



Service Priorities and Programmes
Electronic Presentations

Convention ID: 391

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The contribution of hip abductors strength to functional performance of patients with total knee arthroplasty

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Keywords:

Total Knee Arthroplasty

Hip Abductor Strength

Functional Performance

Introduction

Knee osteoarthritis (OA) is a common chronic degenerative disease characterized by recurrent severe pain, joint deformity, physical and functional limitation. Total Knee Arthroplasty (TKA) is recognized as a highly beneficial surgical intervention for patients suffering end-stage knee OA. In 2012, there were 2223 episodes of TKA performed in Hospital Authority, which had increased by 112% since 2008. Nevertheless, studies revealed that residual functional deficits could persist one year after surgery or even longer. Therefore, investigating modifiable factors that contribute to functional performance after TKA may direct evidence-based rehabilitation approach. One such modifiable factor is lower extremity weakness. The quadriceps muscle strength demonstrated positive association to physical functions in TKA. However, the role of hip abductors muscle strength has not received much attention. Recent studies showed that hip abductors muscle might also contribute to functional performance.

Objectives

To evaluate the contribution of hip abductors muscle strength to functional performance in patients with TKA.

Methodology

This was a prospective longitudinal study with repeated measurements over 6-month period. 36 subjects (69% female; mean age=68.0±6.1), scheduled for unilateral, primary TKA in the Joint Replacement Centre of the Hong Kong Buddhist Hospital were recruited. Assessments were performed at post-operation 4th, 12th, 24th weeks. Physical outcome measures included quadriceps and hip abductors muscle strength. Functional performance comprised 3 timed measures: (1)Timed Up-and-Go Test (TUG), (2)5-Chair Rise Test and (3)Stair Ascend/Descend Test. Stepwise multiple linear regression was used to assess the abilities of quadriceps and hip abductors strength in account for the variation on functional performance as outcome variables.

Result

Quadriceps muscle was a significant predictor for TUG and Stair Ascend/ Descend

Test with R² ranged from 0.19 to 0.22. While, hip abductors muscle strength was a significant predictor for all 3 measures on TUG, 5-Chair Rise Test, and Stair Ascend/Descend Test with R² ranged from 0.21 to 0.43. Both hip abductors and quadriceps muscle strength were significant contributors to functional performance after TKA. Besides, hip abductors muscle strength influenced functional outcome more than quadriceps muscle strength. Therefore, not only quadriceps muscle strengthening should be emphasized, but also hip abductors muscle enhancement in the clinical pathway of the peri-operative rehabilitation regime.