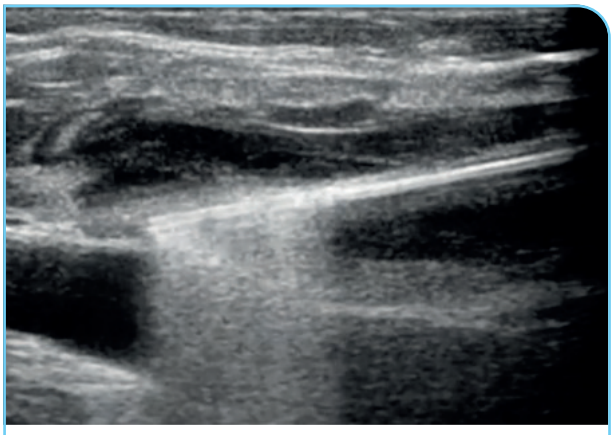

fig. 5a > Starting point of ablation of SFJ (ultrasound)

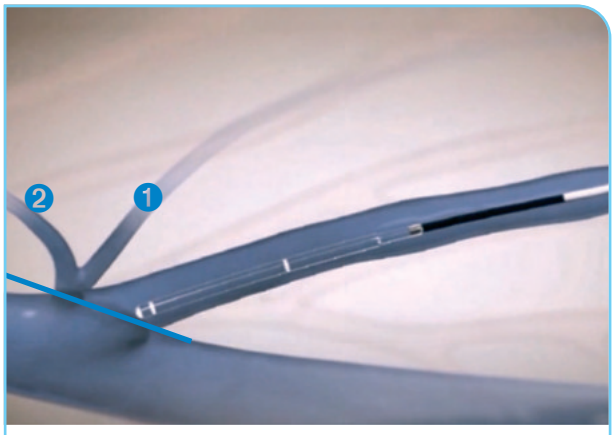

fig. 5b > Starting point of ablation of SFJ (illustration)
— SFJ border ❶ Anterior Acc. Vein ❷ Epigastric Vein

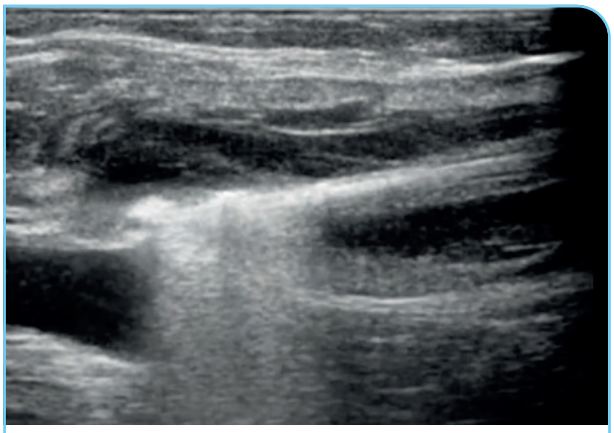

fig. 6a > ELVeS Radial 2ring fiber while laser crossectomy (ultrasound)

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fig. 6b > ELVeS Radial 2ring fiber while laser crossectomy (illustration)

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After the laser is placed, tumescent anesthesia is administered. If adequately administered according to sandwich principles, it allows excellent contact between edges of the junction and fiber tip. Also, it prevents surrounding tissue and small arterial vessels from damaging. After TA readjustment of the laser fiber is needed, the laser is fired and we monitor the ablation, we can proceed with the laser crossectomy. > fig. 6a, fig. 6b

The only possible negative outcome has proven to be E.H.I.T. and we regularly check for that during the next couple of check-ups happening soon after operation. Still, we found that even the occurrence of E.H.I.T. is well below 1% of all operations and actually never had anything above level 3, which in itself is an extremely rare occasion.

With the two techniques, UGLA and laser crossectomy, I improved my skills to a level where I can freely guarantee to my patients a successful treatment with several years of warranty for my work, without exceptions. Problems once deemed impossible for the laser are now a common task and easily solved. I believe many could prosper through my techniques and protocols. Me, and my colleagues have been providing educative workshops on these techniques in my clinic, but also in congresses around the world.

+++ MARKET SPOTLIGHTS +++

The Laser Hospital "LaClinica"

In Italy, the first clinic has opened where patients are treated exclusively with minimally invasive laser methods: In a multi-level building on 700 square meters in the north of Milan, 16 doctors are practicing between 8:00 a.m. and 8:00 p.m. in the medical fields of neurosurgery, gynecology, proctology, pain therapy, phlebology, ENT, urology, and gastroenterology.

The intention of "LaClinica" was to offer diagnosis and therapy at the highest medical and technical level using the latest and most innovative methods in an outpatient treatment setting. The vision was a day clinic that would allow patients to receive medical services without being pulled from their daily activities.

The first step in this process is the chance for patients to make their first contact with a doctor in a tele-consultation. Even before entering the clinic, symptoms are clarified, questions discussed, and further information obtained. Doctors book treatment rooms and operating theaters on schedule, ready for use, without the risk of delays, via slots.

Not least in the tense situation due to the Corona pandemic, "LaClinica" is making a valuable contribution to relieving the strain on the Italian healthcare system. By expanding the range of outpatient treatments and taking over non-urgent operations, impending postponements or even cancellations of planned operations can be compensated for. ■

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vascular professional "Center of Excellence 2022"

"In the 21st century, thanks to the cutting edge laser technology, precision is measured in microns, and phlebology is experiencing a renaissance. I'm thrilled to be given the opportunity to be on the forefront of the field."

Dr Petar Dragić and his clinics are a highly specialized establishment for the modern treatment of varicose veins and for vascular aesthetics. It consists of three clinics located in Belgrade, Novi Sad and Banja Luka and also the Europe Training Centre.

Dr Petar Dragić is a pioneer in laser vein surgery with over 15.000 laser interventions, representing one of the most extensive experiences and largest series of operations in the world. Every technique performed is state of the art, in order to achieve perfection in terms of safety, long-term results, recovery and, finally, aesthetic results. He has contributed to the development of phlebology and has educated doctors from around the world.

On a daily basis he excels in the performance of endovenous ablation, laser crossectomy (La cross) and ultrasound monitoring of ablation (UGLA).

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+++ MARKET SPOTLIGHTS +++

Fiber Optic Technology in Medicine

Since the US physicist and laser pioneer Elias Snitzer was the first to describe a cladding-pumped fiber amplifier in 1988, the development of medical laser fibers has become widespread and is now at a very high quality level with optical fiber technology. Laser light emitted by fiber optics has a high beam quality (over 85% of the light can be emitted), does not heat up at the fiber tip as much as in earlier days, and allows multiple simultaneous procedures (incision, excision, vaporization, hemostasis, and coagulation of soft tissue in contact or non-contact mode). Also, with fiber optic lasers, light delivery is possible in pulsed mode and also with continuous beam.

In addition to diagnostics, fiber optic lasers in medicine find their application primarily in treatment - both invasive and non-invasive. For surgical procedures - as compared to diagnostic and external applications - light transmissions with higher powers are necessary. For the removal of benign enlarged prostate tissue, high wattage combined with shorter wavelengths are required because high effectiveness and efficiency must be achieved directly at the fiber tip in contact mode. In the treatment of insufficient veins, on the other hand a higher absorption of the laser light in the water components of the blood within the vein is advantageous to avoid damage to the vein wall. In proctology, the combination of the 980nm and 1470nm wavelengths opens up the greatest opportunities for both preservation of surrounding tissue and organs and complete healing. In general, lower wattage with higher wavelengths enable avoidance of excessive carbonization at the fiber tip.

The offer on the market is large and varied, inviting you to choose the best and most suitable laser fibers for treatment. ■


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