Background: Malrotation of the tibial component can cause revision, lead to altered joint kinematics, and likely produce clinical issues in total knee arthroplasty (TKA). Many surgeons decide on the tibial component’s rotational angle with reference to the tibial anatomical anteroposterior (AP) axis, and they have adopted Akagi’s line, which is originally defined on computed tomography (CT) as the line connecting the middle of the posterior cruciate ligament to the medial border of the patellar tendon attachment, as the most important tibial AP axis intraoperatively. However, some surgeons experienced intraoperative difficulty in detecting Akagi’s line. The accuracy of the intraoperative identification of Akagi’s line and the effect of accuracy on postoperative clinical outcomes are unknown. Therefore, we evaluated the intraoperative reproducibility of the tibial AP axis “Akagi’s line,” which is originally defined on CT, and the effect of the reproducibility on postoperative clinical outcomes. Methods: This prospective study included 171 knees of 160 patients who underwent TKA. We measured the difference between the intraoperative Akagi’s line and the original Akagi’s line defined on CT. The difference was measured by the tibial component rotation angle relative to the two kinds of Akagi’s line. In CT analyses, the original Akagi’s line was defined on preoperative CT and the tibial component rotation was measured on postoperative CT, which projected the preoperative Akagi’s line using a 3D software program. In intraoperative analyses, the intraoperative Akagi’s line was registered in the navigation system and the tibial component rotation was measured using the navigation system. The value and absolute value of the angular difference of the intraoperative Akagi’s line relative to the original Akagi’s line were measured. Additionally, the effect of the angular difference on postoperative clinical outcomes (Knee Injury and Osteoarthritis Outcome Score: KOOS, 2011 New Knee Society Score: NKSS) was evaluated. Results: The absolute value of the angular difference of the intraoperative Akagi’s line to the original Akagi’s line was 5.5°. The range of the intraoperative Akagi’s line relative to the original Akagi’s line was internally rotated 22° to externally rotated 16°. Intraoperative Akagi’s line outliers (difference to original Akagi’s line >5° and >10°) occurred in 46% (78 knees) and 14% (24 knees). In the outlier analysis (>5°), the tibial component rotation angle was externally rotated 5.3° in the outlier group (>5°) and externally rotated 3.2° in the non-outlier group (<5°) and, there was a significant difference; however, there was no difference in the clinical outcomes between two groups. In the outlier analysis (>10°), the tibial component rotation angle was externally rotated 6.5° in the outlier group (>10°) and externally rotated 3.7° in the non-outlier group (<10°) and, there was significant difference. Additionally, the outlier group (>10°) showed lower pain scores in KOOS and lower symptom scores in NKSS. Conclusion: The original Akagi’s line defined on CT was not replicated intraoperatively. The intraoperative poor detection of Akagi’s line could be the reason for the tibial component rotational error and worse postoperative clinical outcomes.

Category: Knee - Arthroplasty

Patient Specific Balanced TKA: A Five Year Outcome, Patient Satisfaction and Survival Study

Abstract ID# 22385

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Summary:
This study demonstrates excellent outcome scores, high patient satisfaction and a low failure rate with a patient specific navigated balanced TKA technique.

Data:
Aim: Recent studies have shown wide variation in the bony anatomy and soft tissue envelope of the knee and a neutral mechanical axis is not necessarily required for long term TKA survival. In response a patient specific navigated balanced TKA technique has been developed enabling bounded anatomical implant placement with small positional changes made to implant a TKA optimally within it’s natural soft tissue envelope. The aim of this study is to report the five year patient outcome, satisfaction and survival of this technique. Method: A single surgeon prospective study of 1180 consecutive Attune TKA’s was performed with Brainlab 3. Outcome scores: Oxford, WOMAC, KOOS, Forgotten Knee scores and patient satisfaction were collected at one, two and five years and an implant survival analysis was performed. The five year data is presented in this study Results: The mean Oxford score was 44.1. The mean Forgotten Knee score 73.1. The mean WOMAC score was 8.2. KOOS Joint Replacement score was 87.4. Patient satisfaction was 97.1% and 95.3% would have the operation again. The survival at six years was 99.1%. Discussion: This study demonstrates excellent outcome scores, high patient satisfaction and a low failure rate with a patient specific navigated balanced TKA technique.

Category: Knee - Arthroplasty

Functionally Aligned Total Knee Arthroplasty Restores Native Medial Pivot More Frequently Than Mechanically Aligned Total Knee Arthroplasty – A Prospective Randomized Trial

Abstract ID# 22509

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Summary:
Functionally aligned TKAs more reliably produced a medial pivot pattern than mechanically aligned TKAs, without medial implant constraint.

Data:
Introduction A medial pivot pattern has been found in native knees and is desirable in total knee arthroplasty (TKA). But whether it is achieved in TKA is debated and not well understood. Mechanical alignment (MA) and functional alignment (FA) are both recognised techniques for TKA. As a part of an ongoing prospective randomized trial, we assessed whether there was a difference between FA and MA primary cruciate retaining TKAs in producing a medial pivot pattern as measured by pressure sensors. Methods 60 patients (29 FA TKAs and 31 MA TKAs) were consented to participate in a prospective, randomised controlled trial. At the end of the procedure, MA and FA TKAs were determined to be balanced with equal medial and lateral gap measures as determined with robotic assistance. Then an intra-operative pressure sensor was used to collect (with surgeons blinded) medial and lateral pressures and contact points between the femoral component and the insert through the range of motion (determining medial pivot or lateral pivot patterns). Results Both alignment techniques achieved balanced TKAs, with no significant difference in balance measured by the sensors at 10° (p=0.475), 45° (p=0.466) or 90° (p=0.644) of flexion. Soft tissue releases were required more frequently to achieve balance in MA TKAs (36% MA vs 3% FA; p<0.01). FA TKAs produced a medial pivot pattern more consistently (76% FA vs 41% MA; p<0.01). Conclusion Intra-operative results from this trial suggest that different alignment philosophies may lead to different contact patterns and kinematics, despite being well-balanced. It is possible to recreate a medial pivot following TKA without medial implant constraint. Functionally aligned TKAs more reliably produced a medial pivot pattern than mechanically aligned TKAs.

Category: Knee - Arthroplasty


Abstract ID# 22510

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Summary:
When comparing robotically assisted functionally aligned TKA with robotically assisted UKA, the UKA group had superior results in the first-year post-operative but there was no difference in outcomes between the two groups at 24 months.

Data:
Introduction Medial UKA and TKA are both effective treatments for osteoarthritis of the knee. Many studies have compared the outcomes of the two treatments but less so with the use of robotics or comparing UKA to individualised TKA alignment techniques. Functional alignment is a novel technique for performing a TKA and shares many principles with UKA. This study compares a case-matched series of robotic-assisted UKAs (RA-UKA) and robotic-assisted TKAs (RA-TKA) performed using functional alignment. Methods Patients within the Perth Hip and Knee Clinical Registry who underwent a RA-UKA were case-matched with...
patients who had undergone a functionally aligned RA-TKA. Post-operatively they were compared for differences in FJS, OKS, pain score, ROM, ability to ascend and descend stairs as well as kneel. Results 101 matched pairs were eligible for final review. Both groups had significant improvements in FJS and Oxford Knee Score (OKS) following surgery. Pain and FJS had become equivalent at one year with all remaining measures being significantly better in the UKA cohort. At 2 years there was no significant difference between the UKA and TKA patients in any outcome measure observed. Conclusion Functionally Aligned RA-TKA and RA-UKA have both been shown to be successful treatments for knee arthritis in this study. The UKA group have superior results in the first year post-surgery, but there was no difference in outcomes between the two groups at 2 years. These outcomes should be considered when deciding appropriate treatment choice for individual patients in which either treatment could be utilised.

Category: Knee - Arthroplasty

Two-Year Burden of Antibiotic Use for Prosthetic Joint Infection Following Total Knee Arthroplasty

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Summary: PJI patients spend 135.8 more days and $2138.9 more dollars on antibiotic use when compared to non-PJI patients. Data: Introduction: Prosthetic joint infection (PJI) is the most common indication for TKA revision and is associated with higher morbidity and mortality. In addition, it poses a substantial economic burden on patients and the healthcare system as it increases and lengthens hospital stays, requires long-term antibiotic therapy, and almost always needs at least one surgical intervention. Our study aims to estimate the total days and cost of therapeutic antibiotic use among patients with prosthetic joint infection (PJI) after total knee arthroplasty (TKA). Methods: We conducted an observational cohort study with a 2-year follow-up using the IBM Watson MarketScan Commercial Claims and Encounters Database. Patients with osteoarthritis who underwent primary TKA between January 1 and September 30, 2017, were included. Primary exposure was the diagnosis of PJI within 90 days post-TKA. The primary outcome was the days of antibiotics use, and the secondary outcome was the costs associated with antibiotics, both over the 2-year period post-TKA. Propensity score matching analysis was performed matching with patient and provider characteristics. Results: A total of 13,201 subjects formed the study group and 557 completed PRRMS at 12 months after TKA (84%), and were included in the analysis. There were 300 males and 308 right knees. The mean age was 68 years (range 33-92). The preoperative alignment was neutral in 426 (77%), neutral in 18 (3%) and valgus in 113 (20%). The valgus group had significantly more females (63% vs 42%, P=0.001), an older mean age (70 vs 68 p=0.001), compared to the varus group. The mean Oxford Knee Score was 41 in the valgus group and 40 in the varus group (p=0.415). The varus outliers (10 degrees or more) had greater mean improvement (p=0.005) and a higher mean 1 year Oxford score than the other groups (p=0.032). A significantly higher rate of satisfaction with surgery (p=0.003) and proportion reporting they would undergoing the same surgery again (p=0.029) was observed in both the valgus and varus outliers (10 degrees or more) (97-100%) compared to those within 10 degrees alignment (88-90%). Conclusions Preoperative valgus deformity was observed in 20%, and predominantly affects females. Valgus deformity was not associated with inferior patient reported outcomes or lower rates of satisfaction, compared to varus knees at 1 year after arthroplasty. Those with preoperative coronal alignment of 10 degrees or more vaugus or varus had the highest rates of satisfaction with surgery, compared to those within 10 degrees.

Category: Knee - Arthroplasty

Pre-Operative Patient Factors Can Predict Progression to Bilateral Knee Arthroplasty Within 7 Years

Abstract ID# 22782
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Summary: One in three total knee arthroplasty patients progressed to bilateral total knee arthroplasty within 7 years of the index surgery, and progression could be predicted by pre-operative measures. Data: It is estimated that as many as 40% of patients who receive a total knee arthroplasty in the management of osteoarthritis return for a subsequent total knee arthroplasty in the contralateral knee within 10 years. The risk factors for a first total knee arthroplasty are well understood, but much less is known about the risk factors for patients who progress to bilateral knee arthroplasty. Identifying the risk factors associated with this progression may provide an opportunity for more thorough planning and expectation setting. All patients of a single orthopaedic surgeon who had undergone a total knee arthroplasty in the management of osteoarthritis were evaluated for inclusion in this study. Patients who had undergone a knee arthroplasty prior to their first documented surgery with this surgeon were excluded, as were patients who had undergone...