AMPUTEES SOCKS: HOW DOES SOCK PLY RELATE TO SOCK THICKNESS?

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INTRODUCTION

The term “sock ply” may be a source of confusion in prosthetics practice, because there may not be a consistent relationship between sock ply and sock thickness. The purpose of this study was to characterize how sock ply related to sock thickness for different sock materials commonly used in limb prosthetics. We also evaluated how sock thickness changed under loading conditions experienced while wearing a lower-limb prosthesis.

METHOD

Seven sock materials of varying ply were tested using a custom instrument. Sock thickness under eight different compressive stress conditions and two different in-plane tensile strain conditions was measured.

RESULTS

For socks woven from a single material, thickness under walking stance phase conditions averaged 0.7, 1.2, and 1.5 mm for 1, 3, and 5-ply, respectively. For socks woven from several materials, the corresponding results were 0.4, 0.7, and 0.8 mm, respectively. Sock ply did not sum, e.g. a 3-ply sock was not three times the thickness of a 1-ply sock.

DISCUSSION

Consistent with clinical experience, sock thickness was not the same for different sock products of the same ply. By definition, ply depends on the yarn thickness in the material, and different materials (e.g. wool vs. blends) had different yarn thickness. We found that on average, under walking stance phase loading conditions, Thick Socks were 80% thicker than Thin Socks, pointing to the severity of the discrepancy. Data may be useful towards selecting socks during fitting and towards understanding volume changes induced by adding socks.

CONCLUSION

Sock thickness and compressive stiffness are strongly dependent upon sock material and interface pressure.

REFERENCES