통증 및 근골격재활
발표일시 및 장소 : **10 월 27 일(토) 14:10-14:20 Room B(5F)**

OP1-3-2

Principal component analysis of variables from insole pressure measurement for post stroke hemiplegia

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Objective
To investigate structure of variance dependencies among gait variables from insole pressure measurement system in post-stroke hemiplegia, we measured gait variables during level walking and conducted principal component analysis.

Method
58 participants with acute post-stroke hemiparesis were included in this study. They performed 10 meter level walking without cane or walker. Insole foot pressure measurement was applied. Temporo-spatial parameters included walking speed, stride length, cadence, double support phase, stance phase for more and less affected limbs, stride time and its standard deviation, stance phases and their standard deviations. Effective foot length (EFL) was a normalized anterior-posterior displacement of center of pressure for individual foot length, respectively. Principal component analysis was conducted for the variables from insole pressure measurement system. Principal components which could explain more than 80% of variability were selected. After selection of components, each component was interpreted by variables with more than absolute value 0.3 loadings.

Results
Cumulative proportions of variations explained by first 3 components are 73.9% (Figure 1). Each components and variables with their loading on components are reported in table 1. We interpreted 1st components as representing impairments in more affected lower limb function (Figure 3). We interpreted 2nd components as representing compensations in less affected lower limb function (Figure 2). We interpreted 3rd components as representing variability and stability.

Conclusions
For gait variables from insole type pressure measurement system, there are three independent components explaining total variance. The largest proportion of variance is from impairment of more affected side.

Table 1. 1st 4 components and each variable's loading on each components. DS: double stance phase, SS: single stance phse, MA: more affected side, LA: less affected side, EFL: effective foot length, DSDl: double stance phase duration, sd: standard deviation, Sym: symmetrical index.

	Component1	Component2	Component3	Component4
Stride length	**-0.350**			
Cadence	-0.231	-0.243	0.149	
Initial DS	**0.339**			-0.239
Terminal DS	**0.337**		-0.210	
SS_MA	**-0.354**	-0.260	0.119	-0.185
SS_LA	-0.272	**0.394**	0.145	**0.335**
EFL_MA	**-0.330**	-0.172	-0.158	0.203
EFL_LA	-0.219	0.250	**0.388**	**-0.390**
DSD sd	0.176	**-0.303**	**0.562**	0.288
Stance sd MA	0.243	-0.246	**0.474**	**0.312**
Stance sd LA	0.298	-0.182	-0.111	-0.201
Sym_EF	0.194	**0.366**	**0.404**	**-0.429**
Sym_SS	0.151	**0.547**		**0.425**

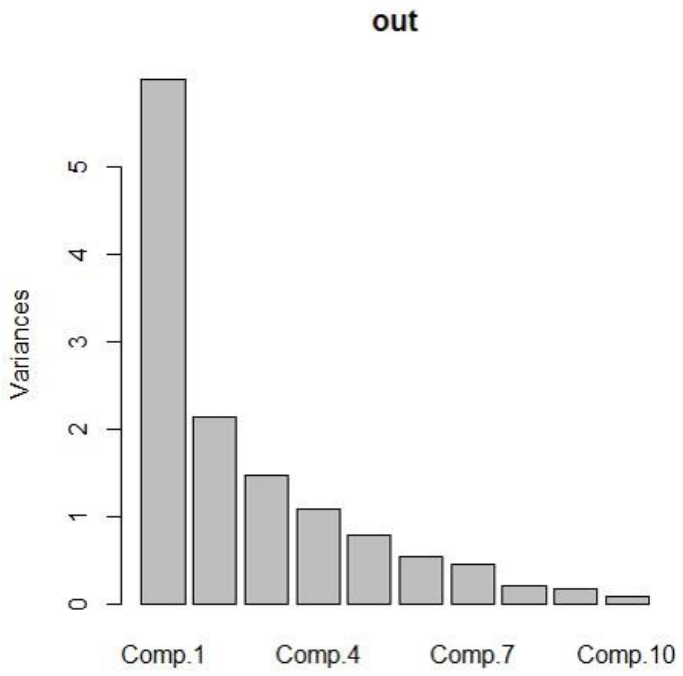

Figure 1. Variances explained by each component. 1st component explains 46.10% of total variance. 2nd component explains 16.48%, and 3rd components explains 11.37%.

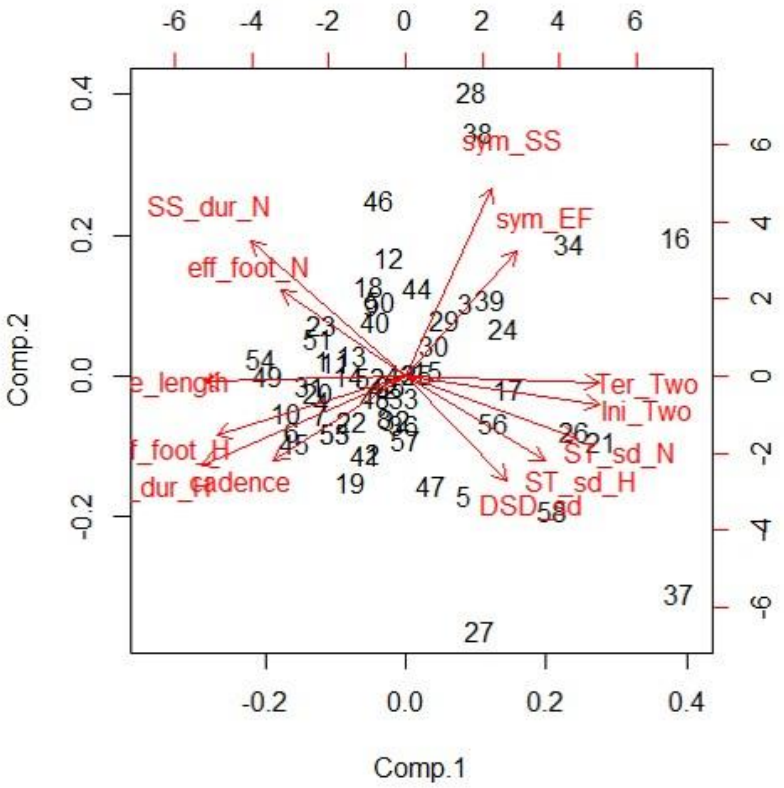

Figure 2. Each variables loadings on 1st and 2nd components which are independent each other.