



TECHNOLOGY FOR VASCULAR HEALTH



Static Vessel Analysis

- Non-invasive and contact-free examination – high patient tolerance
- Efficient and optimised workflow – within seconds
- Interdisciplinary use – cardiology, neurology
- From preventive diagnostics to monitoring the success of therapy
- High-precision analysis features – Innovation Made in German

Static Vessel Analysis

Static Vessel Analysis is an excellent method for the non-invasive and contact-free investigation of the conditions of the smallest blood vessels. As a unique approach to microcirculation provides essential information on subclinical changes in the smallest vessels of the entire body. Through this “mirror image”, Retinal Vessel Analysis provides information about the holistic vascular health of patients. It enables important conclusions to be drawn about systemic diseases and the development of end organ damage.

With the help of the unique VesselMap software, vascular parameters are determined and analyzed from previously recorded retinal images. These parameters are valid biomarkers that can be used as risk factors or prognosis indicators for vascular diseases and vascular events in the eye and other organs. The VesselMap software is therefore ideal for use in clinical routine as well as scientific examinations and provides important information about the individual patient risk, e.g. for

- Risk assessment for vascular diseases
- Estimating and predicting progression
- Testing therapeutic approaches
- Monitoring therapy progress
- Motivating patients through early progress monitoring

A supplement to standard diagnostics, for example, in:



Cardiology

Coronary Heart Diseases
Heart Attack
Heart Failure



Cardiometabolic prevention

Cardiovascular Events
(Heart Attack, Stroke)
Cardiovascular Diseases
(Angina Pectoris, PAD)



Ophthalmology

Glaucoma
Retinal Vascular Occlusion
Diabetic Retinopathy



Metabolic Diseases

Diabetes
Obesity
Cholesterol



Neurology

Alzheimer's, Dementia, Stroke



Nephrology

Renal Insufficiency



Rheumatology



Hypertensiology

Powerful technology – Innovation Made in Germany

The VesselMap software is available as a software license in combination with different click packages (200, 300 and 500 measurements) and durations (1 year and 3 years). It can be combined with various imaging systems from leading manufacturers and integrated into the existing clinical environment.

Optional additional modules:

The **imaging system** for taking fundus images if no suitable device is available.

The **base unit**, consisting of instrument table, computer unit and power supply for comfortable and mobile work.

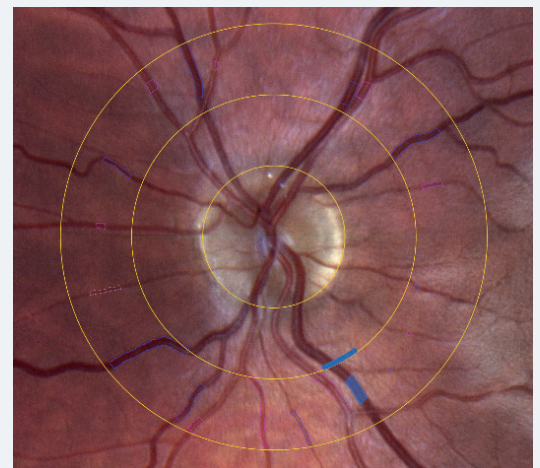
The **server solution** for connecting different workstations and synchronizing the corresponding databases.

The **practice system connection** for smooth integration of Static Vessel Analysis into everyday practice.

The **research option** for free measurement of vessel diameters outside of the standardized examination protocol.

Examination procedure – with in seconds

1. At least one standardised image of the retina is taken with the imaging system.
2. The digitized retinal image is evaluated using ring-shaped markers centred on the position of the
3. The software automatically preselects all arterial and venous vessels with a diameter of more than 40 μm .
4. From this, a vessel diameter averaged over the location is automatically determined for each connected vessel section.
5. The last step is automatic calculation of the vessel parameters using the formulas described by Hubbard for the ARIC protocol¹.



Static Vessel Analysis according to the ARIC study protocol

Note: Steps 2-4 are applied via automatic preselection of the software.

¹Hubbard, Larry D., et al. „Methods for evaluation of retinal microvascular abnormalities associated with hypertension/sclerosis in the Atherosclerosis Risk in Communities Study." Ophthalmology 106.12 (1999): 2269-2280.

Biomarkers

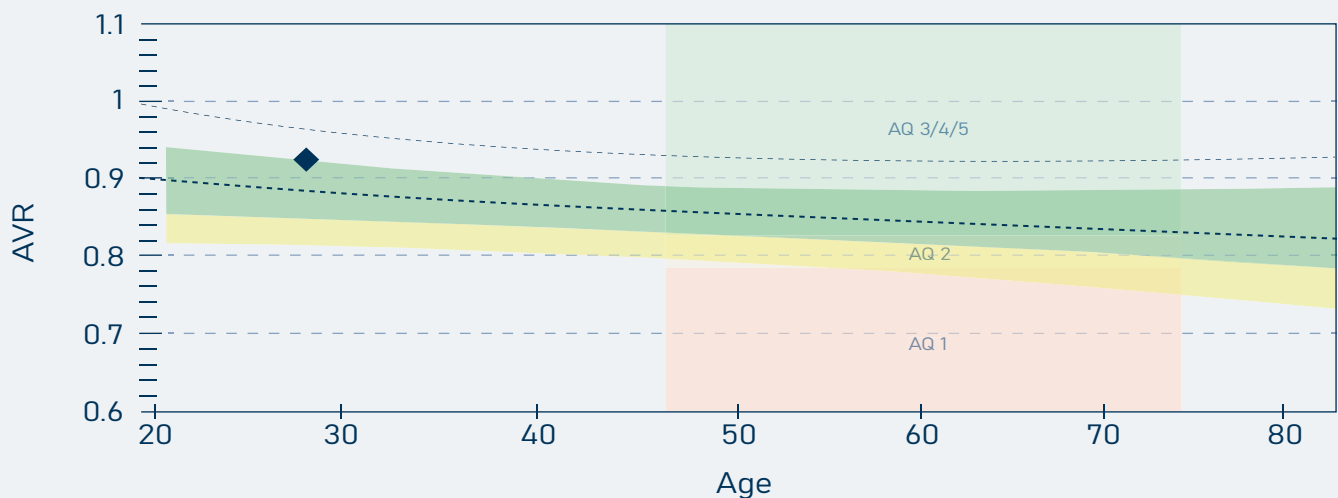
CRAE - Central Retinal Arteriolar Equivalent: Arterial model vessel diameter

CRVE - Central Retinal Venular Equivalent: Venous model vessel diameter

AVR - Arteriolar-to-Venular Ratio: The CRAE/CRVE ratio

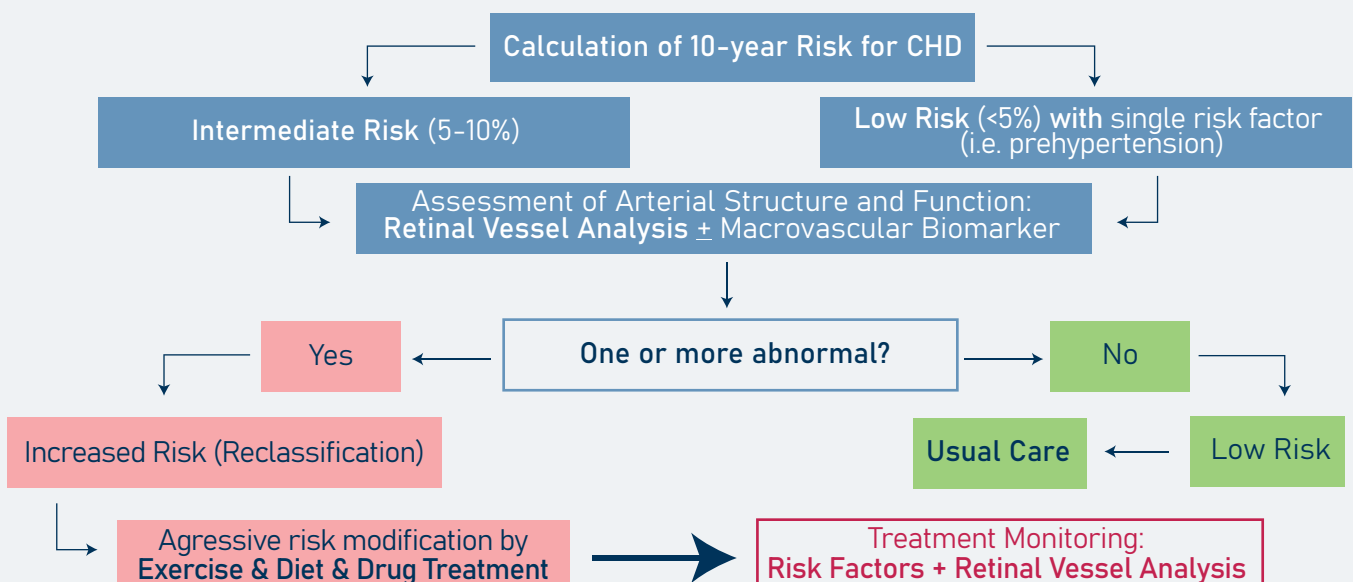
The central equivalents CRAE and CRVE describe model vessel diameters for characterising the central vessels. These model vessel diameters take into account all arterial and venous vessels carrying blood to and from the retina, according to a geometric haemodynamic weighting.

Study protocol



To illustrate the examination results, they are classified in norm data according to age. The individual vascular age of each patient, as well as the relative risks for the development of various symptoms and vascular events, can be determined from this representation. The risk is classified on the basis of large studies.

Example of integration in everyday practice



Concept for future clinical implementation with modifications based on suggestions from (Kullo and Malik, 2007)

Field report on Static Vessel Analysis

Dr. med. Ute Hunger

Registered ophthalmologist, Frankenberg (Saxony, Germany), with husband

Dipl.-Med. Harry Hunger

„As an ophthalmologist, I had heard about the Retinal Vessel Analysis method many years ago and was familiar with the approach. However, the comprehensive significance and benefits of the screening tool for assessing vascular health only became clear to me after a drastic experience in my own family," our long-time customer Ute Hunger, MD, in a personal conversation with Imedos. Her personal experience with the Static Vessel Analysis shows the potential of the method.



Ignored test result with tragic consequences – A field report

In 2008, the doctor purchased an Imedos Static Analyzer (ISA) for her practice in Frankenberg/Saxony. Out of interest in the technology, she tested the vascular health of her entire environment. Besides her staff she also examined her husband, Dipl.-Med. Harry Hunger, who is an internist. "And that's when we got suspicious. My husband, who was preparing for a marathon at the time and eating healthy throughout, had the worst results of all." Dr. Hunger initially thought the result was an operator or measurement error. Due to the uncertainty, the couple contacted us and visited the Imedos headquarters in Jena, Maua. Here, an Imedos employee repeated the examination. The procedure and the measurement results were evaluated and discussed by our Retinal Vessel Analysis experts. Although the result was insignificantly different from the first Vessel Analysis, the couple did not attach any further importance



Then, on a quiet day three months later, the unexpected happened. "With the words, 'I'm not going to have a heart attack, am I?' my husband came to see me in the office," says Dr. Hunger. "At first, he just wanted to take a painkiller and lie down for a bit, but after a short time he was unconscious. I called the emergency services right away and started chest compressions," Dr. Hunger reports. The next hour was a nerve-wracking struggle. The arriving emergency physician confirmed the acute heart attack. "It took a long time before my husband was stable enough to be transported to the hospital." There, he lay in a coma for a week before his vitals gradually improved. "Thanks to the very good response of the emergency physician and hospital staff, and the subsequent cure, my husband is fully recovered today. But it was really close".

To this day, it is not clear what exactly triggered the heart attack. During the examinations, an elevated lipoprotein(a) level was diagnosed. The poor blood value was not known to the athletic and health-conscious doctor. Dipl.-Med. Hunger was always active and sporty. „Of course, my daily work routine was stressful during this time, but I never perceived this as a negative burden. Quite the opposite. I didn't feel exposed to any risk," Dipl.-Med. Hunger was always active and sporty, says Harry Hunger, MD, describing the situation.

Since the incident at the latest, the internist and the ophthalmologist have been convinced of the technology of Static Vessel Analysis. "We should not have accepted the result so easily back then. In the meantime, we have been using Retinal Vessel Analysis in our everyday practice for almost twelve years," they



Dipl.-Med. Hunger was always active and sporty

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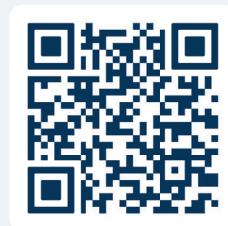
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CONTACT

We will be happy to answer
any questions you may have:



E-MAIL