

# Technology Validation

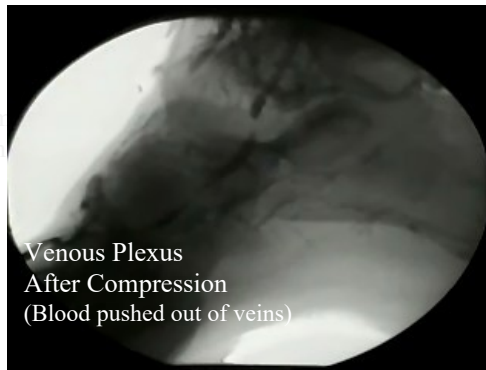
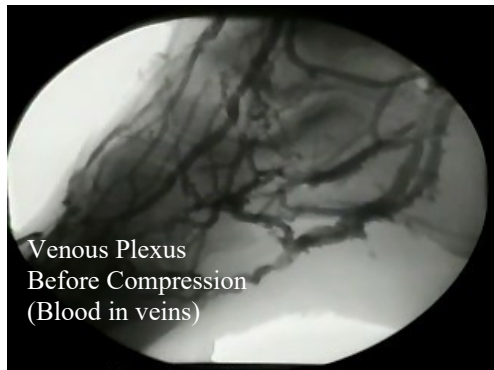
## Hydraulic Powered Anti-fatigue Insoles

### Fluid and dynamic pressure load relief from hydraulic dynamics of fluid filled insoles

The hydraulic dynamics of fluid filled insoles were validated a number of years ago according to the medical expertise available at the Laboratory for Functional Anatomy and Biomechanics, University of Copenhagen. The effects and benefits of the sensory and massaging effects was tested by the Center for Sensory-Motor Interaction, University of Aalborg Denmark.

**Hydraulic dynamic fluid filled shoe insoles convert a “static” foot support (shoe) into a “dynamic” foot support. This concept is quite contrary to traditional thinking that we should create and utilize custom measured and fitted insoles that reduce the ability of feet to move.**

One result of using a fluid (such as USP glycerin) in the insoles is a constantly changing pressure load on the bottom of the foot. That changing pressure load stimulates muscle activity and movement of the foot. The fluid in the insoles actually transfers the body’s weight which, in turn, activates the fluid layers pressure relieving quality. The fluid essentially disperses potentially damaging pressure concentrations over a large area beginning at the heel pad and ending near the ball of the foot. **It is body movement in connection with dynamic pressure load relief that is the basis of the orthopedic benefits derived from shoe insoles.**



**NOTE:**

Venous blood moves only in one direction. This radiology study confirms that when the plexus and the collateral veins of the foot are compressed the pump like action rapidly ejects the blood into the deep veins of the leg.

Another result is that the hydraulic effect of taking a step or rocking back and forth from heel to toe creates a “fluid compression wave” that has a positive impact on the pressure load on the sole of the foot as well on blood circulation in the feet and legs. This massaging wave creates pressure against the venous plexus as it moves along the sole of the foot between the heel and the forefoot. That wave action increases circulation as it acts to literally pump blood through the veins of the foot, ankle, knee and leg.

In Summary: The dynamics of the fluid in shoe insoles reduces the time and the intensity of pressure on vulnerable foot tissue. This dynamic hydraulic action occurs with each step we take and each time we change our posture. The fluid compression that occurs as the result of redistribution of fluid during walking begins acting to absorb heel shock after which the fluid “compression wave” moves forward to massage the bottom of the foot. You actually feel the full effects of **shock absorption, compressive massage** and **pressure redistribution** by rocking forward and backward shifting weight from heel to toe.

For many users the clinical result of using devices like shoe insoles is often **immediate pain relief** to the heel, knee, hip and back. The clinical impact of the pressure load relief achieved by the dynamic action of the fluid equates to a reduction of the time the venous system in the skin area under the sole of the foot is exposed to pressure loads. Pressure load relief has the greatest significance for people who stand without moving as the pressure load becomes static. The optimal relationship between fluid movement and relief of the pressure load on our feet is achieved by the amount of fluid in the insole along with the size, shape and location of different fluid channels that are integrated into the construction of shoe insoles.