# Veinlite™ Transilluminator: Examination Aid


**Introduction**

Who would have thought, say 20 years ago, that a specialized medical illumination device could play such an important role in the diagnosis and treatment of vein disorders? Examination of veins seems like a well established medical specialty whose efficacy is heavily dependent upon the skills and visual acuity of the practitioner. How many applications could there be for an illumination device tailored to the practical needs of these kinds of medical procedures?

A great many, in fact, and the number is growing.

A new device that uses fiberoptic technology to create a kind of virtual backlighting in a small area has proven extremely useful for enhancing the visibility of veins (such as reticular) which are often difficult to see. Further, the mechanical design of the device can be used to provide a partial fixation of a near-surface vein and cause it to bulge slightly, thereby making it easier to administer injections if needed. The **Veinlite**™ has played an extremely helpful role in many thousands of examinations of vein disorders and in monitoring the effects of treatment.

**Technology**

Transillumination, i.e. shining light through tissue, has been used for some years to aid visualization of superficial veins, but is very limited because of the variability of underlying tissue types and the presence of underlying bony structures. A newer method called side-transillumination overcomes these limitations by shining light into the skin at an angle from outside the area of interest. A circular array of angled fiber optic lights creates a conical volume of illumination that comes to a focus at a depth of roughly one cm, creating a virtual light source that improves the visibility of veins lying near the surface. For this to work most effectively, a tight seal is needed between the ring of lights and the skin, something difficult to achieve near bony areas such as knee or ankle. Some improvement is provided by use of a smaller size ring for these areas (two sizes are available).

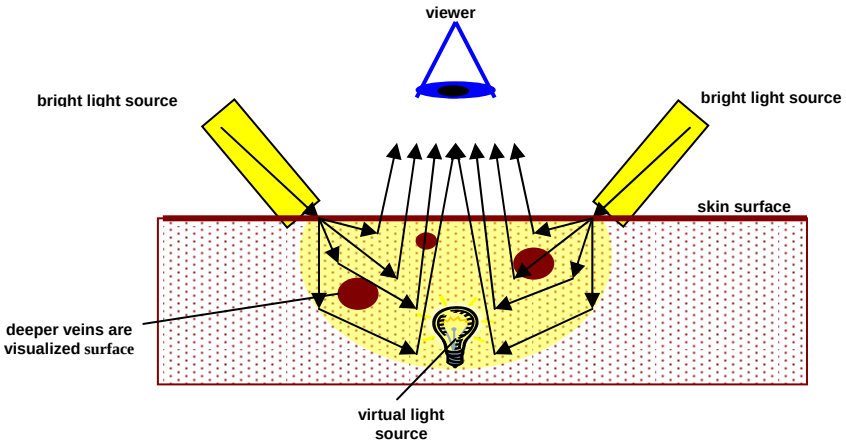


Figure 1: Schematic diagram of how “side-transillumination” works.

The diagram illustrates the underlying concepts of the Veinlite™ (developed by Dr. Nizar Mullani). Light from the many fiber optic sources converges at a focal point below the skin surface. This concentration of many beams partially overcomes the optical attenuation characteristic of tissue and provides the desired virtual backlighting.

**Medical Technical Details**

This device is packaged in a smooth plastic case, designed for patient comfort during medical usage. The rugged mechanical package (Figure 2) is designed for frequent use. It can be sterilized by standard chemical means. A future model is planned which will be compatible with an autoclave. The ring size most commonly used provides a conveniently sized viewing area, as well as sufficient space to allow injection into veins (Figure 3).

Figure 2: Ring illuminator and fiberoptic cable.

Figure 3: Usage to support injections.

## Potential Users of the Veinlite™

There is a growing community of medical workers who could use this device to simplify their work and improve patient care:

- Nurses and Technologists: When it is necessary to give injections or extract blood, this device could be used to simplify identification of the desired vein and keep it from "rolling" during the injection.

- Phlebotomists and others who treat serious vein disorders: This device aids in both diagnosis and treatment, as described by a practitioner (following section).

## Examples of Clinical Usage

Asad Riad Shamma, MD, provided this description of typical clinical applications.

## Patient Education

Patients rarely understand details of venous problems, especially the role of reticular veins. By transilluminating the skin, the practitioner can show how the feeder vein is the foundation of an overlying spider vein complex and therefore explain the rationale for treating the reticular veins. The ability to provide a brief tutorial for the patient simplifies the task of selecting an appropriate treatment plan. It is also comforting to the patient to be able to see and understand his medical problem directly.

## Key to Successful Sclerotherapy

After visualizing the vein to be treated, the practitioner presses lightly on the skin with the Veinlite ring and pulls it back, stretching the skin in the direction opposing the opening in the ring. This procedure is the key to successful sclerotherapy because it achieves two vital objectives:

- It stabilizes the vein and facilitates accurate entry of the needle into the vein that cannot now roll away from the needle.
- It tightens the overlying skin and permits an almost painless entry through the skin into the vein (Figure 3), something difficult to achieve if the skin is loose or redundant. This procedure is particularly useful in treatment of older patients with sagging skin, and for doing sclerotherapy on reticular breast veins.

## Additional Technical Points of the Procedure

After securing entry into the vein (confirmed by blood return), release some of the pressure originally applied to the skin by pressing on the ring. Then, using a 3cc luer lock syringe with 30 gauge needle and minimal force on the plunger, gently inject the sclerosing agent. As soon as the vein segment within the ring is seen to blanch, re-exert pressure on the skin by pressing on the Veinlite ring, keeping thumb firmly on the plunger for about 10 seconds. This retards the refilling of the vein with blood and allows the sclerosing agent to stay in contact with the intima for a longer time.

Normally the practitioner starts with the patient supine and works on the anterior limb from just above the ankle to the groin. The patient is asked to roll (one quarter turn) laterally, and the procedure is repeated on the outside of the limb. The patient then shifts to prone position so that the posterior limb can be treated. Finally, after the patient rolls another quarter turn, the procedure is completed on the inside of the limb.

A compression stocking is used after the treatment over a light, thigh-high liner that eases application of the stocking and keeps it clean.

In order to allow the Veinlite ring to slide easily over the skin the patient is requested not to put lotion on the legs on the day of treatment. As preparation for the examination, the skin is sprayed with 70% alcohol solution. The practitioner can clean the ring between patients by applying a 70% alcohol solution with lint free gauze.

**Another Application: Assisting in Mini-Phlebectomy.**

If one chooses to treat bulging varicosities by means of a mini-phlebectomy, it is necessary to mark the proposed puncture sites accurately on the skin. This is normally done with the patient standing, but when the patient lies down (as needed for the procedure), some of the markings become inaccurate. It is possible to use the Veinlite to mark the puncture sites with the patient already in the proper (reclining) position and with leg positioned exactly as it will be for the procedure (Figure 4), thus bypassing a common accuracy problem.

Figure 4: Identifying and marking injection sites, patient in correct position.

**Complications: Trapped Blood**

Occasionally blood becomes trapped in a treated vein, causing skin discoloration and pain for the patient. This blood can be evacuated with an 18 or 20 gauge needle, generally in a straightforward manner because the vein in this condition is usually hard and palpable. Use of the Veinlite makes this process quicker and more accurate.