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

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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, randomized 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


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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