CHAPTER 4

Results

4.1 Reliability study

Test-retest reliability of the variables from a 30-second chair stand test, a 40-m fast paced walk test, and a stair climb test were determined. Participants were tested and retested within one day with at least an hour rest from the first test. Five participants (4 female and 1 male) were chosen randomly from all participants. The mean age, height and BMI of the participants were 61.40 ± 8.41 years, 57.80 ± 8.35 kg, 156.2 ± 9.18 cm, and 23.61 ± 1.94 kg/m^2, respectively. The intraclass correlation coefficients ($ICC_{3,1}$) values of the number of complete stand from a 30-second chair stand test, the performance time of a 40-m fast-paced walk test, and the performance time of a stair climb test were 0.753, 0.946 and 0.790 respectively as shown in Table 1.

Table 1 The intraclass correlation coefficients ($ICC_{3,1}$) values of the variables from a 30-sec chair stand test, a 40-m fast paced walk test, and a stair climb test

Outcome variables	$ICC_{3,1}$	*p*-value	(95% CI)
number of complete stand from a 30-second chair stand test	0.753	0.042	-0.151 - 0.971
performance time of a 40-m fast-paced walk test	0.946	0.002	0.578 - 0.994
performance time of a stair climb test	0.790	0.031	-0.059 - 0.976

4.2 Principle study

4.2.1 Demographics characteristics of the participants

This study aims to compare the effect of knee orthosis (knee sleeve and brace) on functional outcomes in individuals with knee osteoarthritis. Individuals with knee OA ranged in age from 50-70 years were recruited through posters and direct contact via telephone. Twenty-eight knee OA patients (8 men and 20 women) with mean age of 59.54 ± 5.49 years participated in this study. Seventeen participants were diagnosed with OA knee on the right side (10 participants with mild and 7 participants with moderate severity) and eleven participants were diagnosed on the left side (7 participants with mild and 4 participants with moderate severity). The average duration of having knee pain was 2.90 ± 2.34 years. The baseline value for pain in a previous month was 5.21 ± 1.73 (ranged from 3 to 9) by using NRS (0-10). Each participant was asked to choose the knee orthosis of his/her choice when all of the tests were done. Nineteen participants chose the OA knee brace over the knee sleeve and vice versa in the other nine participants. No report of any adverse effect from wearing the knee orthoses during the test.

Table 2 The demographic characteristics of the participants

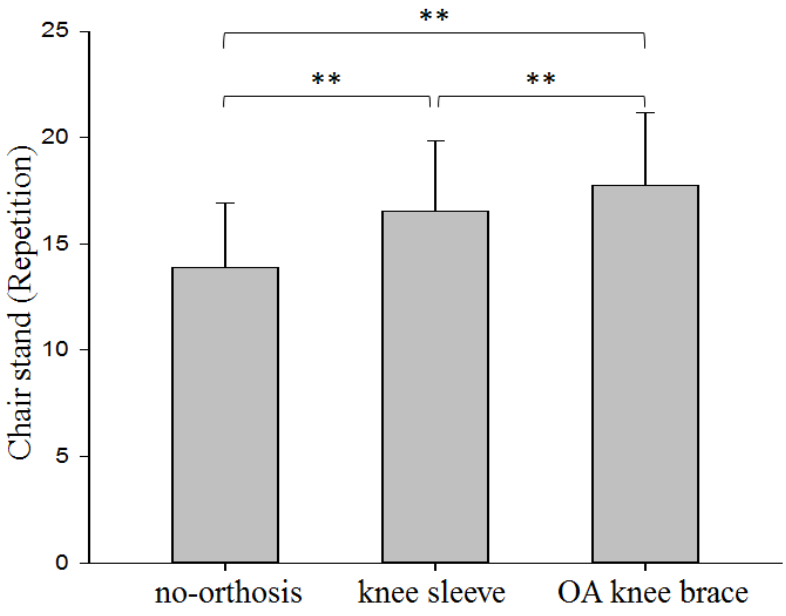
Variables	Total (N=28)
Sex	Men=8 (28.57%) Women=20 (71.43%)
Age (years)	59.54 ± 5.49
Height (m)	1.57 ± 6.67
Mass (kg)	61.77 ± 9.61
BMI (kg/m^2)	24.97 ± 2.92
Knee pain side (number)	Right=17 (10 with mild and 7 with moderate) Left=11 (7 with mild and 4 with moderate)
Pain experience (year)	2.90 ± 2.34
Pain in previous month	5.21 ± 1.73

For baseline assessment, the average value for the KOOS pain was 66.27 ± 16.23, other symptoms were 62.63 ± 13.70, function in daily living (ADL) was 70.48 ± 15.72, function in sport and recreation were 38.93 ± 18.17, and knee related quality of life (QOL) was 42.64 ± 19.84.

4.2.2 A 30-second chair stand test

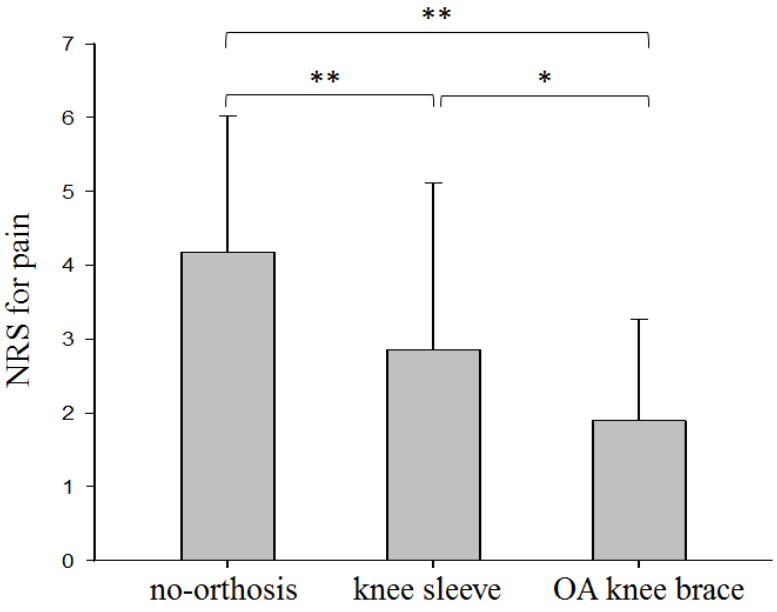
Results of a 30-second chair stand test were shown in Figure 8. The mean number of sit-to-stand repetitions of the no-orthosis condition (baseline value), the knee sleeve condition, and the OA knee brace condition were 13.89 ± 3.02, 16.54 ± 3.33, and 17.75 ± 3.34, respectively. Repeated measures ANOVA with a Greenhouse-Geisser correction indicated that the numbers of sit-to-stand repetition were significantly different among the three testing condition ($F(1.40, 37.69) = 60.30$, $p < 0.01$). Pairwise comparisons (LSD) revealed that the mean number of repetition was higher for both the knee sleeve and the OA knee brace conditions compared to the baseline condition ($p < 0.01$). In addition, the number of chair stand test in the OA knee brace condition was significantly better than the knee sleeve condition ($p < 0.01$).

NRS for pain was less for both the knee sleeve and the OA knee brace conditions compared to baseline condition ($p < 0.01$) as shown in Figure 9. NRS for pain in the OA knee brace condition was significantly lower than the knee sleeve condition ($p = 0.01$).



** significant different between conditions at $p < 0.01$

Figure 8 Repetitions of chair stand test (mean ± SD)



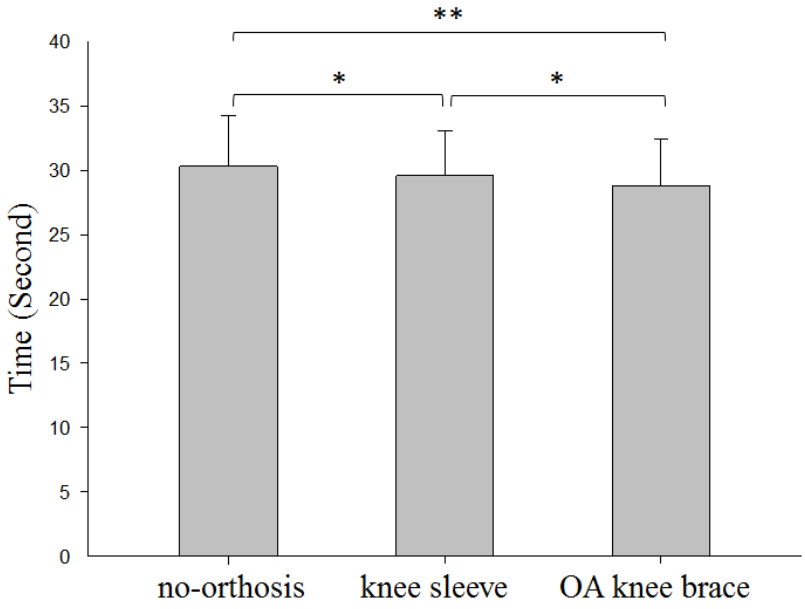
* significant different between conditions at $p < 0.05$
** significant different between conditions at $p < 0.01$

Figure 9 NRS of chair stand test (mean ± SD)

4.2.3 A 40-meter fast paced walk test

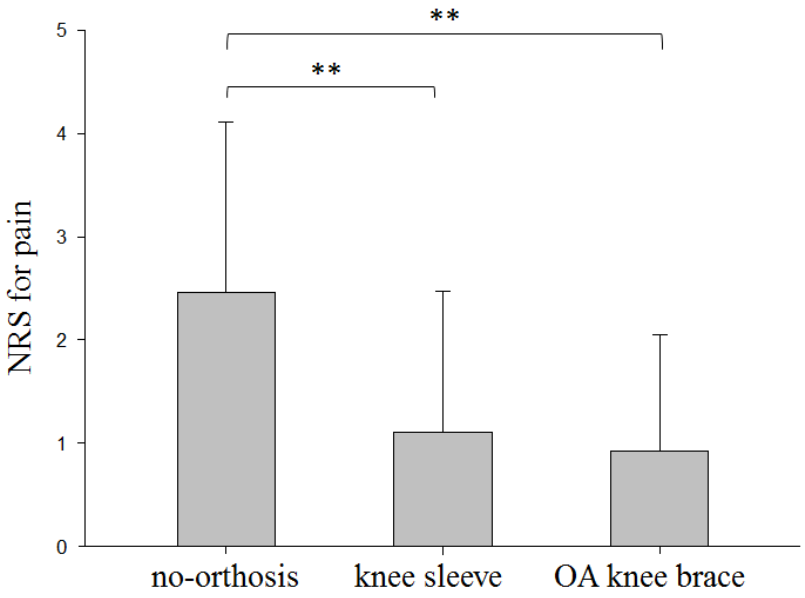
The average walking speed was 1.34 ± 0.18 meter/second at baseline, 1.37 ± 0.17 meter/second at the knee sleeve condition, 1.41 ± 0.18 meter/second at the OA knee brace condition. Results of a 40-meter fast paced walk test were shown in Figure 10. The mean fast paced walking time of the no-orthosis condition (baseline value), the knee sleeve condition, and the OA knee brace condition were 30.30 ± 3.94 second, 29.56 ± 3.51 second, and 28.81 ± 3.57 second, respectively. ANOVA with repeated measures with a Greenhouse-Geisser correction indicated that the mean scores of walking time were statistically significantly different among three testing condition ($F(1.46, 39.31) = 13.39$, $p < 0.01$). Pairwise comparisons (LSD) revealed that the significant differences in walking time were found between knee sleeve and baseline condition ($p = 0.019$), and also between OA knee brace and baseline condition ($p < 0.01$). In addition, the mean walking time of the OA knee brace condition was significantly less than the knee sleeve condition ($p = 0.001$).

NRS for pain during walking was less for both the knee sleeve and the OA knee brace conditions compared to baseline condition ($p < 0.01$) as shown in Figure 11. NRS for pain in the OA knee brace condition was significantly lower than the knee sleeve condition ($p = 0.248$).



* significant different between conditions at $p < 0.05$
** significant different between conditions at $p < 0.01$

Figure 10 Time of fast-paced walk test (mean ± SD)



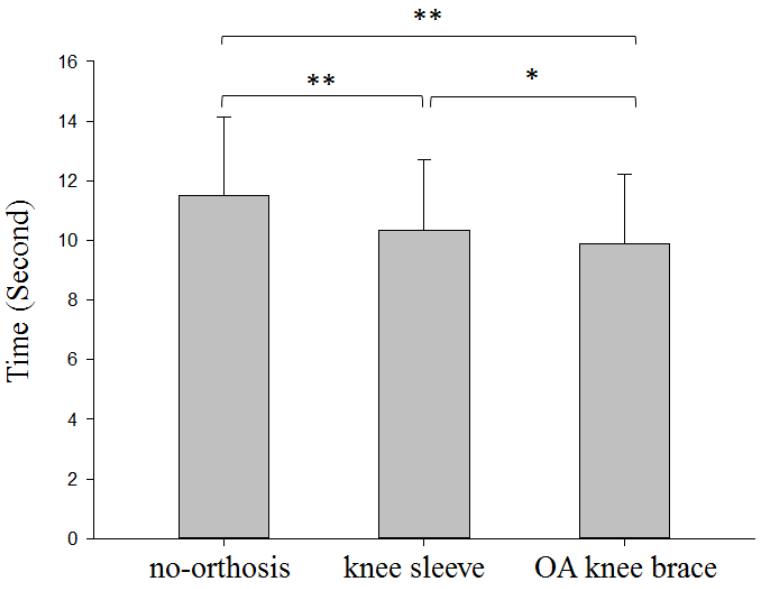
** significant different between conditions at $p < 0.01$

Figure 11 NRS of fast-paced walk test (mean ± SD)

4.2.4 A stair climb test

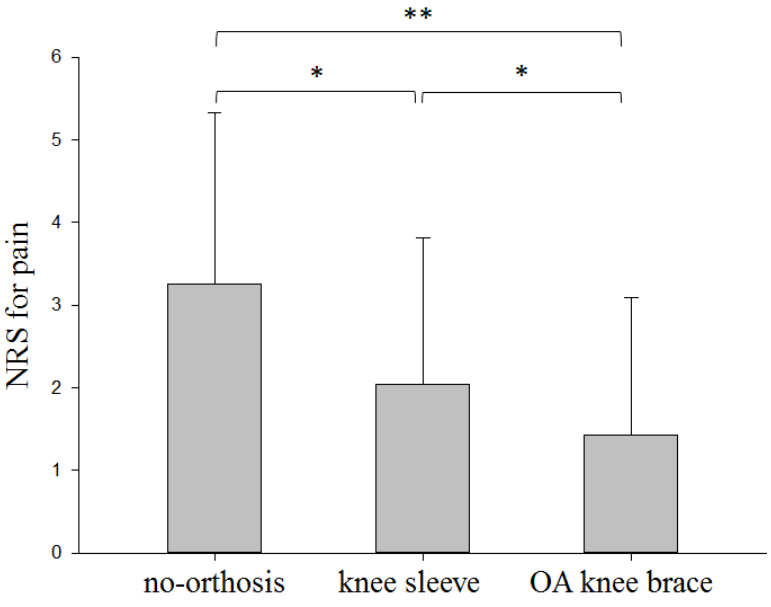
Results of a stair climb test were shown in Figure 12. The mean stair climb time of the no-orthosis condition (baseline value), the knee sleeve condition, and the OA knee brace condition were 11.51 ± 2.64 second, 10.34 ± 2.39 second, and 9.89 ± 2.34 second, respectively. ANOVA with repeated measures with a Greenhouse-Geisser correction indicated that the mean scores of stair climb time were statistically significantly different among three testing condition ($F(1.27, 34.31) = 26.65$, $p < 0.01$). Pairwise comparisons (LSD) revealed that the mean stair climbing time of both the knee sleeve and the OA knee brace conditions was significantly less compared to baseline condition ($p < 0.01$). In addition, the mean stair climbing time of the OA knee brace condition was significantly less than the knee sleeve condition ($p = 0.002$).

NRS for pain during stair climb was less for the knee sleeve compared to baseline condition ($p = 0.001$) and for the OA knee brace compared to baseline condition ($p < 0.01$) as shown in Figure 13. NRS for pain in the OA knee brace condition was significantly lower than the knee sleeve condition ($p = 0.008$).



* significant different between conditions at $p < 0.05$
** significant different between conditions at $p < 0.01$

Figure 12 Time of stair climb test (mean ± SD)



* significant different between conditions at $p < 0.05$
** significant different between conditions at $p < 0.01$

Figure 13 NRS of stair climb test (mean ± SD)

4.2.5 The orthosis of choice of the participants

A chi-square test revealed a significant association between the pain experienced in the previous month and the orthosis of choice ($\chi^2(1, n = 28) = 4.414$, $p = 0.036$). The proportion of participants who rated their knee pain in the previous month above 5 preferred the OA knee brace over the knee sleeve (35.7 % VS. 32.1%), whereas those with knee pain score less than 5 selected the knee sleeve over the OA knee brace (28.6% VS. 3.6%).

Table 3 A contingency table showing the number of brace chosen by the participants

Values are n (percent).

		Level of pain experienced in the previous month		Total
		Pain ≤ 5	Pain > 5	
Type of brace	knee sleeve	8 (28.6%)	1 (3.6%)	9 (32.1%)
	OA knee brace	9 (32.1%)	10 (35.7%)	19 (67.9%)
Total		17 (60.7%)	11 (39.3%)	28 (100%)