Original Article

Comparison of routine physical therapy exercises with and without core stability exercises in total knee replacement patients

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Objective: To compare the effects of routine physical therapy exercises with and without core stability exercises in total knee replacement patients.

Methodology: In this single blinded randomized control trial 44 patients with the age 50-80 years were included and data were collected from Medix Hospital Lahore. Patients with neurological disorder and radiculopathy were excluded while including unilateral cemented total knee replacement patients and both genders. After 3 weeks of operation, patients were allocated to groups by lottery method. Routine physical therapy group or control group included ankle pumps, straight leg raise in supine, short arc quad, hip abduction in side lying, squats and walk. Experimental group include drawing in maneuver or abdominal bracing, Curl ups, bridging with abdominal bracing, heel slide with abdominal bracing, leg lift with abdominal bracing, side support with knee flexion, side support with knee extension, table top leg press and dead bug along with routine physical therapy exercises. Treatment was given for 6 days a week for 6 weeks under supervision with 10 repetitions of 2 sets and 5 second hold. Pre and post readings were recorded on lower extremity functional scale.

Results: There was a significant difference among the lower extremity functional scale. Post mean score of control group was 19.45$\pm$5.20 and that of experimental group was 42.54$\pm$7.20 ($p<0.001$).

Conclusion: Core stability exercises were more effective compared to routine physical therapy exercises in total knee replacement patients. (Rawal Med J 202;45:842-845).

Keywords: Core stability, total knee replacement, osteoarthritis.

INTRODUCTION

Ligaments support the knee joints during static and dynamic activities hence providing stability and mobility in conjunction with hip and knee.[1] Knee osteoarthritis leads to severe pain and incapacity to do work, forcing people to single leg or both leg knee arthroplasty. Rehabilitation is important key factor in patients return back to normal routine life.[2] Total knee replacement leads to significant pain improvement and functional activity performance. Adding high intensity exercises improve functional outcome with better performance.[3] Routine physical therapy rehabilitation tends to improve the strength of the quadriceps femoris muscles and knee joint range of motion to improve gait and climbing stairs. Core stability helps to improve independence of transfer, decrease pain, increase range of motion and improve functional mobility of patients.[4]

Core stability exercises with standard physical therapy improve functional results, balance and quality of life.[5] Lower extremity functional scale develops by Binkley has high responsiveness, validity, reliability and test retest value. Minimal detachable difference of 9 indicates that there is clinically important difference. Internal reliability is excellent that is α=0.96. That is why the lower extremity functional scale can be used as better option in measuring score after core training in total knee replacement patients.[6] Core stability exercises have fast effect on functional recovery of total knee replacement patients. Hence, comparing routine physical therapy exercise and core stability exercises in total knee replacement patients will beneficial for these patients.

METHODOLOGY

This single blinded randomized control trial of total 44 patients, divided 22 in each group by lottery

method after 3 weeks of operation. Time duration was 20 months. Data were collected from the Medix Hospital, Lahore. Sample size was calculated with formula using 5% level of significance and 80% power of test.

$2\sigma^2 (Z_{1-\alpha/2} + Z_{1-\beta})^2$ n= $(\mu_1-\mu_2)$

Age ranged from 50-80 years (mean 62.93±9.146). BMI (Body Mass Index) showed that 18(41%) patients were overweight and 26(59%) patients were obese (mean BMI 30.07±2.92). Unilateral, cemented total knee replacement patients, both genders with age range 50-80 years were included. Patients with neurological disorder and radiculopathy were excluded. After taking informed consent, data were collected by using lower extremity functional scale (LEFS).

Control group received ankle pumps, straight leg raise in supine, short arc quad, hip abduction in side lying, squats and walk. Experimental group was given the core stability exercises, Drawing in maneuver or abdominal bracing, curl ups, bridging with abdominal bracing, heel slide with abdominal bracing, leg lift with abdominal bracing, side support with knee flexion, side support with knee extension, table top leg press and dead bug along with routine physical therapy exercise. Exercise was performed for 6 days a week and for 6 weeks. 10 repetitions with 2 sets and 5 second hold were performed (Table 1). Rehabilitation exercises were done under the supervision. Pre and post readings were recorded on lower extremity functional scale.

Statistical Analysis: SPSS version 21 was used for analysis. The dependent sample t test was employed while a $p \leq 0.05$ was considered statistically significant.

RESULTS

Demographic characteristics of study population are shown in Table 2. Patients treated with core stability exercises had higher post score; mean score was 42.54±7.2 as compared to the patients treated by routine physical therapy exercises which had mean score of 19.45±5.2 (Table 3). These results revealed that core stability exercise are more effective than routine physical therapy exercises for total knee replacement patients in making them functionally active. There was significant difference among the post mean scores of lower extremity functional scale of control group and experimental group.

Table 1. Core stability exercises with repetitions and holding time.

Exercises	Repetitions
Drawing in maneuver or abdominal bracing	10×2 repetitions with 5 second hold
Curl ups	10×2repetitions with 5second hold
Bridging with abdominal bracing	10×2repetitions with 5 second hold
Heel slide with abdominal bracing	10×2repetitions with 5 second hold
Leg lift with abdominal bracing	10×2repetitions with 5 second hold
Side support with knee flexion	10×2repetitions with 5 second hold
Side support with knee extension	10×2repetitions with 5 second hold
Table top leg press	10×2repetitions with 5 second hold
Dead bug	10×2repetitions with 5 second hold

Table 2. Demographic characteristics of patients.

Variable	Mean	Frequency
Age (years)		
50-79	62.93	
Operated Leg(L/R)		25/19
Gender		
Male		15
Female		29
Height	163.cm	
Mass	68kg	
BMI	30.07	
		18 (overweight)
		26 (obese)

Table 3. Comparison of lower extremity functional scale score among post control and post experimental groups.

Score	Group	N	Mean± SD	T	p-value
Lower Extremity Functional Scale	Control	22	19.45±5.2	-12.127	0.000
	Experimental	22	42.54±7.2		

Core stability exercises regime explained in Table 1 were helpful in making patients active by achieving gain in functional movement and performance of activities. Total knee replacement patients responded more to core stability exercises and improving functionally in movements and activities.

DISCUSSION

The purpose of this study was to find if there was significant difference in core stability exercises than routine physical therapy exercises in total knee replacement patients. Core stability exercises made patients functionally independent and helped them to perform activities of daily life. Patients who performed core stability exercises had improved effects in comparison to other routine exercises. Core stability exercises also called trunk stability exercises have increased effect on functional outcome of patients of total knee replacement than routine program.[5]

Our study found that there was significant difference in core stability exercises than routine physical therapy exercises in total knee replacement patients. Core stability exercises improve overall function of body by improving endurance, flexibility, strength and neuromuscular control of joints so increasing functional performance or functional movements of patients hence proved better than routine physical therapy exercises.[8] Long term rehabilitations have better effects on independence and frequency of physical activities of daily life.[9] Core stability exercises performed for six weeks had effect on trunk and hip muscles hence increasing the core stability of body with measurable difference. Muscles respond to core stability exercise in six weeks.[10]

Core stability exercises not only increase the endurance of muscles but also increase the balance of body hence improving overall core stability of body which increase functional outcome of patients.[11] Core stability rehabilitation training in total knee replacement patients have a positive effect on functional outcome which can be measured with detachable difference on lower extremity functional scale that core training is better than routine physical therapy exercises. Thus, it can be the part of treatment plan in total knee replacement patients. Core stability exercises increase the strength of trunk and hip muscles hence increasing the core strength.[12]

Strengths of this study is standardized measure. Pre readings were taken after 3 weeks of total knee replacement surgery. Current study used specified hospital in one region of Lahore. Future investigation can be measuring balance, quality of life and satisfaction level in total knee replacement patients with core stability exercises.

CONCLUSION

Core stability exercises had significant results than routine physical therapy exercises in total knee replacement patients.

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