

Medical

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Aortic Pulse Wave Velocity
the GOLD standard for
measuring arterial stiffness



PulseTrace PWV measures Arterial Stiffness between two locations of the arterial tree. It uses a Doppler probe to identify the arrival of the arterial pulse to calculate the Pulse Wave Velocity (PWV). This is a 'gold-standard' validated¹ method for arterial stiffness measurement.

- Aortic arterial stiffness as measured by PWV between the carotid and femoral arteries (PWVcf) is an independent predictor of cardiovascular risk.
- Ranges in large groups have been published and all major arterial stiffness outcome studies have used PWV. Uses include:
 - Risk stratification
 - Monitoring disease progression
 - Evaluating treatment



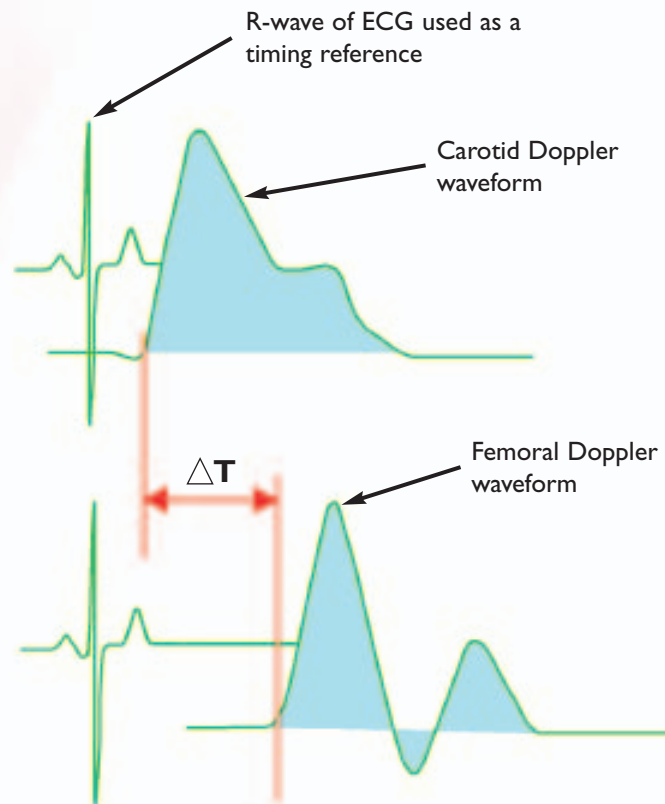
Focus on the Future

Arterial Stiffness & Pulse Wave Velocity

PWV is the most widely validated and universally accepted measure of arterial stiffness²⁻⁵. The observation that aortic PWV increases with age and blood pressure was recognised in the 1930's by Hallock⁶ and Haynes et al⁷.

It is now recognised that in addition to hypertension, other risk factors accelerate the age-related stiffening of the aorta. Aortic PWV therefore acts as an integrative measure of cardiovascular risks⁸⁻¹⁵.

Because arterial stiffness is an independent predictor of cardiovascular risk, there is now great interest in its use for cardiovascular risk stratification and to monitor drugs that can alter/improve aortic stiffness¹⁶.



$$PWV = L / \Delta T$$

PWV = Pulse Wave Velocity (m/s)
 L = Length between measurement sites (mm)
 ΔT = Transit Time (time delay) (ms)

PWV Measurement

Micro Medical has used the 'gold standard' Doppler method to detect the onset of flow in the artery. Doppler pulses are recorded sequentially in 2 different arterial sites and compared using the R-wave of the ECG as shown above. Sequential vs. simultaneous measurement of the pulse transit time has been shown to introduce no error provided the cardiovascular system is stable¹⁷. The PulseTrace PWV automatically steps the user through a programmed examination providing extremely simple operation and automatic calculation of the PWV between any two-user selected/defined locations. By using a 5MHz Doppler probe, signals from both the carotid and femoral sites can be easily found in all subjects including those with obese or muscular necks. Other segments include femoral to popliteal, subclavian to brachial or radial and brachial to tibial or dorsalis pedis.

The recognised 'gold standard' and most published technique for measuring PWV is to use the time difference between the onset of flow in two arterial locations, as measured by a Doppler probe, divided into the externally measured distance between the two locations.

PulseTrace PWV Cat. No. PT4000

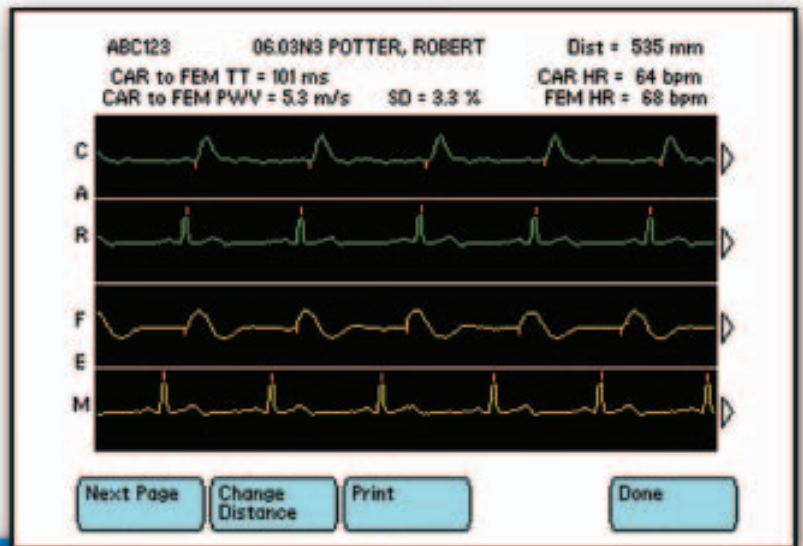
Features

The Micro Medical PulseTrace PWV has many advanced features including:

- Requires minimal training to obtain clinically valid results
- Easy to locate good quality signals even when measuring deep arterial pulses found in obese patients
- Well tolerated by the subject
- The majority of published outcome and population studies have used the Doppler method
- Fast automated sequential measurements
- Self contained, light and portable and does not require an external PC
- High resolution printer and colour 1/4 VGA LCD display
- Complete with all accessories in a sturdy case
- User defined measurement sites
- Waveforms, parameters and patient data storage
- PC software for uploading and managing results
- 'Future Proof' – can be upgraded via software downloads.



▲ 5MHz CW Doppler Probe provides a direct and easy to use method to locate the arterial pulse in many locations including carotid and femoral.



▲ The PulseTrace PWV results screen shows the calculated PWV, ECG signal and Doppler waveform (top: carotid waveform, bottom: femoral waveform). The red markers identify the foot of the arterial waveforms and the R-wave of the ECG, which is used as a timing reference.

◀ PWV-Upload is a PC program that allows all the PulseTrace data to be uploaded to a PC for storage, viewing and reporting. For carotid/femoral data it includes a nomogram derived from published data for PWV comparisons. It also includes a utility to export data to other programs e.g. Excel for statistics and analysis.



Specifications

Product Name	PulseTrace PWV	Part Number	PT4000
Measurements	Transit Time in ms, between two sequentially measured Doppler waveforms from user defined locations, using the 'R' wave of the ECG as a timing reference. The average of ten waveforms from each location are used and the SD is calculated and displayed. PWV in m/s is automatically calculated by dividing the time delay by the externally measured distance between locations. All waveforms are displayed and the detected onset of the pulse is marked. Heart Rate in beats/min is monitored at each measurement location over the ten waveforms. The user is advised if there has been a significant change.		
Examination/ Storage	User defined measurement sites/1000 tests including waveforms		
Doppler Transducer	5Mhz ± 1% continuous wave Doppler pencil probe		
Max.Audio Output	500mW rms typical (volume control on interface box)		
Doppler Waveform	Bi-directional zero crosser (forward and reverse) with AGC		
ECG	Three lead set length 1000mm European colour code with tab-snap clips, no additional components for defib protection.		
Printer/ Display	320 dot per line internal thermal printer/1/4VGA Colour LCD		
Power Supply:	Input 100-250V 50-60Hz. DC output 12V 500mA		
Battery Pack:	Rechargeable NiMH 7.2V		
Dimensions:	337 x 140 x 45mm (when display closed). Transducer/ECG interface 190 x 100 x 45 mm		
Weight:	Unit weight 1.1 kg. Packed weight with carry case and accessories 2.6kg		
Standards	Type B device, CE approved (Directive 93/42/EEC)		
Environment	Complies with directive EN60601-1-2 electromagnetic compatibility		

The PulseTrace is manufactured by Micro Medical Ltd and is offered as Catalogue No. PT4000

Micro Medical Ltd pursues a policy of continuing improvement in design, production and performance of its products. The right is therefore reserved to vary details at any time and without notice.

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