Patello-Femoral Forces in the Native and Replaced Knee are Significant:

**Patello-Femoral Forces in the Native and Replaced Knee are Significant. An Insight into Anterior Knee Pain?**

**Abstract ID** #22791

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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 occurred 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 apparatus may be responsible in AKP seen after TKR. It has been possible to characterise 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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**Summary:**
Intra-operative change of fixed flexion deformity was not associated with a higher incidence of patella baja.