Supplemental Document

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Quantitative measurement of mechanical properties in wound healing processes in a corneal stroma model by using vibrational optical coherence elastography (OCE): supplement

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1. Young's modulus of Ecoflex 00-30 silicone

The shear modulus imaging based on PhS-OCT was used to analyse the Young's modulus (E) of Ecoflex 00-30 silicone by calculating velocity of shear wave propagation. The system setup and mathematic model was introduced in our previous publication [1].

The relationship between shear modulus and shear wave velocity can be expressed as

$$\mu = \rho V_s^2 \qquad \text{[Eq.(S1)]}$$

Where μ is the shear modulus in the material. ρ is the density of the material and V_s is the shear wave velocity.

As silicone is a homogeneous, incompressible, and isotropic medium, shear wave speed has direct ratio to the linear elastic modulus of silicone. So, the shear modulus is simply proportional to the Young's modulus, according to the expression

$$E = 3\mu \qquad \text{[Eq.(S2)]}$$

Where E is the Young's modulus of the material.

Thus, the relationship between shear wave velocity and Young's modulus is shown as

$$E = 3\rho V_s^2 \qquad \text{[Eq.(S3)]}$$

Where ρ is the density of silicone given in technical bulletin with 1070 kg/m^3. V_s is the shear wave velocity shown as Fig. S1. So, the Young's modulus of silicone was calculated by equation [Eq.(S3)] as 222 kPa.

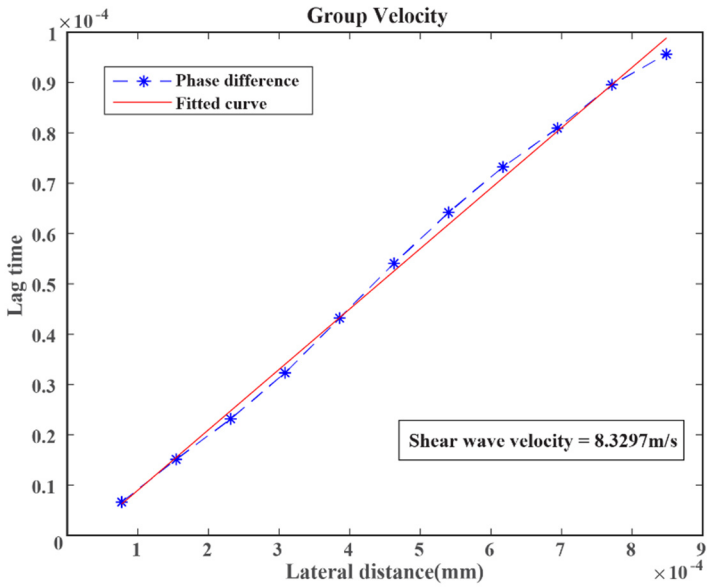

Fig. S1. linear fitting of log time and lateral distance from the first point

References

1. S. Song, Z. Huang, T. M. Nguyen, E. Y. Wong, B. Arnal, M. O'Donnell and R. K. Wang, "Shear modulus imaging by direct visualization of propagating shear waves with phase-sensitive optical coherence tomography," J. Biomed. Opt **18**(12), 121509 (2013).