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## Soft-Robotic Sleeve for CTS Strain

Carpal Tunnel Syndrome (CTS) affects roughly 3%-6% of the working population ages 18-64. This affliction is caused by applying stress on the median nerve that is routed through the carpal tunnel while it is at a positive or negative angle to the human wrist. The median nerve often becomes inflamed and swollen due to pressure from the palmar carpal ligament which causes numbness, stiffness and in some cases severe pain. This is particularly prevalent in tasks such as typing. Simple tasks can become nearly impossible with CTS. A number of products on the market and research prototypes try to alleviate CTS strains, however, these designs are generally passive and don't dynamically adjust the wrist angle.

Researchers at Arizona State University have developed a soft-robotic wearable device to relieve Carpal Tunnel Syndrome, during activities like typing. This soft robotic sleeve detects wrist-plane angles, in real-time, and actuates bladders that keep the wrist-angle neutral to alleviate the pressure on the median nerve and relieve CTS strain. The sleeve is breathable, washable and easy to put on and take off. A prototype has been developed and tested and showed that the device adjusted the wrist angle in real-time upon sensing angle distortion.

This wearable, soft-actuated robotic sleeve dynamically adjusts the position of the wrist in real time to provide much needed relief for patients suffering from CTS strains so that they can get on with their daily activities.

### Potential Applications

- Prevent CTS strain
- Release/alleviate CTS strain

### Benefits and Advantages

- Allows dynamic adjustment of the wrist, in real time, to a neutral position

- Alleviates the pressure on the median nerve to relieve CTS strain
- Safety measures are built in
  - o Quick pressure release
- Cost-effective (early estimates sit at about \$76 to build)
- Easy to put on and take off
- Breathable and washable
- Decreased power requirements and the likelihood of failure