

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

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INTRODUCTION & AIM

Assistive Chopsticks for Disabled and Beginner

Joint

Suitable joint position was not investigated.

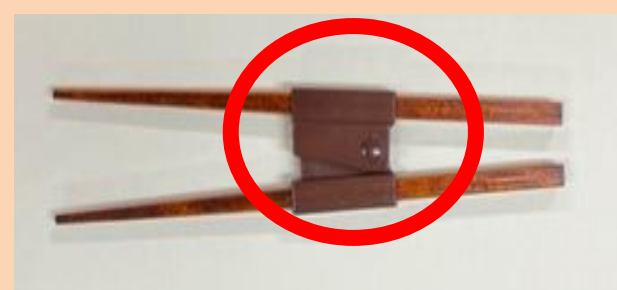
Aim of this study was to investigate the effects of joint positions (top and grip) on food-serving tasks to find suitable joint positions.

METHOD

Chopsticks for Comparison



Control



Grip Joint



Top Joint

Experiment

Participants: 10 young males

Food-Serving Task:

10 boiled soybeans were moved to adjacent dishes.



Measurement

Electromyography (EMG):

➔ Muscle Load for Grasping (flexor digitorum superficialis muscles)

➔ Sampling rate was 500 Hz.

➔ Mean values of each trial were normalized by maximum voluntary contraction (MVC).

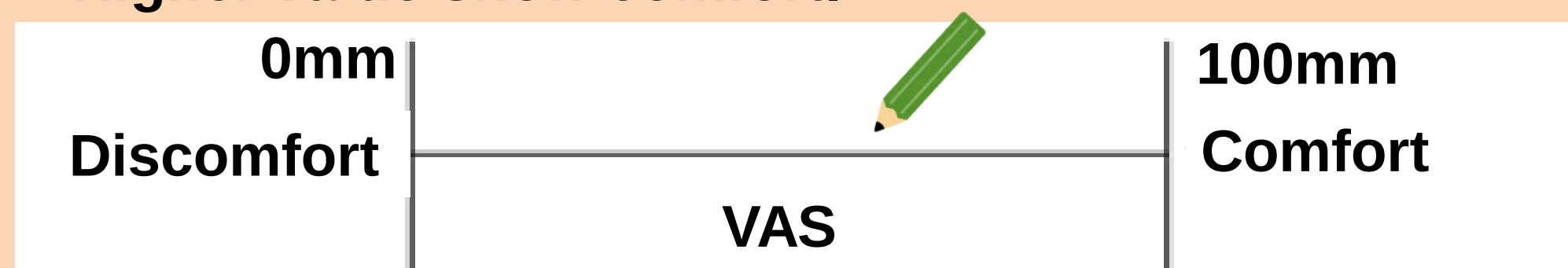
EMG Sensor



Visual Analog Scale (VAS):

➔ Comfort of Grasping Operations

➔ Higher value show comfort.



Required Time for Task:

➔ Performance of Food-Serving Task

RESULTS & DISCUSSION

Results

Electromyography (EMG)

➔ Values of participant E were detected and removed as outlier by Smirnov Grubbs test.

➔ Muscle activity of control was highest in 6 people. (A, B, C, F, G, and J)

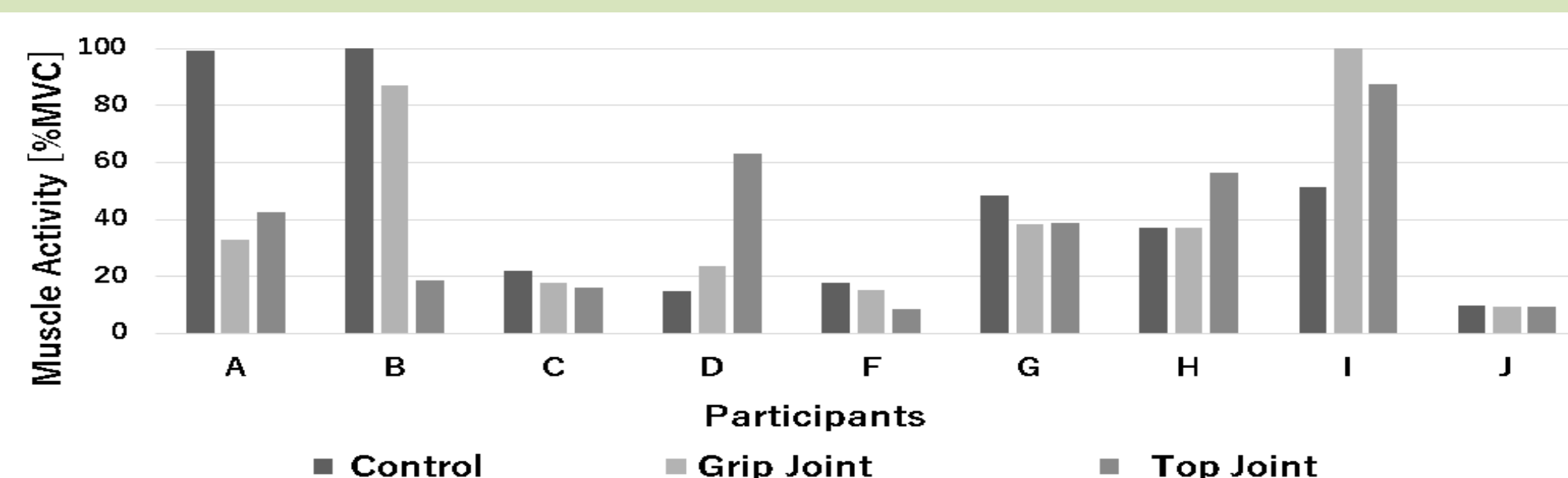


Fig.1 Muscle Activity of Food-Serving Task

Visual Analog Scale (VAS)

➔ Comfort of grip joint was lowest in 7 people. (A, C, D, E, G, H and I)

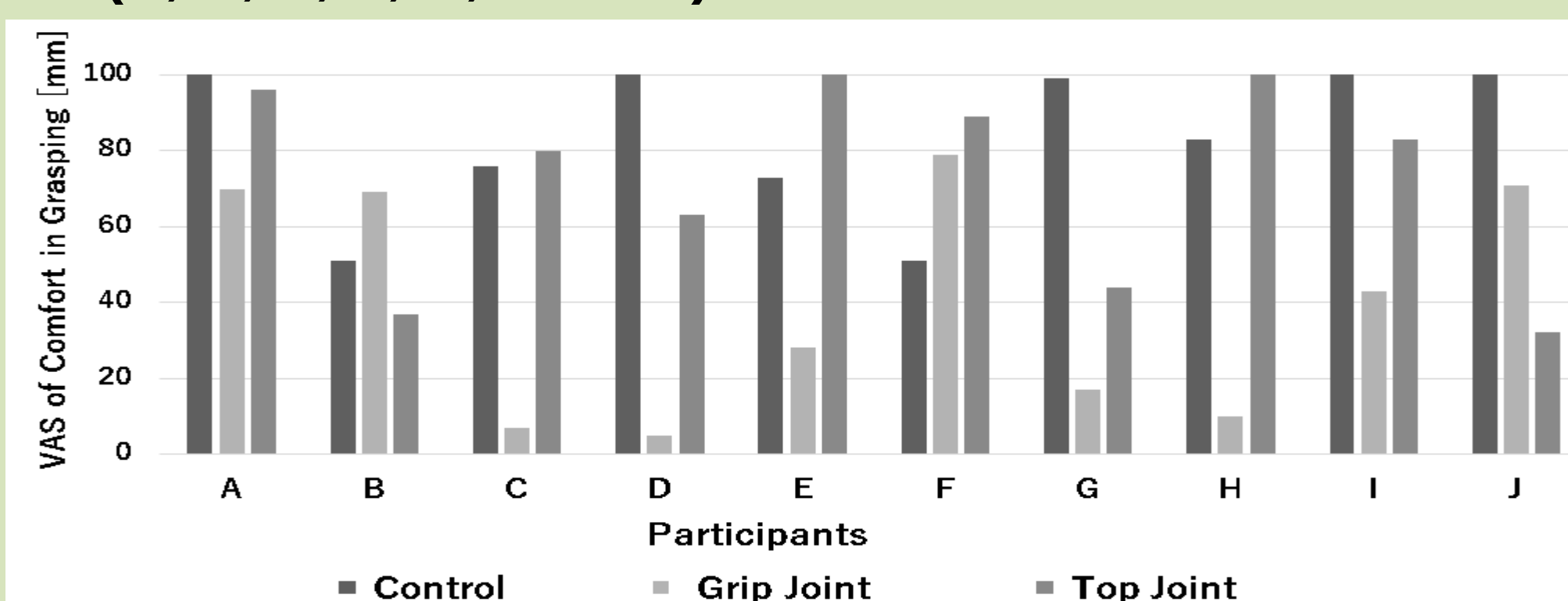


Fig.2 VAS for Comfort of Grasping in Food-Serving Task

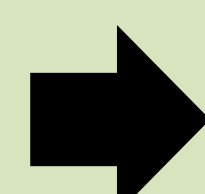
Required Time for Task:

➔ There was no trend.

Discussion

Muscle Load: Grip & Top Joint < Control

Comfort: Grip Joint < Top Joint & Control



Top joint is suitable for food-serving task using assistive chopsticks.

CONCLUSION

This study investigated the effects of joint positions of assistive chopsticks on muscle load, comfort, and performance in food-serving task.

The results showed that top is suitable position for joint of assistive chopsticks.

Conflict of Interest : The authors declare no conflict of interest.