

Pulse Wave Velocity

With the release of Version 7.0 software for SphygmoCor Pulse Wave Velocity, the default setting for the choice of algorithms was changed and some information on this is detailed below.

Pressure Pulse Onset Point Algorithm

The most widely used method for determining PWV is to measure the time delay between a characteristic point or 'timing point' on the two pressure waveforms that are a known distance apart. Most of the methods use the "foot of the wave" as the characteristic point, because this feature is sharply delineated and unaffected by differences in the shape of the pressure pulse waveform at the two recording sites. There are several mathematical methods (algorithms) for identifying the location of the "foot of the wave". In SphygmoCor Vx we have always offered the user a range of options for the algorithm to be used to locate the "foot of the wave".

The four algorithms that are available in SphygmoCor Vx Pulse Wave Velocity are

- Percentage (%) Pulse Height (default prior to Version 7.0)
- Maximum dP/dt
- Intersecting Tangents (default in Version 7.0)
- Maximum of Derivative 2.

The "Percentage Pulse Height", "Intersecting Tangents" and "Maximum Derivative 2" algorithms all use a method to find the start of the pressure pulse – "the foot of the wave" - whereas the timing point for the "Maximum dP/dt" can occur at about halfway up the systolic upstroke. We do not recommend the use of the "Maximum dP/dt" for Vx measurements.

The "Intersecting Tangents" and "Maximum Derivative 2" have been shown to provide the most consistent and reliable results, with a correlation coefficient of 0.90, with the methods that use timing points to the left or right of the foot of the wave producing consistently different results ⁽¹⁾. While the "Percentage Pulse Height" algorithm was not included in this study, it would likely be more reliable with poorer quality and "noisier" pressure waveform data.

It is therefore suggested that for new studies the new Version 7.0 default setting of "Intersecting Tangents" is used as the algorithm. However, for ongoing studies that have been started using the Version 6.x default setting of "Percent Pulse Height", it is still acceptable to continue to use the Percentage Pulse Height algorithm.

For customers wishing to convert any old data to a different algorithm, it will be necessary to change each reading individually through the "Recalculate" function.

(1) Reference: Chiu YC, Arand PW, Schroff SG, Feldman T, Carroll JD. Determination of pulse wave velocities with computerised algorithms. American Heart Journal 1991; 121(5):1460-9.