

EMG Sensor-based Evaluation for Joint Position of Assistive Chopsticks in Food-Serving Task

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Abstract:

Assistive chopsticks using joint mechanisms have been developed for people with disabilities and beginners. This joint mechanism can assist in food-serving using chopsticks. However, a suitable joint position for assisting chopstick operations has not yet been investigated. Thus, the purpose of this study was to investigate the effects of assistive chopsticks with two joint positions (top and grip) on food-serving tasks to find suitable joint positions. The participants were 10 young males. Participants moved 10 boiled soybeans to adjacent dishes using normal chopsticks (“control”) and assistive chopsticks with two joint positions (“grip position” and “top position”). To evaluate fatigue during chopstick operation, the activity of the flexor digitorum superficialis muscles was measured using an EMG sensor. The comfort of chopstick operations was investigated using a visual analog scale (VAS). The performance of the chopstick operation was evaluated based on the total required time for each operation. The results of the EMG sensor showed that the muscle activities of assistive chopsticks were lower than those of the control condition (normal chopsticks). In addition, the VAS results showed that the top joint caught beans more easily than in the grip position. Furthermore, there was no difference in the required time for performance in all conditions. These results indicate that assistive chopsticks with a joint mechanism on the top position are the most suitable for food-serving tasks. Furthermore, it is considered that the top position is better than the grip position for the joint mechanism of the assistive chopsticks.