ABSTRACT

Background: Clinical stretching is frequently recommended for iliotibial band syndrome management. Current literature lacks conclusive findings regarding isolated human iliotibial band tissue elongation and stiffness behaviors. Applying clinical-grade stretching force results to iliotibial band tissue behavior is thus challenging.

Purpose: This study’s objectives were to determine isolated iliotibial band tissue tensile behaviors during tension-to-failure testing and to relate the results to previously reported iliotibial band stretch findings.

Study Design: Descriptive in vitro laboratory study.

Methods: Ten isolated un-embalmed iliotibial band specimens were exposed to tension-to-failure testing using a 10kN material testing system. Peak load, load at yield point, and ultimate failure load were measured in Newtons. Corresponding absolute (mm) and relative (%) tissue deformation was recorded. Load-deformation curves were established to calculate iliotibial band stiffness (N/mm).

Results: A mean peak load of 872.8±285.9N and resulting 9.0±3.9% tissue deformation from initial length was recorded. An 805.5±249.7N mean load at yield point and resulting 7.0±1.9% tissue deformation was observed. A 727.6±258.4N mean load was recorded directly prior to ultimate tissue failure. Mean tissue deformation at ultimate failure was 11.3±4.2%. Mean iliotibial band system stiffness was 27.2±4.5N/mm.

Conclusion: The iliotibial band can withstand substantial tensile forces. Clinical stretching forces likely fall within the load-deformation curve elastic region and may not result in permanent iliotibial band tissue deformation. Sustained elongation resulting from stretching the ITB may require substantial patient compliance. Future studies should investigate potential underlying factors related to positive symptom relief from iliotibial band stretching that include immunological responses, fluid accumulation, altered proprioception, and pain perception.

Level of Evidence: 3

Keywords: Iliotibial band, load-to-failure testing, stiffness, tensile behaviors

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