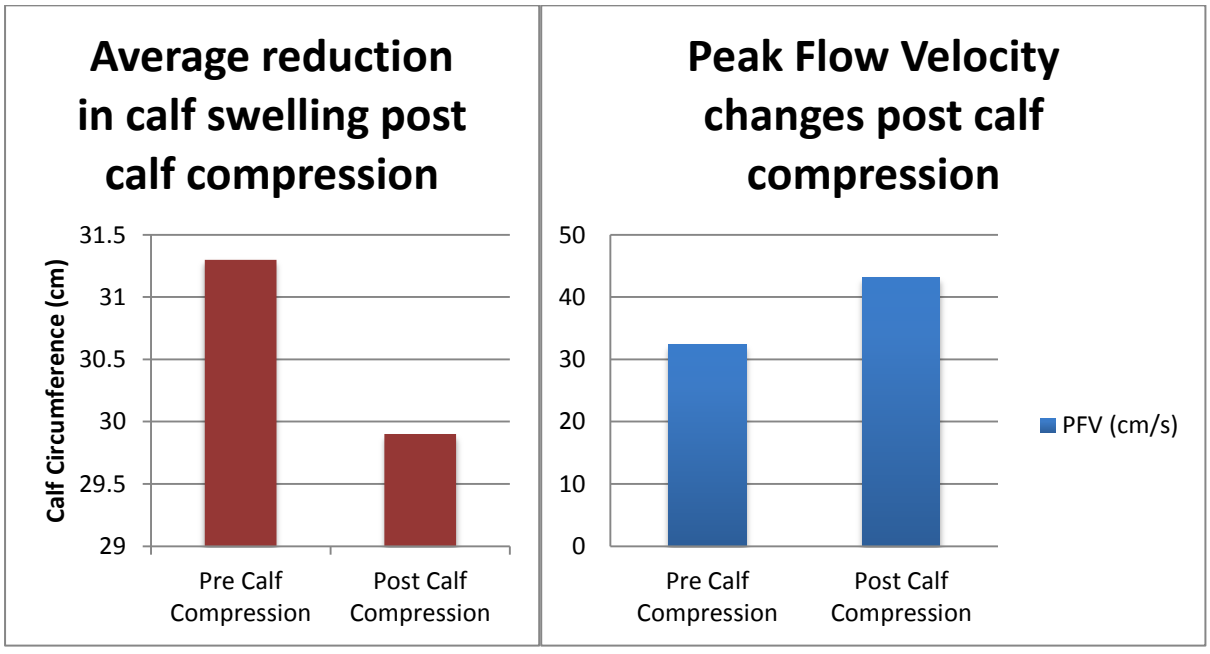
Vekroosan® Calf Compression Device by DVT Solution Pty Ltd.

The Vekroosan® sequential calf compression device (SCCD) is designed to apply modulated external sequential pneumatic pressure to lower limbs of patients with chronic venous disorders, sufferers of Deep Venous Thrombosis (DVT) and related complications. It has been designed specifically to meet the following requirements:

- **Efficient**. Effective calf compression is achieved through programmed sequential calf compression. It has shown to significantly increase blood flow through the femoral vein by increasing the mean peak flow velocity from 32.4 cm/sec to 43.1 cm/sec. Consequently it reduced the calf swelling from a circumference of 31.3cm to 29.9cm[1].
- **Safe**. The design incorporates pneumatic pressure control and battery management circuitry to mitigate the risk of vascular constriction and injury to the user.
- **Hygienic**. The cuff (air bladder) in physical contact with the patient had been made a separate (potentially disposable) entity from the electronic pump assembly. This allows the cuff to be discarded when soiled/damaged and a new one "clipped" on to the pump at minimal cost.
- **Reliable**. In order to be useful in the treatment of chronic venous conditions, an operational life of at least a year (assuming daily usage) is desirable. This requirement strongly influences the cost of the primary components - the internal air pumps.
- **Low cost**. To assist in the widespread adoption of the DVT Solutions product, minimisation of the manufactured cost has been a primary design objective.

Clinical studies involving 118 patients have shown significant benefits of the device as shown below[1].



Specifications

The pump is attached to the cuff by three spring-loaded plastic hooks which protrude through the pump housing from a rigid plastic 'backbone' affixed to the cuff. Pneumatic connections are made to the bladder compartments via blunt (hollow) protrusions which mate with a receptacle (and sealing o-ring) in the base of the pump assembly. In order to change the cuff, the spring clips are squeezed together by the user and the pump lifted off the cuff. The pump is then replaced over the (keyed) plastic hooks of the replacement cuff.

Weight (excluding inflatable cuff) – approximately 0.45 kg, consisting of:

Component	Weight (grams)	Number req.	Total weight (g)
ABS plastic case	64	1	64
ABS plastic chassis	40	1	40
ABS plastic backbone + cuff hardware	35	1	35
Air pumps	58	3	174
Air solenoids	14	3	42
Battery	44	1	44
LCD display	12	1	12
Electronics	30	1	30

Pump electronics:	210 (l) x 55 (w) x 38 (h) mm
Cuff (bladder):	660 (w) x 250 (h) mm
Cuff (garment):	Polyurethane, Polyester (PVC & Latex free)
Battery:	4.0Ah Li-Ion. Expected run time ~10+ hours. Charge ~8 hours (overnight)
Cuff pressure:	Programmable to a max of 60 mmHg

Features

The Cuff Pump has been designed with the following feature set in mind. Additional features may be added until the design is finalised.

- The pump sequentially inflates/deflates 3 independently controlled pneumatic chambers according to programmed intervals/durations,
- The chamber pressures are programmable to any value between 10 – 100 mmHg,
- Charging of the pump is performed via a mini-USB connector and supplied +5V, 1A mains/USB charger,
- Battery and pump status is displayed on a backlit LCD, and
- Safety monitoring while running and a self-check on initial boot.

Statistics

Almost 15,000 Australians develop Venous Thromboembolism (VTE) each year, with approximately 5,000 of these cases resulting in death. Around the world, overall incidence ranges from 0.75 to 2.7 cases per 1,000 people. The financial cost of VTE was reported at $1.72 billion, of which $148 million was direct health system expenditure. The indirect costs of premature death and disability add up to $20 billion per year.
VTE is more common than the most common types of cancers and accounts for the 5th leading cause of death in 2003.
Blood clots may be prevented with appropriate therapy in most cases[3].

About Us

DVT Solution Pty Ltd. has been dedicated to developing new innovations in battling venous thrombosis and related complications since 2006.

We have a vision to provide solutions to the growing epidemic of venous thrombosis.

We are a proudly Australian owned and operated company. Vekroosan® is assembled in Australia by our Sydney manufacturers.

Contact

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[1] S. Ramakrishna, H.R. Pota, W Alexander. '*Use of novel pneumatic compression device to improve venous haemodynamics in patients with chronic venous disease'*. International Journal of Medical Sciences, 2015.

[2] H. R. Pota, S. Ramakrishna, J. Webb. 2015

[3] Report by Access Economics P/L. '*World Thrombosis Day presentation*'. August 2014