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Introduction

- Carpal tunnel syndrome may profoundly affect manual dexterity in patients.
- We hypothesize that changes in carpal tunnel pressures affect flexor tendon kinematics.
- A range of carpal tunnel pressures with and without release of the transverse carpal ligament were simulated in a series of cadaveric hands, while observing changes in MCP, PIP, and DIP flexion.

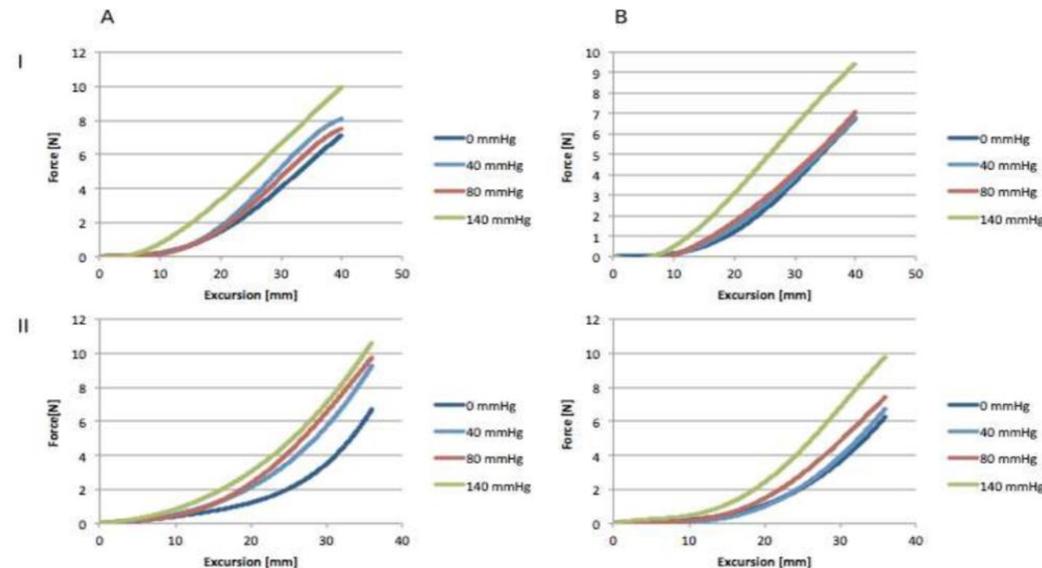
Methods

- Three cadaveric specimens were tested.
- Carpal tunnel pressures of 0, 40, 80, and 140 mmHg were applied.
- Angular displacement of MCP, PIP, and DIP was measured using a visual tracking system.
- A biomechanical computer-controlled pulley system was attached to FDS-only, FDP-only, and FDS/FDP-combined.
- Transverse carpal ligament was measured intact, partially-released, and fully released.

Figure 1



Figure 2



Results

- No significant difference was noted in the angular displacement of MCP, PIP, and DIP joints with all carpal tunnel pressures and the carpal ligament intact ($p < 0.05$).
- A significant difference in excursion was noted for intact and partially-released carpal ligament conditions for MCP ($p < 0.03$) and PIP ($p < 0.009$).
- The force required to pull FDP and FDS increased significantly with intracarpal pressure.

Conclusions

- Angular displacement of the MCP, PIP and DIP is not significantly affected by carpal tunnel pressure, independently.
- Flexor tendon excursion is affected by carpal tunnel pressures when the transverse carpal ligament is intact or partially-released.
- Overall improved MCP and PIP range-of-motion showed a positive correlation with release of the ligament.
- The force required on the flexor tendons was significantly increased with elevated carpal tunnel pressures, with the ligament intact or partially-released.