

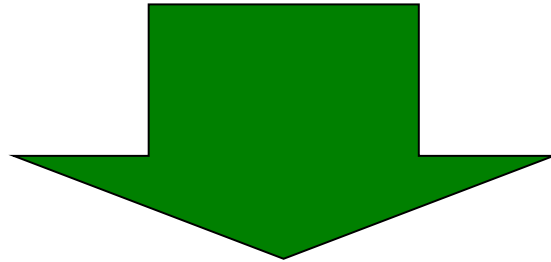
back ground

- walking heel to toe (tandem gait) is
 - a helpful clinical test in identifying subtle or mild ataxia
 - a balance exercise for elderly



prevention exercise of fall for elderly
in nursing care insurance

- quantitative and qualitative studies on tandem gait are rare.

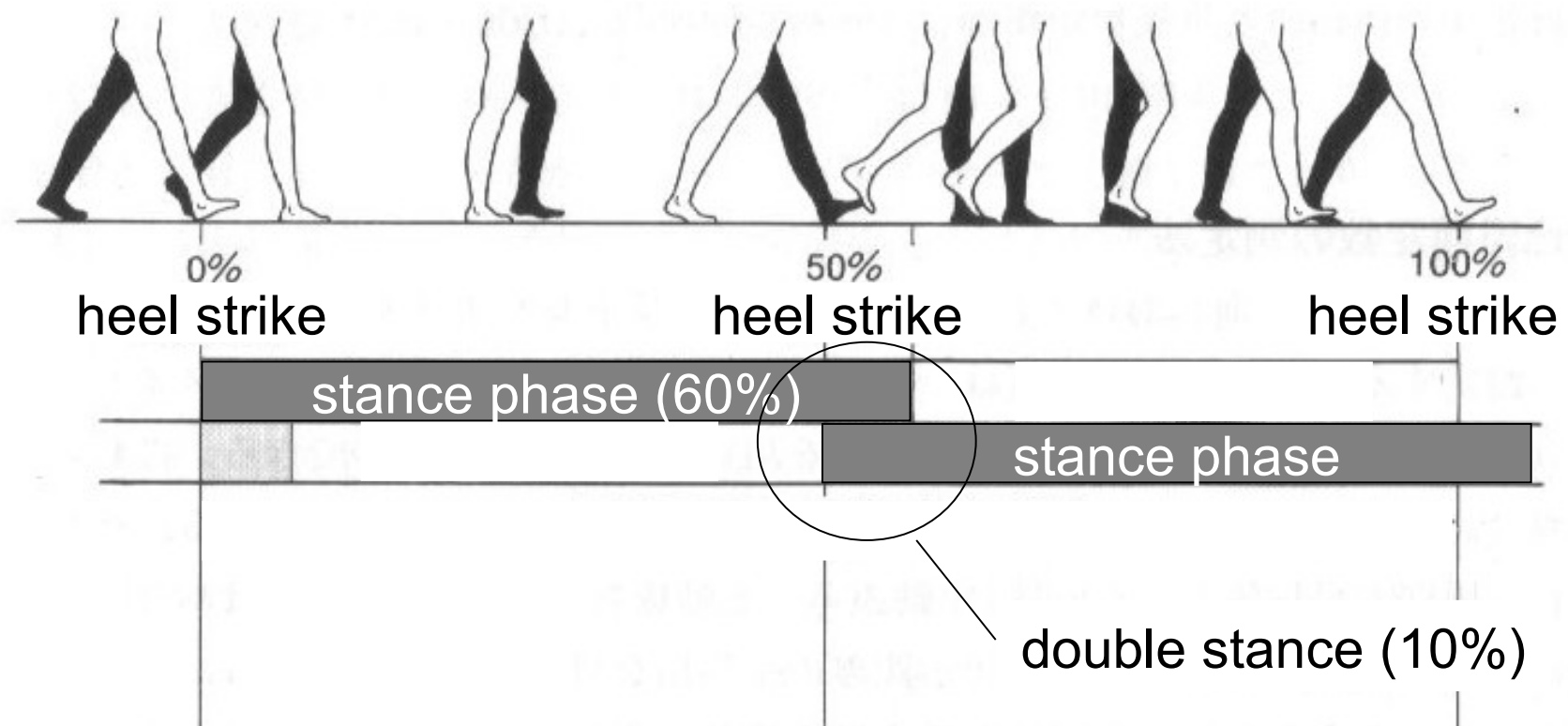


to clarify the characteristics of tandem gait, we compared gait cycle and muscle activities while subjects walked with two different tasks:

- 1) tandem gait
- 2) normal gait

method

- subjects
 - sixteen healthy males (21.6 ± 0.6 yr)
- dependent variables
 - gait characteristics
 - stance percentage
 - double stance percentage
 - heel strike/ foot flat percentage



- muscle activities with electromyography
 - vastus medialis (VM)
 - gluteus medius (GM)
 - hamstrings (HS)
 - gastrocnemius (GC)



result

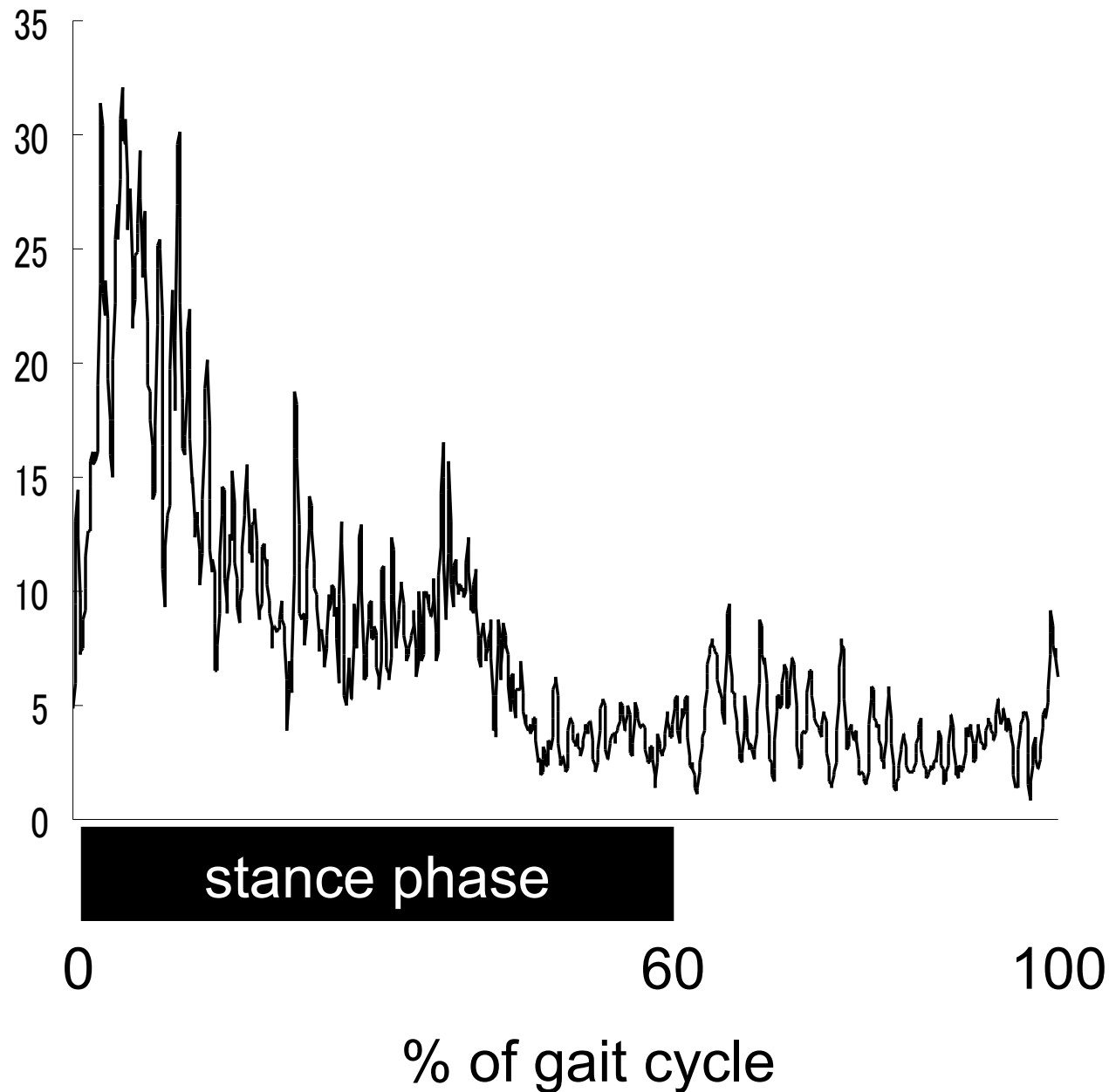
- gait characteristics

	tandem gait	normal gait	
stance percentage [%]	59.1±3.3	59.3±2.4	n.s.
double stance percentage [%]	8.2±3.9	9.0±2.4	n.s.
heel strike/ foot flat percentage [%]	8.8±7.1	10.8±7.3	n.s.
gait speed [m/s]	0.38±0.08	1.40±0.17	p <.001

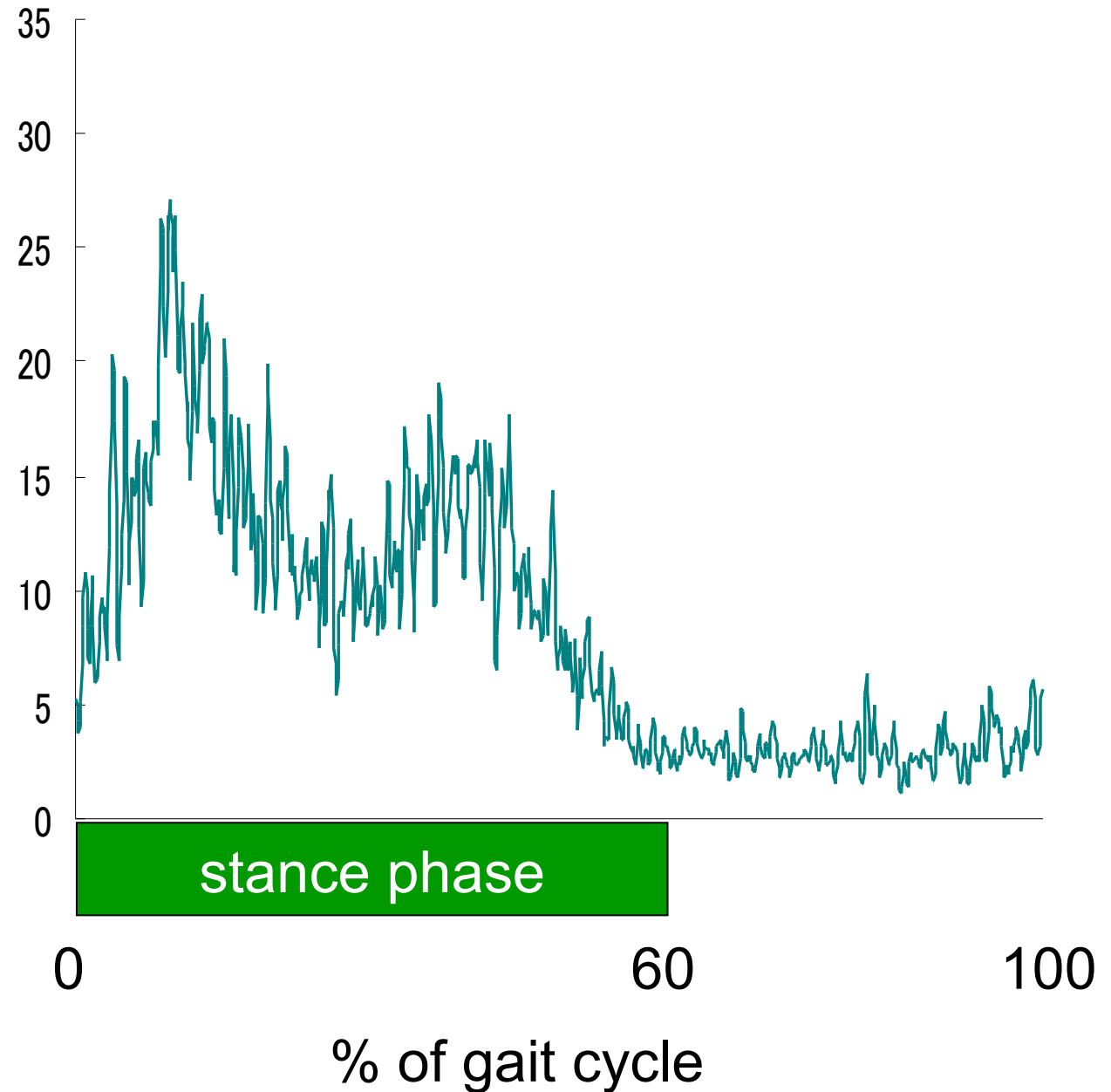
with paired t-test, n.s.: no significant

- qualitative assessment of iEMG
 - gluteus medius

normal gait

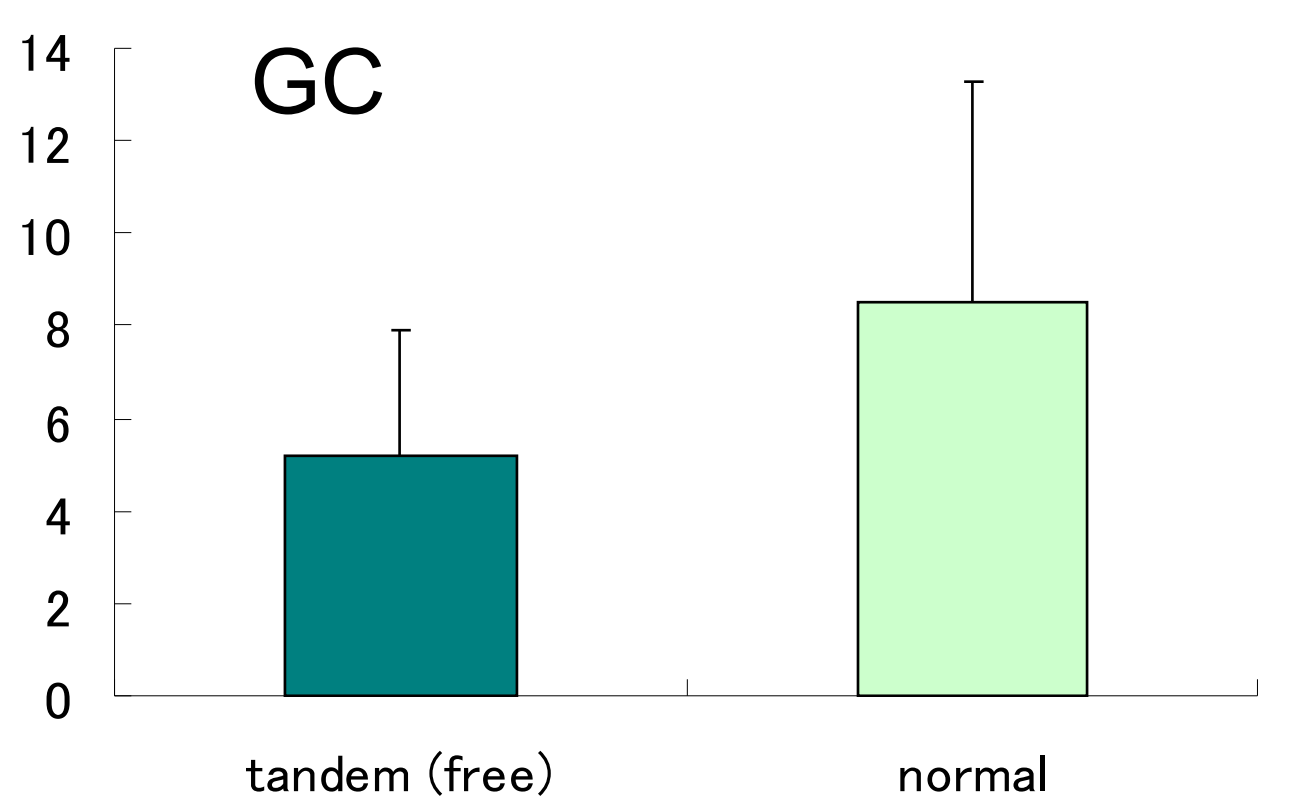
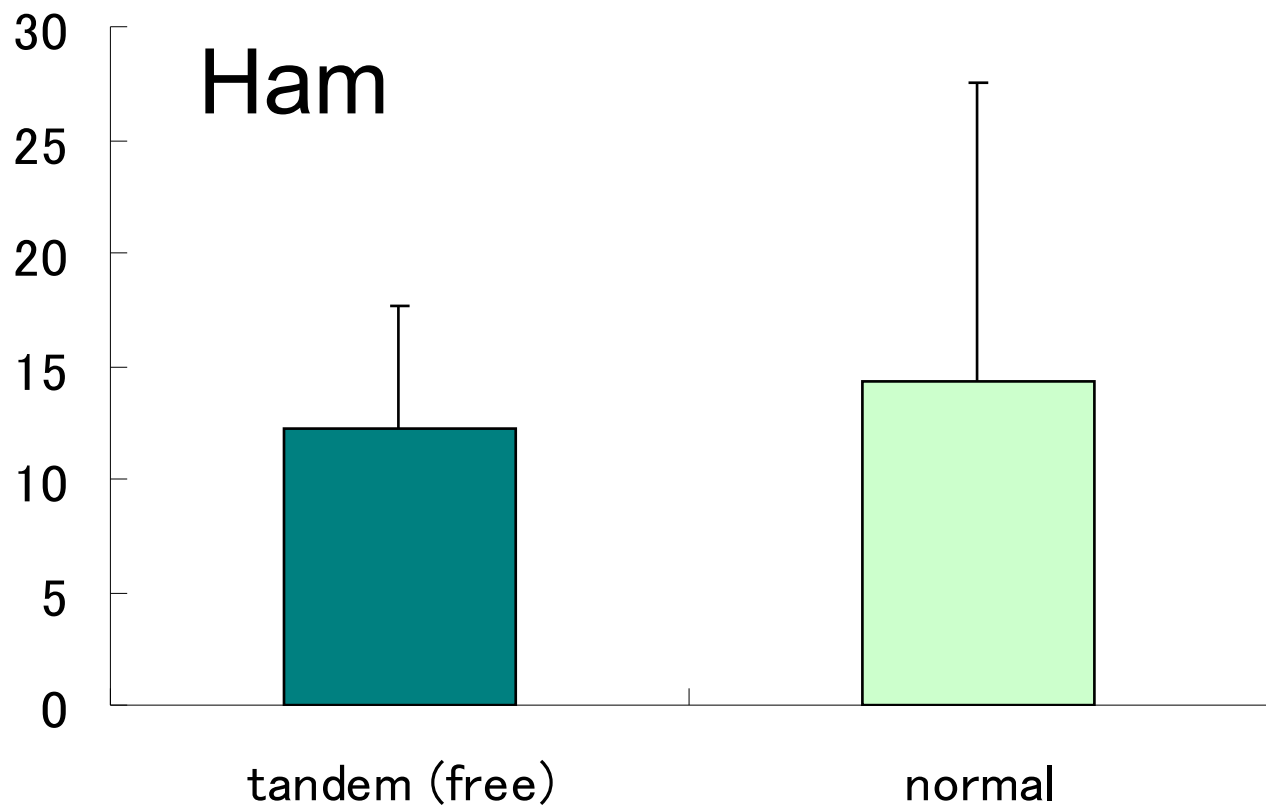
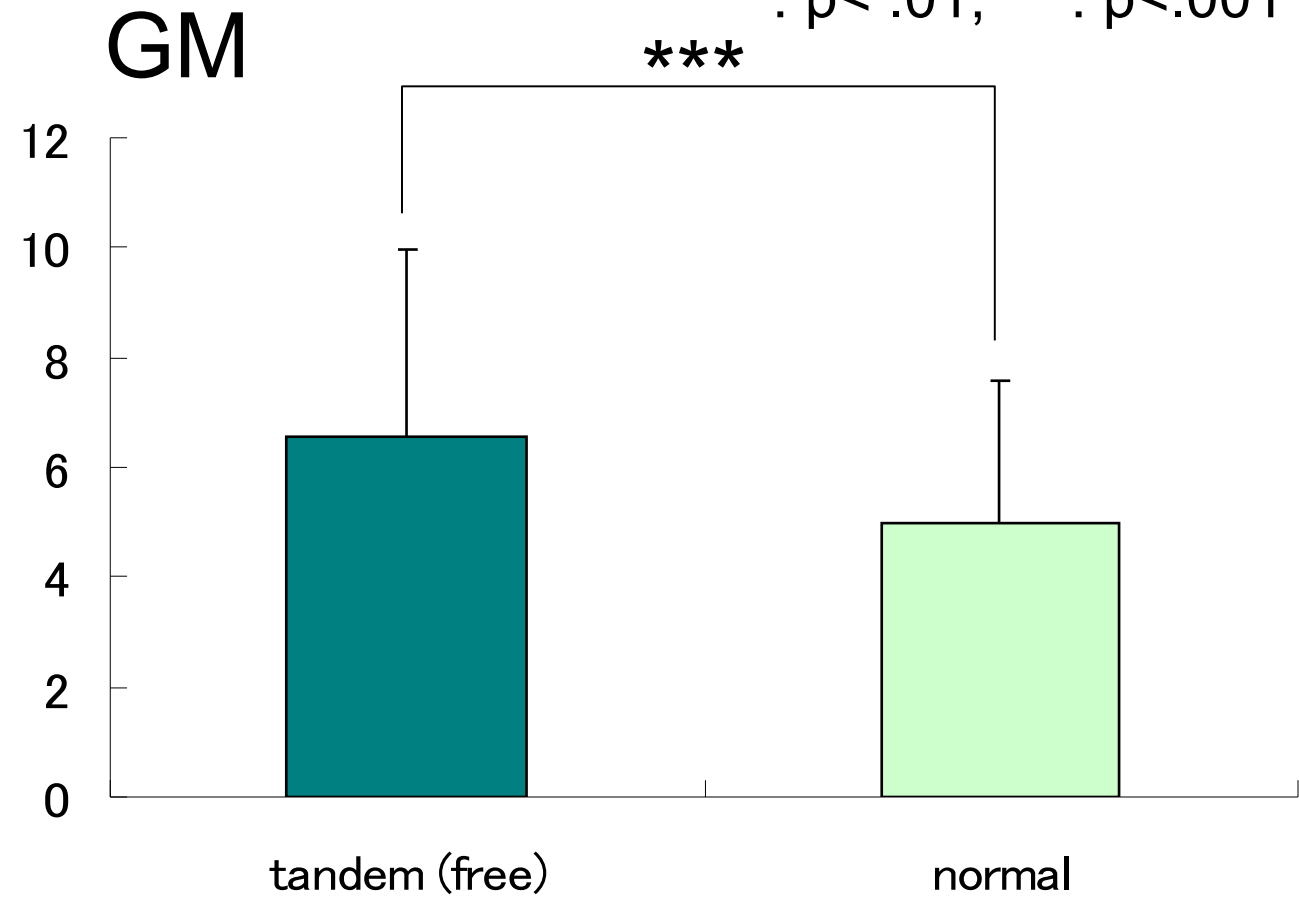
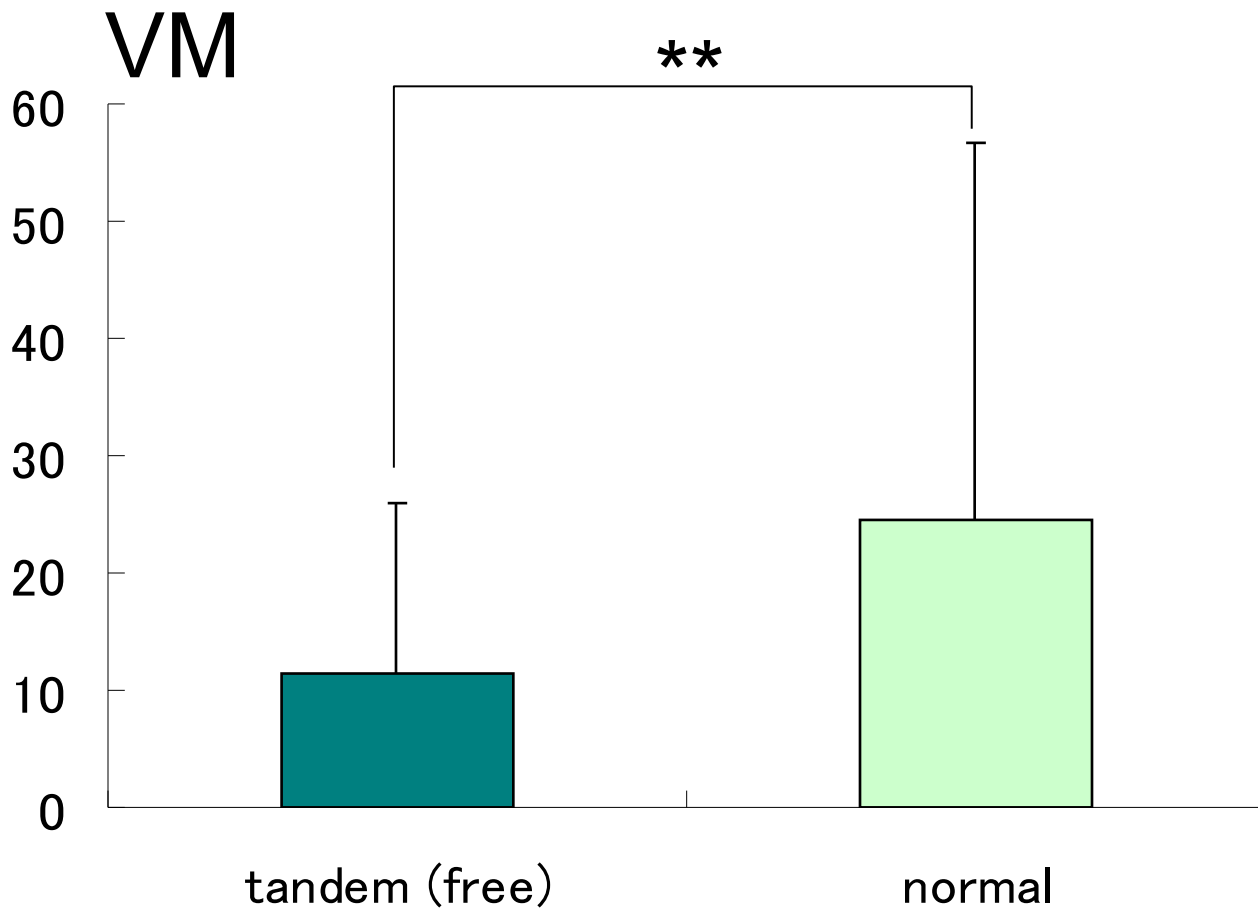


tandem gait



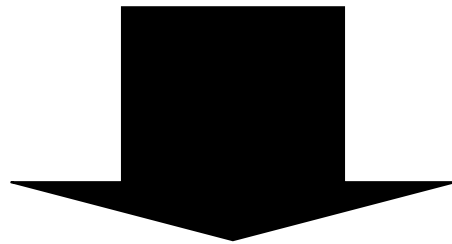
quantitative assessment with iEMG

** : $p < .01$, *** : $p < .001$



discussion

1. There were no significant differences between gait characteristics of tandem gait and normal gait, although gait speed of tandem gait was significantly slower than normal gait ($p < .001$).
2. The iEMG of GM during tandem gait was
 - more explicit and constant during tandem gait of stance phase compared to normal gait
 - significantly greater than normal gait ($p < .01$).



tandem gait is not only a helpful and sensitive clinical test but useful and safer for muscle strength exercise of hip abductor