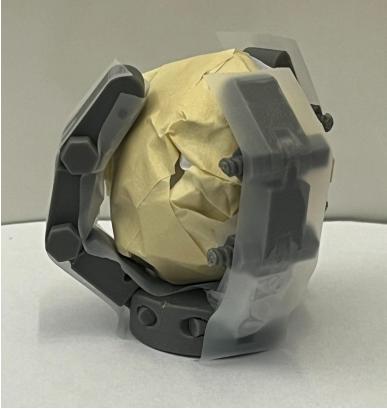
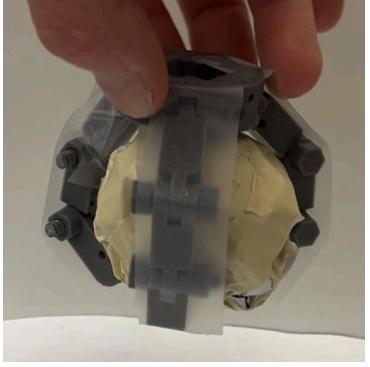
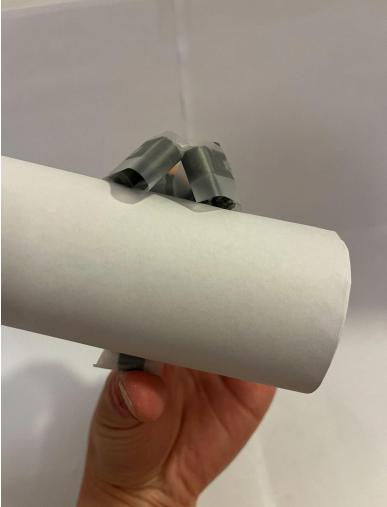


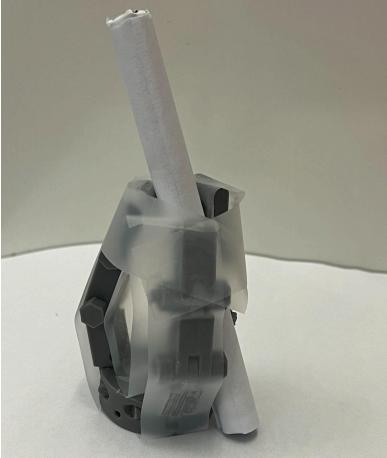
Determining Essential Finger Configurations for Stable Object Grasping

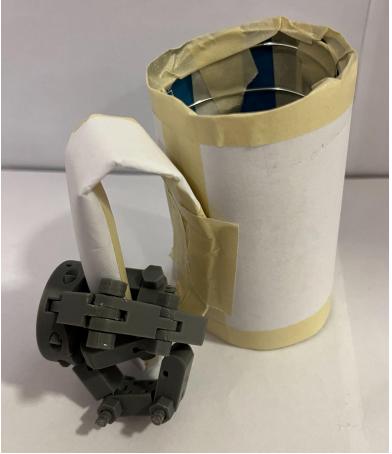
Finger length: 5.5 cm

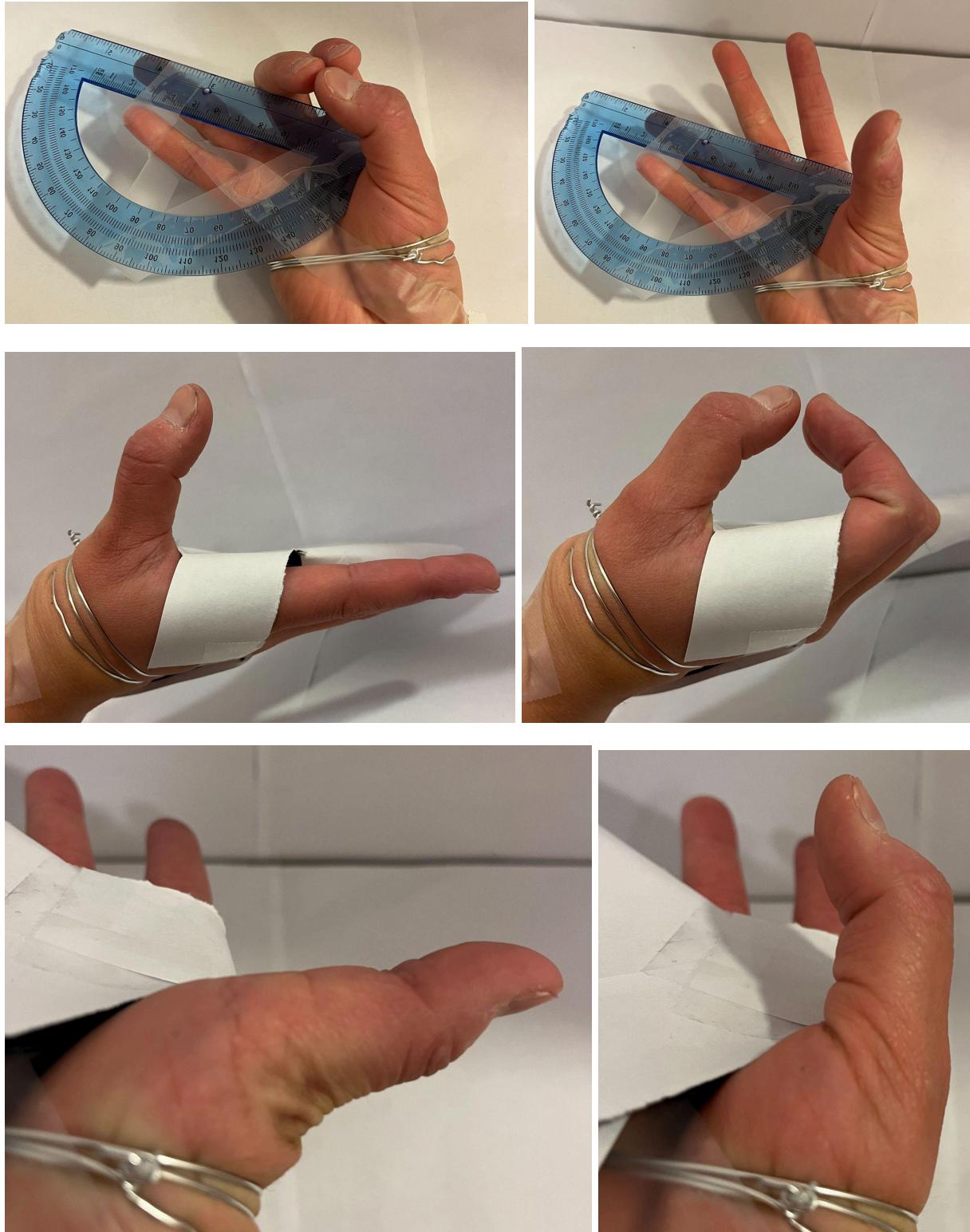
Palm diameter: 3.2 cm

Grip name	Position 1	Position 2	Notes
Spherical grip			Potentially enough surface area contact
Cylindrical grip			Not enough surface area contact. Object being held up by parts of the screw.

Diagonal volar grip			Not proper DVG because there are no opposing fingers to wrap around the cylindrical portion
Lateral pinch			Not stable grip because one finger is not opposing the surface area of another finger.
Extension grip			Potentially stable if enough grip strength and friction. Length and angle of the fingers important for stable grasp

Platform			
Tripod pinch	 	<p>The side surface area of a finger is not used.</p> <p>Will need to be able to control each joint to prevent it from collapsing or bending in the wrong direction</p>	

Pulp pinch			If object shape and size in a certain range, potentially a strong grasp.
Hook	 		Hook with one finger and the other two as potential supports. Not as stable as having more than 1 finger wrapping around the object.

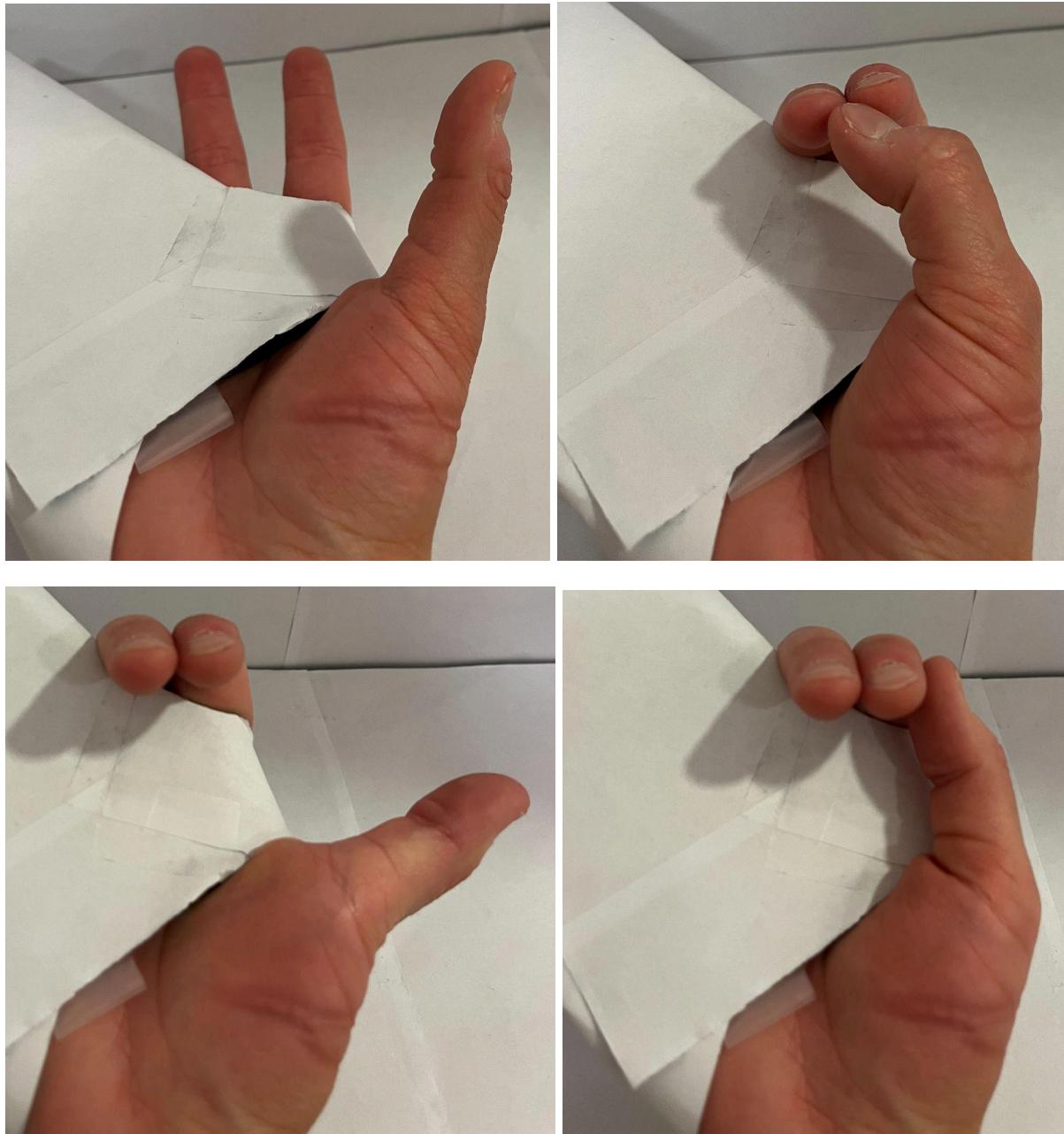


Constrained motion such that we have two fingers opposing the thumb. No abduction / adduction motion in the thumb

Grip name	Position 1	Position 2	Notes
Spherical grip			Sphere grasped well. Not as well as the first design, but still stable.
Cylindrical grip			More stable than first design
Diagonal volar grip	Not possible because there is no adduction / abduction movement in any of the fingers		
Lateral pinch	Not possible because there is no adduction / abduction movement in the thumb		
Extension grip			Good - either thumb tip or surface contact possible

Platform			Limitation in my own hand - Thumb didn't extend all the way out without adduction
Tripod pinch			<p>Could work with opposing motion between thumb and one finger or both fingers.</p> <p>Could also work by flexing the second finger a bit more to allow the inner surface to make contact with the object.</p>
Pulp pinch			Worked very well - wrapped around the object stably. Deformable body potentially helped with grasp stability

Hook	 	<p>Two fingers wrapped around the object well - more stable than 1 finger.</p> <p>Third finger could potentially wrap around the other two fingers.</p>

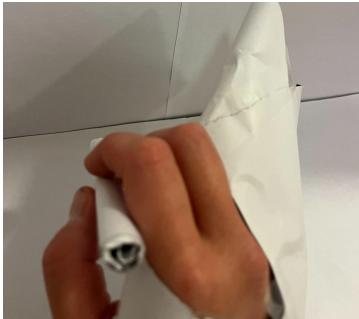


Two opposing fingers: flexion / extension

Thumb: flexion / extension + adduction / abduction

Grasps in the table below were only tested with second hand configuration as the first was tested in the previous test.

Grip name	Position 1	Position 2	Notes
Spherical grip			Not as stable in this configuration.
Cylindrical grip			Not as stable in this configuration.
Diagonal volar grip			DVG possible in this configuration
Lateral pinch			LP possible in this configuration

Extension grip			Stable
Platform			
Tripod pinch			Worked well. Potential opposition between thumb and second finger
Pulp pinch			Pulp pinch not as stable in this configuration

Hook		 <p>Stable with two fingers, as in previous configuration.</p>