3 - Clinical Anatomy

OC-062 - (23945) - EFFECT OF DIFFERENT PRECONDITIONING PROTOCOLS DURING BIOMECHANICAL TESTING OF THE HUMAN ILIOTIBIAL BAND

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None to declare

Preconditioning is a method used in tensile testing of biological soft tissues to standardize the effects of the experiment and is thought to create an initial equilibrium stress-strain state by collagen alignment, improving repeatability and comparability of test results. It remains unclear how different preconditioning protocols affect the biomechanical parameters of collagen-rich tissue such as the human iliotibial band (ITB). This study aims to determine the impact of load-guided preconditioning on biomechanical parameters of the ITB.
100 ITB samples from 20 human donors were tested until failure in a uniaxial tensile testing rig. Specimens were divided into two groups: 1) no preconditioning, and 2) load-guided preconditioning up to 50% of F_{max} of the group 1.
The results showed that under the commonly applied low preconditioning forces, pure load-based protocols resulted in an unacceptably high number of sample failures (70% fails at 30% of F_{max}).

Hypothetically, adjusting the preconditioning force based on tissue specific parameters, such as the individual tissue composition or cross-sectional area, could minimize the number of sample fails for both low- and high-force preconditioning. Excessively high preconditioning forces appear to bias the average F_{max} values of biomechanical datasets towards higher values likely due to structural damage to the tissues. The effect of preconditioning on the biomechanical properties of biological tissues requires careful reassessment and further in-depth research to justify its use in tensile testing.

Palavras-chave : iliotibial band, preconditioning, tensile testing