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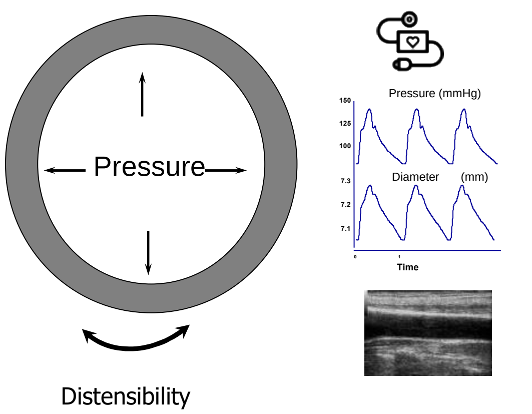
COMPLIANCE AND DISTENSIBILITY COEFFICIENTS

What is it?	Compliance and Distensibility coefficients are parameters of local arterial elasticity. Compliance of an arterial segment is the change in arterial blood volume due to a change in arterial blood pressure. Distensibility is compliance normalized for the starting volume. If the arterial segment is tethered and the flow is pulsatile, volume changes are mainly related to changes in vessel diameter; then compliance (and distensibility) can be estimated as a change in diameter or cross-sectional area for a given change in pulse pressure. In particular, CC, cross-sectional Compliance coefficient, is defined as the “absolute [area] change for a [pressure increment] at fixed vessel length”: **CC**=*change in area/ change in pressure* where ‘area’ can be calculated from the diameter of a blood vessel based on the assumption of circularity (i.e. area = pi x (diameter/2)$^{\wedge 2}$; and DC, cross-sectional Distensibility coefficients, is defined as the “relative [area] change for a pressure increment; the inverse of elastic modulus” **DC** =*change in area/(change in pressure×minimum area)* where ‘area’ can be calculated from the diameter of a blood vessel based on the assumption of circularity (i.e. area = pi x (diameter/2)$^{\wedge 2}$. Compliance and distensibility are expressions of arterial elasticity, the inverse of arterial stiffness. DC can be expressed as a local carotid Pulse Wave Velocity, in [m/s], by using the Bramwell-Hill equation. This formula gives: **cPWV** = 1/√(rho*DC) where rho is the blood density. DC and CC express the elasticity of the artery as a whole, and more specifically Distensibility expresses the intrinsic elasticity of the artery as a hollow structure. The elastic properties of the arterial wall material can be estimated by other parameters (e.g., Young’s incremental elastic modulus taking into account the thickness of the arterial wall).

Why do we measure it?	DC and CC provide a local and direct assessment of arterial elasticity, a parameter that is altered by vascular ageing.
How can it be measured	DC and CC can be non-invasively measured by local pulse pressure acquisition and instantaneous diameter measurement. Local pulse pressure of superficial arteries can be estimated by tonometry. Instantaneous diameter can be measured by image processing (e.g., Ultrasound, MRI). Units of measurement are: CC = m^2 *kPa^{-1} DC = kPa^{-1}
Where is it measured?	DC and CC can be measured non-invasively at different arterial sites, theoretically all those that can be imaged; generally, local elasticity is assessed at superficial sites such as abdominal aorta, carotid and femoral arteries when adopting ultrasound, and other tracts of aorta when using MRI. Reference values for carotid and femoral elasticity are available.
Figure	**Artery as a hollow structure**  Figure inspired by *Laurent S et al. Expert consensus document on arterial stiffness: methodological issues and clinical applications. Eur Heart J. 2006 Nov;27(21):2588-605. DOI: 10.1093/eurheartj/ehl254. Figure 2.* Pressure's logo by *Flaticon.com*

References	Tozzi et al. 2000. DOI: 10.1152/ajpheart.2000.278.4.H1407 Vlachopoulos et al. 2011. DOI: https://doi.org/10.1201/b13568 O'Rourke et al. 2002. DOI: 10.1016/s0895-7061(01)02319-6 Laurent et al. 2006. DOI: 10.1093/eurheartj/ehl254 Van Sloten et al. 2013. DOI: 10.1016/j.jacc.2013.12.041 Engelen et al. 2015. DOI: 10.1097/HJH.0000000000000654 Bossuyt et al. 2015. DOI: 10.1097/HJH.0000000000000655

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