



A new reliable and accurate volumetric device generating profiles of cross-sectional areas

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Lymphedema is swelling of a body part due to excess accumulation of lymphatic fluid. In most cases, lymphedema is the result of lymphatic vessel damage caused by surgery, trauma, infection or filariasis. There are two main goals to measure lymphedema with high accuracy: 1) early diagnosis which may prevent clinically significant lymphedema to develop by early treatment, and 2) evaluate changes in volume (lymphedema) as measure of treatment effects. Besides for clinical environments high accuracy volume measurements also have important applications in sport sciences and technical/industrial environments and others.

As limb volume changes over time are generally small, a reliable and objective method is needed. All methods used to date have challenges to achieve a usable clinical accuracy¹. We have developed and patented a new volumetric device, the Peracutus Aqua Meth (PAM) (picture)². Pumping water in or out of the measuring unit at a nearly constant flow rate

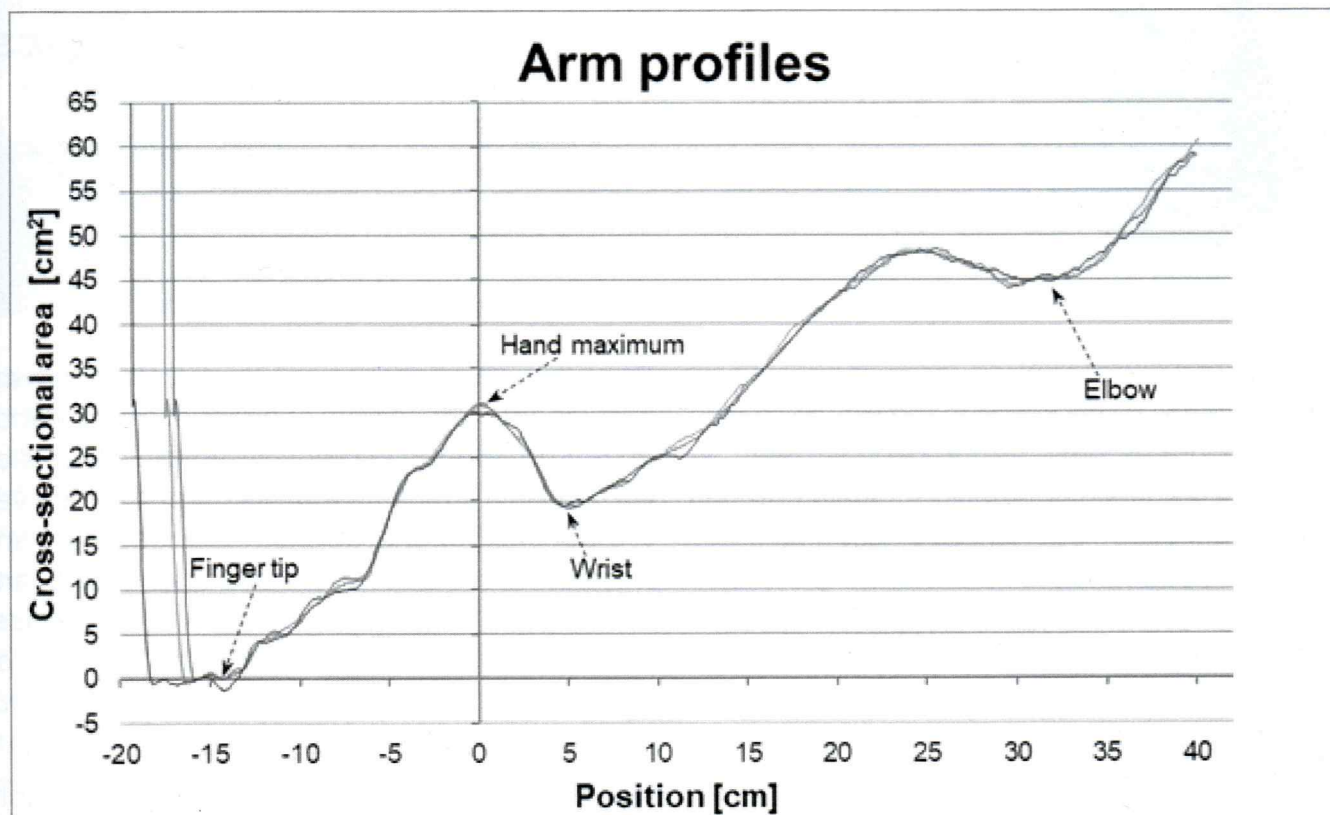
renders a continuous profile of cross-sectional areas along the length of the limb (or any other object). Based on the profile, the volume of any chosen segment of a limb can be determined. A demonstration and an Measuring unit animation are available: <https://www.peracutus.com/products-and-results/peracutus-aqua-meth/>.

The first prototype of the PAM was used in a clinical study including 39 healthy test subjects to demonstrate correct volume measurements³.

The figure below shows the profiles of 3 subsequent measurements. In order to correct for differences in stretching the fingers and holding the arm at different depths in the measuring unit a new reference point, the hand median, was mathematically defined⁴. Aligning profiles in this way greatly enhanced the accuracy of the measurements. Standard deviations of around 1.5% and less are obtained for cross-sectional area measurements as well as for arm volume determinations and segments thereof.



*Measuring unit
of the PAM*



Typical profiles of an arm.

The finger tip, hand maximum, wrist, forearm, elbow and upper arm are easily distinguished.

Biography

Frans Houwen (1958) studied Biology at the Radboud University in Nijmegen, and gained a PhD in anaerobic microbiology and biochemistry at the Agricultural University in Wageningen.

Passionate by science he then worked for several years at the Agricultural University of Uppsala (Sweden) and at the University of Ghent (Belgium). Back in The Netherlands he worked for Sanquin Bloodbank (Maastricht) as manager of the divisions Production, Laboratory & Distribution, including Quality, (international) guidelines, and software application management. Then, as a project manager he carried out several projects to initiate and improve processes and methods. In an industrial environment he has contributed as microbiologist / system developer to the creation of a number of products at the interphase of biology, engineering and software.

Starting from innovation and the belief that (multidisciplinary) collaboration is exciting and needed, he started his own companies ScienceLynk B.V. in 2009 and Peracutus B.V. in 2013.



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CERTIFICATE OF RECOGNITION

THIS CERTIFICATE IS PROUDLY PRESENTED TO

Frans P Houwen

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In recognition of outstanding contribution as a
Distinguished Speaker of the presentation entitled

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at

**3rd International Conference on
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It's a great privilege to express sincere thanks and profound gratitude to present
this award in recognition of your invaluable insights, experience and expertise.

Elliana Richards

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Program Director
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