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College *	College of Medicine
Department *	Physical Therapy and Rehabilitation Science
Title of Research *	Normative 3D Strength Surfaces at the Ankle Joint: Plantarflexion and Dorsiflexion
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Introduction & Purpose *	As industry advances, one must predict human capability for industrial design and injury prevention. Santos™ is one model that can predict strength and endurance. The ankle is important for strength/endurance predictions because it is important for locomotion, as well as static and dynamic tasks. The purpose of this study was to establish a database of ankle strength in healthy subjects, and to determine how different muscle properties interact.
Experimental Design *	56 subjects were tested in maximal static and dynamic paradigms. Torques were gathered at each of five positions/velocities in the pointed toe/flexed toe directions. Data was separated into male/female groups, and plotted in both directions.
Results *	The resulting 3D graphs indicated that there is a significant interaction between the two major muscle properties; these two properties do not decay at the same rate.
Conclusions *	Thus, the 3D surfaces are more beneficial than 2D graphs because one can see the interaction between the two properties. These surfaces may aid clinicians in pinpointing exact weaknesses in patient populations, as well as determine the limits of human strength in static and dynamic tasks. Future studies include 3D strength surfaces in subjects with chronic ankle pain and injury, as well as co-contraction studies of the ankle musculature.

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