THE PCL SIGNIFICANTLY AFFECTS THE FUNCTIONAL OUTCOME OF TOTAL KNEE REPLACEMENT
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Introduction:
Advocates of PCL retention in total knee replacement have often cited the benefits of increased rollback and improved joint biomechanics that could be potentially gained form a functioning PCL. However, evidence demonstrating improved knee function with PCL retention has been contradictory, with some studies showing no improvement in range-of-motion and others revealing paradoxical anterior femoral translation during flexion of PCL retaining prostheses. The present study was performed to test the hypothesis that patients receiving a PCL retaining prosthesis have no difference in functional outcome compared to those receiving a cruciate sacrificing, posterior stabilized design.

Materials and Methods:
A self-administered, validated "Knee Function Questionnaire" was completed by 49 patients at least one year post knee replacement. One group (28 patients) received a PCL-retaining prosthesis, while a second group (21 patients) received a posterior stabilized component. The questionnaire consists of 55 scaled multiple choice questions regarding respondents’ physical activities, limitations, and level of importance in a broad range of physical, vocational, and recreational activities. Activities ranged from baseline activities such as walking and stair climbing to more advanced activities like kneeling and squatting to recreational activities including swimming and gardening.

For each recreational activity, a composite function score was developed by combining the frequency of each patient’s participation in that activity, its perceived importance to the patient and the amount of hindrance, or bother, imposed by the TKA in performing that activity. The composite score ranges from -5 to 5 with a negative score indicating some degree of difficulty. Differences between the composite function scores of the two patient groups were calculated for each activity and compared using the students t-test for statistical significance. In addition, patients also completed the SF-36 and the AKS questionnaires.

Results:
There was no significant differences between the two groups in terms of age (p=0.48) or gender (p=0.78). Patients with both PCL-retaining and -substituting total knee designs were either "somewhat" or "very satisfied" with the surgery on average (P = 68%, PS = 71%; p = 0.78). There were no statistically significant differences between the two groups in terms of the traditional measures of function following total knee replacement, including average ADL scores (p=0.67), sf-36 scores (p=0.60), and the AKS total knee score (p=0.29), although there was a trend towards higher AKS knee function scores amongst patients in the PCL retained group (77.9±7.9 vs. 60.6±8.4; p=0.16).

However, significant differences were found in functional scores in performing several specific activities. Patients with PS knees reported greater functional limitations in squatting (1.2 ± 0.5 vs. 0.4 ± 0.4, p<0.01), kneeling (-1.3 ± 0.5 vs. -0.1 ± 0.4, p<0.05), and gardening (-0.7 ± 0.8 vs. 1.2 ± 0.7, p<0.05). The only functional activity that PS patients exhibited more functionality was swimming (1.2 ± 0.3 vs. 0.2 ± 0.1, p<0.01).

In addition, patients with PS designs reported a greater frequency of swelling or tightness of their replaced knee than patients with a PCL-retaining prosthesis (3.2 ± 0.3 vs. 2.3 ± 0.3 (p<0.05) on a 5 point scale ranging from never experiencing swelling or tightness to greater than once per week).

Conclusion:
While patients receiving PCL-retaining and PCL-substituting total knee designs showed no difference in post-operative function following TKA using traditional measures (ADL scores, sf36, AKS scores), these two groups showed significant functional differences in several activities. Our data suggests that substitution for the PCL with a spine and cam mechanism does not fully restore the functional capacity of the intact PCL. This becomes important in performing high demand activities which involve deep flexion. In addition, the tibiofemoral articulating constraints necessary in the absence of both cruciates appears to result in more swelling and tightness in the knee during everyday function.

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