

Power Assist Globe

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1. Back Ground

Recent years, power assist devices become highly demanded, which relieve a physical strain on carers or support those who need care to be independent. However, a lot of other existing and developing body put-on power assist devices apply rigid body frames or metallic components to assist body, so this design causes the heaviness and the difficulty of fitting. Due to the inconveniences, not “body put-on” but “wearable like a normal cloth” type is the challenges for its practical application.

In order to challenge this type, our company approaches in different way; not make device flexible but mount light and flexible actuator “pneumatic rubber muscle” on supporter that normally supports locomotor apparatus disease patients. In this way, power assist glove, which is saved in weight and designed in a way to blend in with everyday apparel, and can be worn like a normal cloth, has been developing. Power Assist Glove (Fig.1) is grasp power assist glove which is the first development in the series of Power Assist Wear.

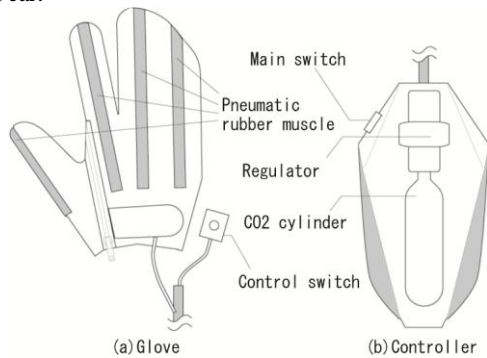


Fig.1 Overview of power assist glove

2. Power Assist Glove

2.1 How to Assist

This device uses pneumatic rubber muscles which expands and contracts tubes by a supplying a fluid as shown on Fig.2. Pneumatic rubber muscles are fixed to back side of finger inserting portioning in order not to prevent the sense of palm during grabbing an object. Pneumatic rubber muscle is made of light and flexible material with comfortable fitting, and is thought to be best as supporting force of body motion.

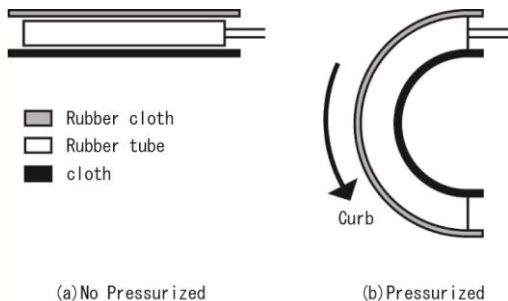


Fig.2 Structure of pneumatic rubber muscle

2.2 Pressure Supply

Small liquid CO2 cylinder is used as pressure supply of this device. Replacement is required after a certain times of uses, but it has several advantages such as small, light, no vibration, silent, and no battery when it compares to compressor and pump.



Pic.1 CO2 cylinder

2.3 How to Operate

An alternative push switch is used as operational switch. This switch can be powered on and off by just hitting it once. This switch opens and closes electromagnetic valve, which is directly coupled with pressure supply, and then operate pneumatic muscles. Also, by allocating the switch around wrist as shown in Fig. 1, this switch can be activated by moving elbow just before grabbing.

2.4 How to Use

This device enables to support grasping movement as shown in Pic. 2 and 3, by adding pressure and contracting all the tubes together which are fixed to back side of finger. In relax condition, this device can support to grasp a bottle, convey it to one's mouth, and to drink it with applying pressure 300 k-Pa on the tubes.



Pic.2 Grapping a glass



Pic.3 Holding a pen

3. Sales Results

The sales figures of Power Assist Glove until 2013 are 22 devices. Also, there is no similar product, whose intended use is to assist grasp strength in daily activities, in Japan.

4. Summary

In the future, increasing the level of this device is concerned; such as diversifying assistance movements, increasing assistant strength, reducing pressure supply in size and weight, and operating the device by reflecting user's will. Additionally, lower limb assist device has been developed as the second step of Power Assist Wear.