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Research-In-Progress

Challenges of Surgical Hand Tools with Large Grip Spans Amongst Small-Handed Surgeons

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Introduction: Surgeons may encounter ergonomic challenges while operating based on hand size alone. These challenges may be associated with laparoscopic instruments with grip spans that are too large. Tools with large grip spans have been reported to decrease maximum grip force during use. Large grip spans may create ergonomic challenges amongst small- handed surgeons who have a decreased grip force compared to surgeons with larger hands. Our study aims to investigate if the large grip span of surgical instruments plays a role in the difficulty in usage of such tools amongst small-handed surgeons.

Methods: The grip force amongst 32 medical students at Rocky Vista University was measured during surgery week, using both large and small grip span adjusted baseline electronic Smedley adult hand dynamometers. After obtaining these measurements, each student filled out an anonymous survey addressing glove size, gender and gripping force whilst using the large and small grip span adjusted hand dynamometers respectively.

Preliminary Results: *Prelim results of mean grip strength in kg based on gender and glove size, using large and small- span hand dynamometers.*

	Grip Strength(kg) (large span)		Grip Strength (kg) (small span)	
Glove size	Male	Female	Male	Female
Small		24.0		25.0
Medium		28.0		29.5
Large	54.6		50.2	

As more data is collected, we predict that small- handed individuals will have a decreased grip force and increased difficulty with usage of the large grip span hand dynamometer compared to those with larger hands.

Next Steps: Past studies have shown large grip-span handles to be the least comfortable and associated with the least grip strength amongst individuals with small hands, while being more comfortable for those with larger hands. Results of our study will provide important feedback on the redesign of surgical

hand tools so that ergonomic challenges will be decreased, and comfort will be maximized amongst surgeons.