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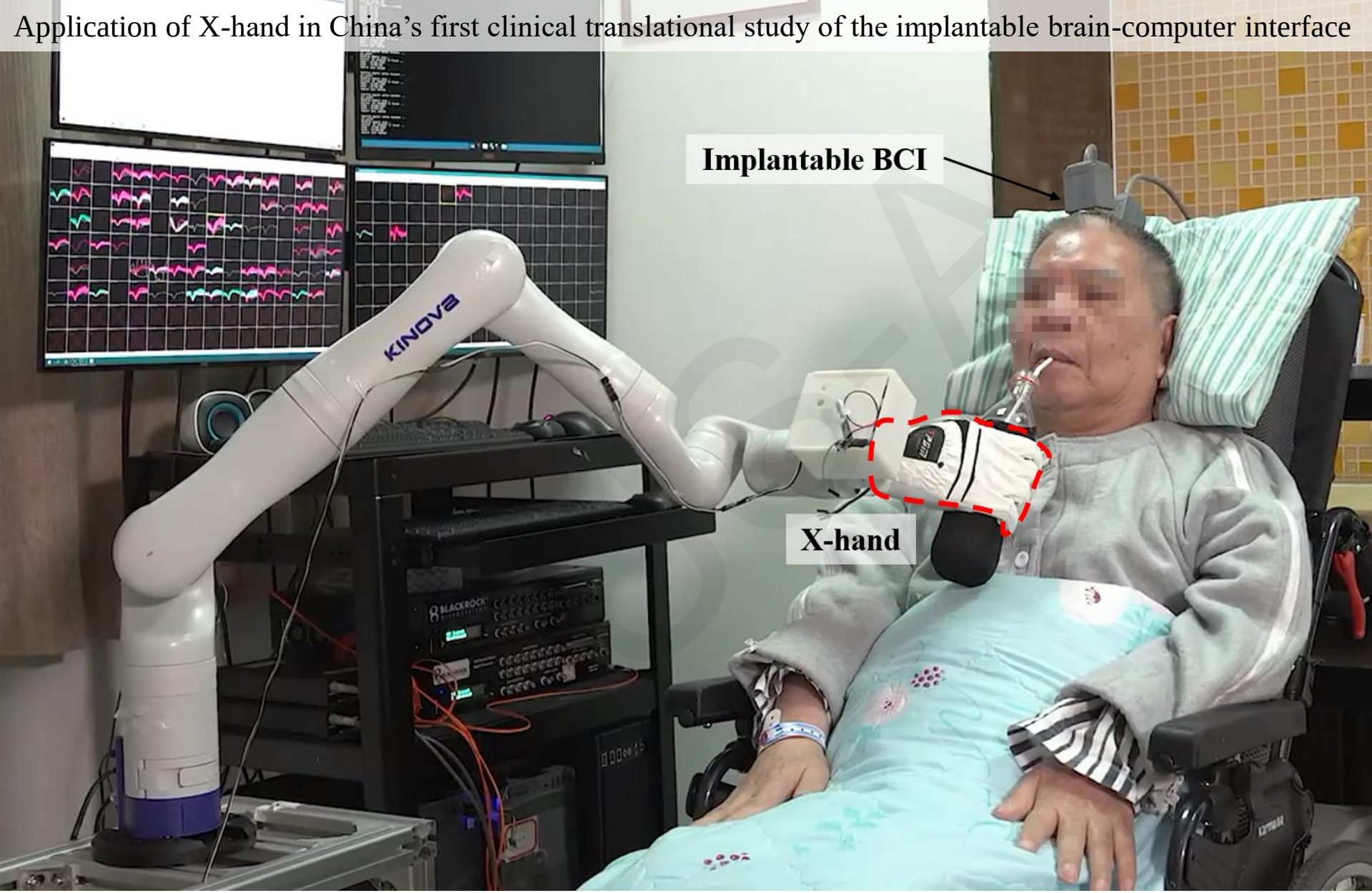
# Anthropomorphic hand based on twisted-string-driven da Vinci's mechanism for approaching human dexterity and power of grasp

**Cite:**

Yong-bin JIN, Shao-wen CHENG, Yan-yan YUAN, Hong-tao WANG, Wei YANG, 2022. Anthropomorphic hand based on twisted-string-driven da Vinci's mechanism for approaching human dexterity and power of grasp. *Journal of Zhejiang University SCIENCE A (Applied Physics & Engineering)*, 23(10):771-782. https://doi.org/10.1631/jzus.A2200216

Application of X-hand in China's first clinical translational study of the implantable brain-computer interface




**Dexterous** and **powerful** robot hands are essential for humanoid or service robots, especially those which are designed to handle unstructured objects in the human daily living environment.

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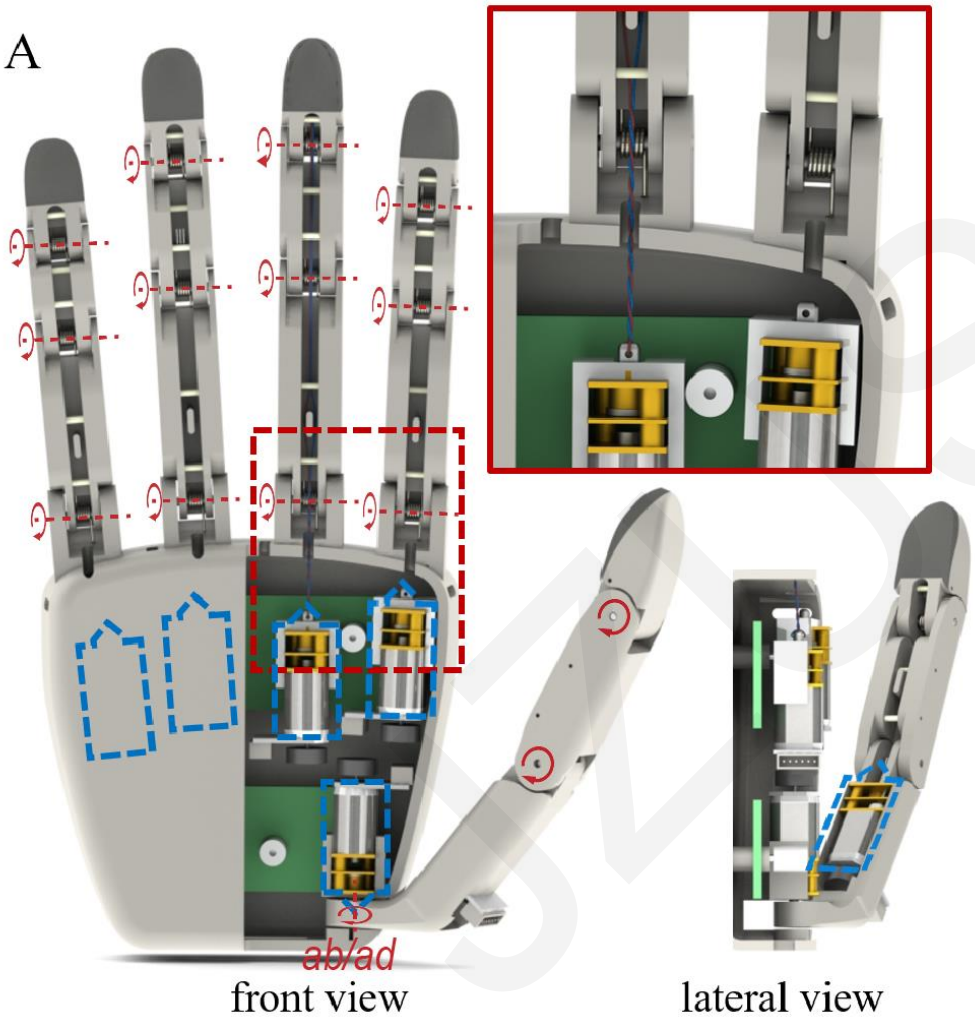
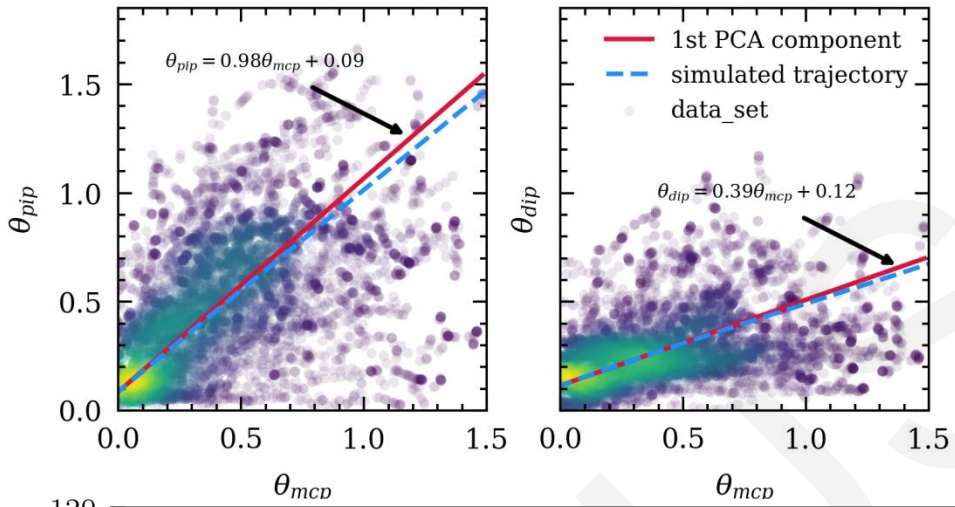
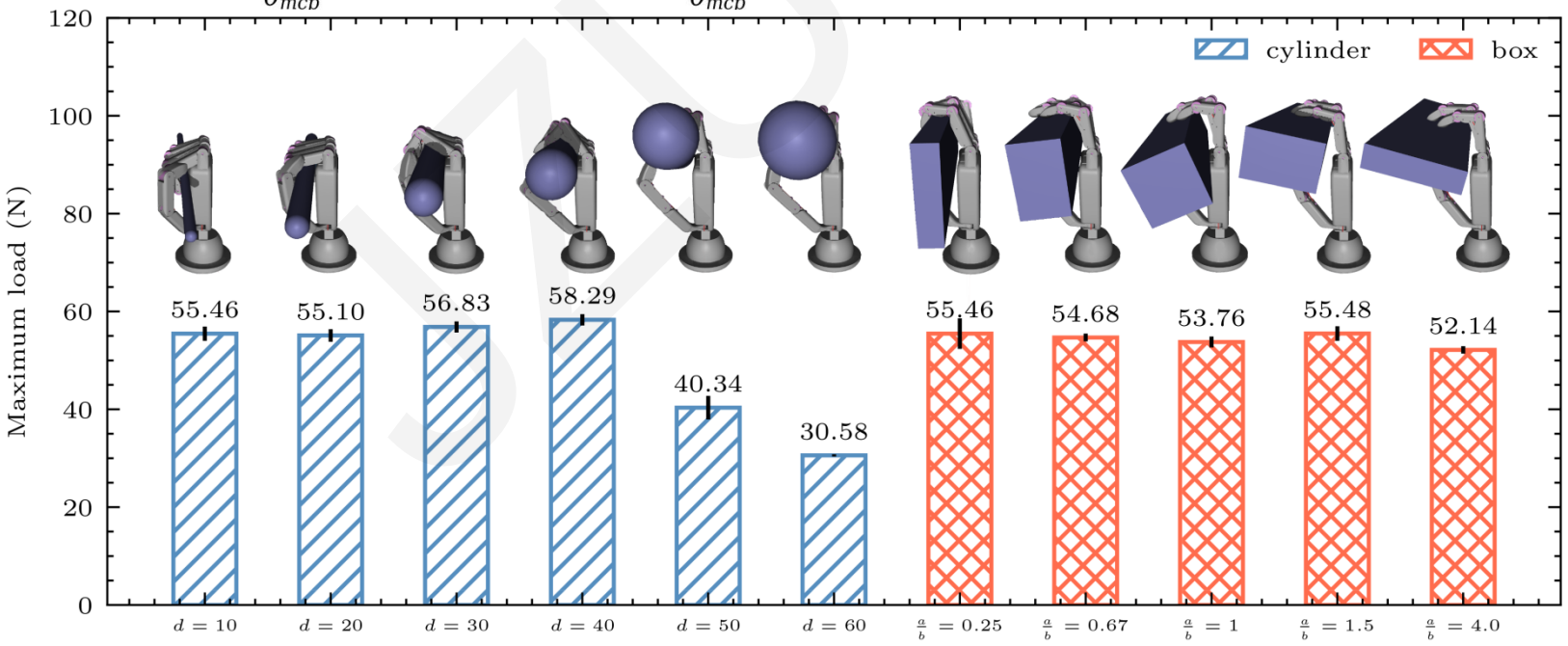
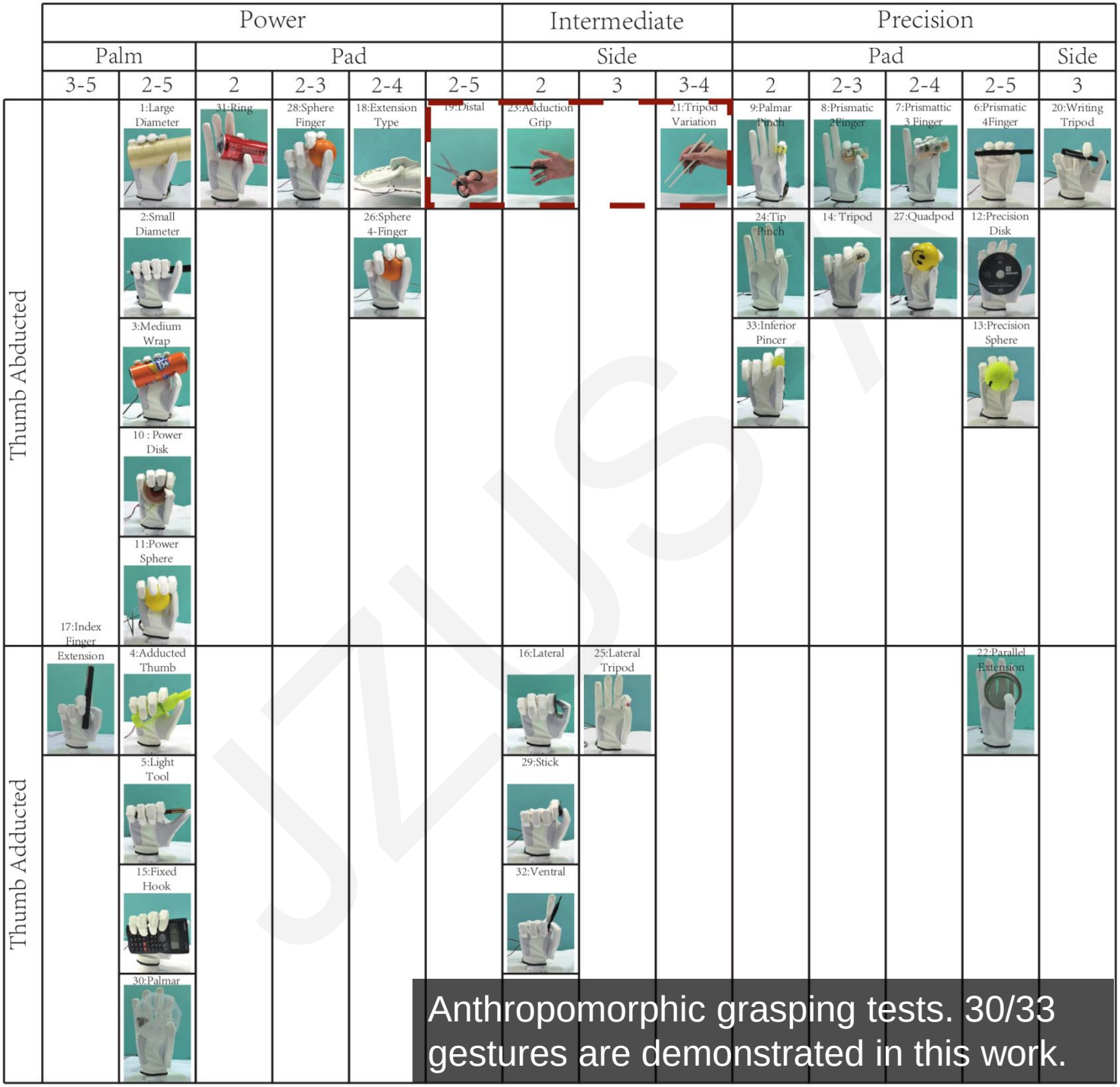


**Intelligent transmission mechanisms** are designed to meet the needs of robot hands for dexterity, compactness, and power.




- Optimizing da Vinci's mechanism based on human hand database
- Underactuated mechanism guarantees good shape adaptation




Power
Intermediate
Precision
Palm
Pad
Side
Pad
Side
3-5
2-5
2
2-3
2-4
2-5
2
3
3-4
2
2-3
2-4
2-5
3
Thumb Abducted
Thumb Adducted
1:Large Diameter
31:Ring
28:Sphere Finger
18:Extension Type
19:Distal
23:Adduction Grip
21:Tripod Variation
9:Palmar Pinch
8:Prismatic 2Finger
7:Prismattic 3 Finger
6:Prismatic 4Finger
20:Writing Tripod
2:Small Diameter
26:Sphere 4-Finger
24:Tip Pinch
14: Tripod
27:Quadpod
12:Precision Disk
3:Medium Wrap
33:Inferior Pincer
13:Precision Sphere
10 : Power Disk
11:Power Sphere
17:Index Finger Extension
4:Adducted Thumb
16:Lateral
25:Lateral Tripod
22:Parallel Extension
5:Light Tool
29:Stick
15:Fixed Hook
32:Ventral
30:Palmar
Anthropomorphic grasping tests. 30/33 gestures are demonstrated in this work.

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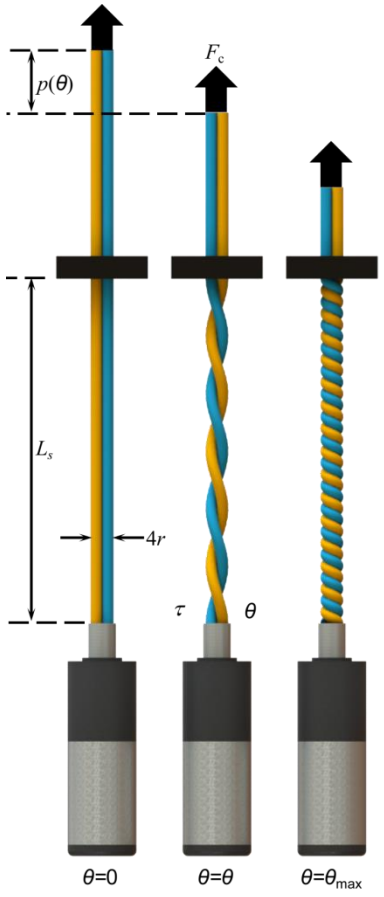
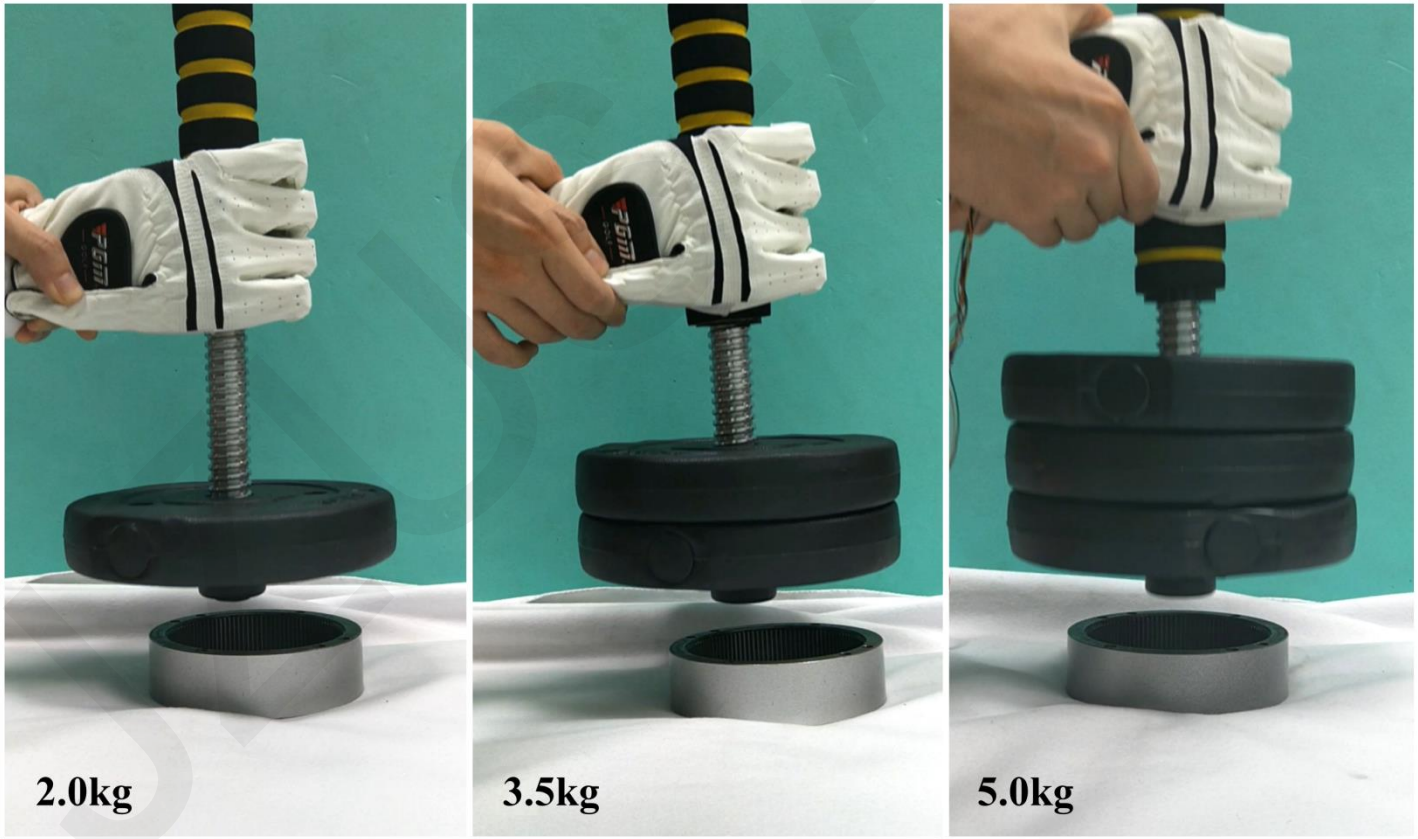
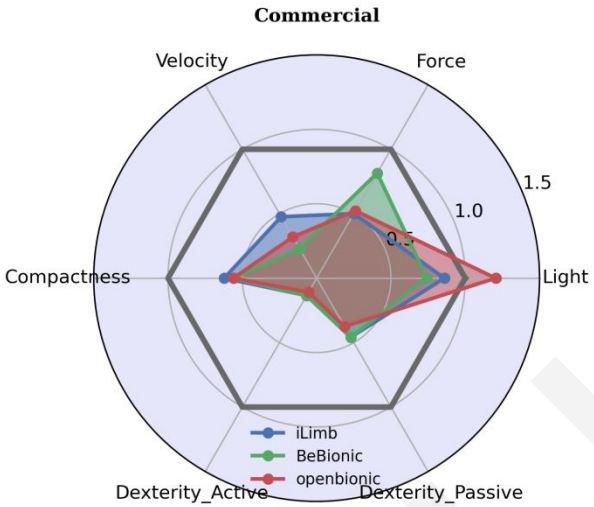
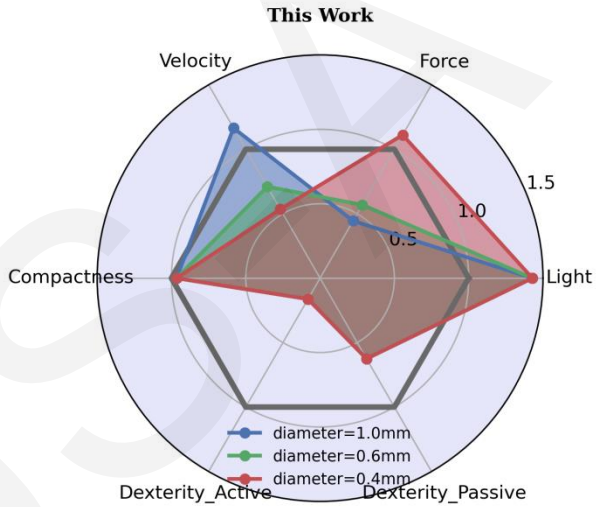



Lightweight, flexible, and compact twisted string actuator enables robot hand to resolve the paradox between weight, size and power.




**iLimb**

**BeBionic**

**Openbionic**

**This Work**

- With the novel intelligent mechanism, trade-off between the lightness, fingertip force, grasping velocity, compactness, and dexterity is realized.
- This brings us one step closer to Anthropomorphic hand