simultaneous bilateral knee arthroplasty. Patients were assessed (i) immediately prior to surgery, (ii) 12 months following surgery, and (iii) 6-7 years following surgery. At the pre-operative and 12 months post-operative assessments, patients were assessed on the Oxford-12 Knee Score, the Knee Society Knee Score, the SF-12, the presence or absence of contralateral knee pain and body mass index. At 6-7 years pre-operative assessment, patients were asked about any surgery or pain in each knee since their total knee arthroplasty. A Classification and Regression Tree was developed to identify factors associated with a higher likelihood of progression to bilateral total knee arthroplasty within 7 years of the index surgery. The strongest prediction model of who progressed to bilateral knee arthroplasty included three classification levels – pain in the contralateral knee prior to the index surgery, body mass index, and Mental Component Score on SF12 measure prior to the index surgery. None of the measures from the 12 month assessment improved the prediction model. Patients who reported an absence of pain in the contralateral knee prior to the index surgery had a 20% chance of progressing to bilateral total knee arthroplasty within 7 years. Patients who reported the presence of pain in the contralateral knee prior to the index surgery, and had a body mass index greater than 30.7 had a 70% chance of progressing to bilateral knee arthroplasty. Patients with pain in the contralateral knee but with a body mass index of less than 30.7 were just as likely to progress to bilateral knee surgery as those with high body mass index if they had a Mental Component Score of greater than 55. In this cohort, one in three total knee arthroplasty patients progressed to bilateral total knee arthroplasty within 7 years of the index surgery. Progression to bilateral knee arthroplasty was predicted by 3 key outcomes – the presence of pain in the contralateral knee, body mass index and SF12. These outcomes were measured prior to the index surgery, and can therefore help to inform expectations of outcome, and planning for multiple surgeries.

Category: Knee - Arthroplasty

Patello-Femoral Forces in the Native and Replaced Knee are Significantly Different. An Insight to Anterior Knee Pain?

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Summary: Currently there is no method of characterising the patellofemoral loading occurring dynamically in the native knee or during knee replacement. We describe a novel apparatus to dynamically measure patella loading in the native and replaced knee, offering the possibility of reducing AKP by more accurate balancing and replication of the patellofemoral forces.

Data: Introduction. Twenty percent of patients report dissatisfaction following TKR, 45% of this group characterise anterior knee pain (AKP) as a source of their discomfort. Therefore, there is interest in studying the ‘Third Space’ or patellofemoral joint and the pressures and function of the surrounding extensor hood. Currently there is no method of characterising the patellofemoral loading occurring dynamically in the native knee or during knee replacement. We describe a novel apparatus to dynamically measure patella loading in the native and replaced knee, and the effect of varying the depth and angle of patella resection. Method. A sensory apparatus was attached to the patella undersurface recording pressures through a range of full flexion in the patellofemoral joint in four native cadaveric knees (unpreserved, pelvis to toe preparations). Sensors were positioned at superior, inferior, medial and lateral positions on the patella surface.Sixteen range of motion studies from full extension to full extension were completed. A TKR was then performed under optimal conditions with robot assistance (MAKO, Stryker inc.) to control accuracy and reproducibility between the four cadavers. In this way surgeon variability was reduced. The patellofemoral sensor was reintroduced and the measurements repeated. The effect of different depths and angles of patella resection were noted. Reliability and reproducibility was shown in an in vitro test rig and verified in the four cadaveric studies. Sensor data was compared for all 4 quadrants using ANOVA with alpha error 0.05. Results. A clear, reproducible pattern of patellofemoral loading occurs in the native cadaveric knee. Following TKR this was significantly changed in both pattern and magnitude (p<0.01). Changing the depth and angle of patella resection altered patellofemoral loading (p< 0.05). In some cases, by the surgeon selecting appropriate depths and angles of patellofemoral resection to address aspects of the abnormal patterns observed after TKR, it was possible to achieve the same patterns and magnitude of patellofemoral forces observed in the native knee therefore replicating natural patellofemoral loading. Conclusions. A characteristic pattern of patellofemoral loading is shown in the native knee which is significantly altered following TKR, suggesting abnormal loading of the patella and extensor hood apparatus may be responsible in AKP seen after TKR. It has been possible to characterize for instance, the lateral loading that occurs in lateral maltracking and subsequently address and reduce the overload by altering the depth and angle of subsequent patella resections. Altering patella resection depth and angles subsequently allows loading in TKR to approach that of the native knee, offering the possibility of reducing AKP by more accurate balancing and replication of the patellofemoral forces.

Category: Knee - Arthroplasty

Is Patellar Resurfacing in Total Knee Arthroplasty Associated with a Higher Incidence of Patella Baja?

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Summary: Patients who undergo patellar resurfacing during total knee arthroplasty do not have a higher incidence of patella baja when compared to those who do not undergo patellar resurfacing. Data: PURPOSE: While total knee arthroplasty (TKA) is a highly successful procedure, it is not without potential complications. Patella baja is a complication that results in an abnormally low-lying patella with associated anterior knee pain, crepitus, and decreased range of motion. To date, no studies have explored the association between patellar resurfacing and the incidence of patella baja. The aim of this study was to compare rates of patella baja between unresurfaced patellas and resurfaced patellas in patients undergoing TKA. METHODS: A retrospective review was conducted at a single institution of patients who underwent TKA between October 2009 and January 2020. Patients were included if they had at least one preoperative radiograph and one-year follow-up radiograph. Patients with a history of prior knee trauma or inflammatory arthropathy were excluded. Blackburne-Peel (BPR) and Insall-Salvati ratios (ISR) were measured on preoperative and one-year postoperative radiographs. An ISR of less than 0.8 in addition to a BPR of less than 0.5 was defined as patella baja whereas a BPR of less than 0.5 alone was defined as pseudopatella baja. Statistical analysis was performed using a linear model analysis of variance and Fishers exact test. RESULTS: 318 TKAs underwent radiographic evaluation, 176 resurfaced and 142 unresurfaced patellas. Of the resurfaced patients 4% (7/176) were diagnosed with true patella baja, while of the unresurfaced patellas 5.6% (8/142) were found to have true patella baja. Of the resurfaced patellas 8% (14/176) were found to have pseudopatella baja compared to 7% (10/142) in the unresurfaced group. Patellar resurfacing was not associated with a higher incidence of patella baja (p=0.60) or pseudopatella baja (p=0.83). Lower preoperative ISRs (p=0.04) and BPRs (0.03) were highly predictive of a higher incidence of patella baja post TKA. CONCLUSION: The added trauma of patellar resurfacing in TKA is not associated with a higher incidence of patella baja in TKA when compared to unresurfaced patellas. Lower preoperative ISRs and BPRs are highly predictive of a higher incidence of postoperative patella baja.

Category: Knee - Arthroplasty

Intra-Operative Change of Fixed Flexion Deformity in Robotic-Arm Assisted Unicompartmental Knee Arthroplasty

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