**Introduction**

- Grasping is a fundamental hand function that is impaired or eliminated following peripheral neuropathies of the hand [1].

- While finger force deficits subsequent to muscle dysfunction have been analyzed [2,3], there has been no framework for analyzing grasp dysfunction.

- We developed [4] and applied a computational framework for predicting grasp quality for different degrees of simulated peripheral neuropathies.

**Methods**

- We used the technique illustrated above to calculate grasp quality for healthy hands and impaired hands [4].
- We simulated nerve pathologies by progressively weakening innervation groups (shown below) individually and calculating the resulting grasp quality [5,6].

**Predictions of Grasp Deterioration:**

- Low median nerve palsy compromises grasp most severely.
- Complete loss of any innervation group makes grasp impossible.

**Conclusions and future work**

- Low median nerve palsy affects grasp quality most severely.
- Modest levels of low median and low ulnar nerve palsies affect grasp quality disproportionately when compared with low radial nerve palsy and Carpal Tunnel Syndrome.
- Although low radial nerve palsy affects the extensors of the fingers, they, counterintuitively, are necessary for grasp [8].
- Our ability to predict grasp quality enables a rigorous comparison of functional deficits across peripheral neuropathies.
- Comparison of patient outcomes with these quantitative predictions will enable development of effective treatments.

**References**


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