

Design proposal for walking cane handle grips

K. TANIGUCHI, A. TAKANISHI. **Design proposal for walking cane handle grips.** *Gerontechnology* 2014;13(2):287; doi:10.4017/gt.2014.13.02.087.00 **Purpose** Many countries have an aging society, making the prevention of falls in older people an important issue and the danger of falls a primary concern for the elderly. Many studies have investigated the influence of patient activity while using different types of canes. However, very few studies have analyzed the grips of the handles of walking canes. The grip on a cane handle can easily be thought of as the most important part of the human/device interface in the prevention of falls. Many people have pain in their wrist that is caused by using incompatible handle grips. The handle grip shape is very important if the user is to obtain the most functionality and benefit from the cane¹. We hypothesized that dorsi-flexion of the wrist causes increased loads on the wrist and decreases the efficiency of power. This study aims to elucidate a design for walking cane handle grips that is able to reduce dorsi-flexion of the wrist and is able to improve efficiency in power. We made a prototype (P-type) of a handle grip that has a different from the standard S-type grip. The P-type shape is positioned along the carpal bone (grayish color bone in *Figure 1*). **Method** Eleven elderly subjects (aged 38 to 75 years old) were recruited. Each subject was asked to put the walking cane on random places on a force plate (the Nintendo Wii Balance Board WBB, a portable, inexpensive, and a reliable technologically-advanced device) with his right hand, while individual load was measured. This load was constant throughout testing. Many studies have reported that the WBB produces valid results for assessing balance while standing². The Center of Pressure (COP) sway was recorded (sampling frequency, 50Hz) for 10 seconds. Informed consent was obtained from all participants. Three trials were tested for each subject, and the difference was calculated from the mean of the trial data that were derived from the COP values. **Results & Discussion** Table 1 shows the variation between the two types of cane grips (P-type minus S-type). To evaluate the efficiency of power and stability in the P-type grip, we used the floor reaction force and the locus length of the COP. Table 1 shows that the P-type grip provides more stability and has greater efficiency of power than the S-type for most of the subjects. These results show that the design for a walking cane handle grip that considered carpal bone shape was effective in improving the stability and efficiency of power of the cane. In future analysis, we plan to explain the relevant parameters of the handle grip and the appropriate height for the handle for individual subjects.

References

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Keywords: mobility & transport, walking cane handle grip, biomechanics, gait aid

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*Table 1. Differences between P- and S-type cane grips; * $p < 0.05$; ** $p < 0.01$; CI=Confidence Interval*

Body height, cm	Force, kg		Distance, cm
	Mean	SD	
143	1.757	-0.734**	-0.9088
145	0.042	-0.018	-18.947**
154	-0.672	-0.204*	3.704
155	1.764	0.354	-12.241*
157	0.558	0.493	-5.715
159	0.126	-0.256*	-1.165
161	3.347**	0.663	-17.338**
162	-0.651	-0.194	8.640
163	1.188	0.164	-4.024
170	1.718	0.266	-1.722
173	-3.863**	0.179	-0.985
Mean	1.19	0.06	-5.4
95% CI	0.2-2.2	-0.2-0.3	-11.1-0.3

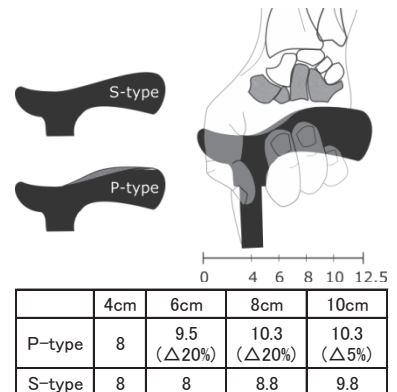


Figure 1. Location and grip thickness (cm)