with CMA of more than 3° of valgus, tibial mechanical angle was increased to reach the safe zone. In 353 cases (7.7%) with CMA of more than 3° of varus, tibial mechanical angle was reduced to reach the safe zone. The average correction of the tibial mechanical angle was 1.1° (varus or valgus). At this stage, a total of 4062 cases (83.2%) were successfully been evaluated using the proposed protocol to reach a safe range of CMA ±3°. The remaining 822 cases (16.8%) could not be managed in the proposed algorithm because of their unusual anatoomical combination of femur and tibia. In most cases, both bones had varus or valgus anatomies precluding correction of one bone by reducing deformity on the other bone (for example, a femur with valgus >5 degrees with a neutral tibia). In such cases, senior author practice is to balance corrections on both sides of the joint depending on each patients specific's anatomy. Further step could be added to the algorithm to include such situations.

Conclusion: TKA optimal alignment has been matter of debate. Mechanical TKA has provided good mid to long-term results. However, associated knee anatomy modifications done in mechanically aligned knee may be linked to some of the unsatisfactory results and the lack of normal knee function. Kinematic TKA has emerged as alternative that would restores/preserves knee function and offer better clinical results in comparison to mechanical alignment TKA. In this study, we tested a proposed algorithm to perform kinematic alignment TKA avoiding preservation/restoration of some extreme anatomies that might not be suitable for TKA long-term survivorship. A total of 2475 of 4884 knees (50.7%) were falling within the proposed safe range algorithm without any anatomical corrections and 4062 of 4884 cases (83.2%) were successfully eligible for our proposed safe range algorithm (femur or tibia within ±5° and CMA ±3°) for kinematic TKA. One limitation of this study is that our database does not provide pre-operative diagnoses for arthroplasty or if there were any other extra-articular deformities. In conclusion, kinematically aligned TKA may be a promising option to improve normal knee function restoration and patient satisfaction. Until we have valuable data confirming the compatibility of all patients' pre arthritic anatomies with TKA long-term survivorship, we believe that kinematically alignment should be performed within some limits. With our proposed protocol, eight out of ten patients would fall safely in a range of kinematic TKA not associated with unfavourable long-term survivorship. Further studies with Radiostereometry or longer follow up might help determine if all patients' anatomies are suitable for Kinematic TKA.

93 - Painful Knees After Total Knee Arthroplasty: New Insights from Kinematics

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Purpose: Total knee arthroplasty (TKA) is recognized as an effective treatment for end-staged knee osteoarthritis. Up to 20% of these patients is unfortunately unsatisfied due to anterior knee pain from unknown origin (Bourne and al. 2010). The aim of this study is to compare knee 3D kinematics during gait of patients with anterior knee pain after TKA to an asymptomatic TKA group. Our hypothesis is that the painful TKA group would exhibit known kinematics characteristics during gait that increase patellofemoral (PF) stresses (i.e. dynamic flexion contracture, valgus alignment, valgus collapse or a quick internal tibial rotation movement) compared to the TKA asymptomatic group

Method: Thirty-eight patients (45 knees) were recruited 12-24 months post-surgery done by one of three experienced orthopaedic surgeons (31 unilateral TKA and seven bilateral TKA, all using the same knee implant). Patients were divided according to their KOOS pain score (with a cut-off at 6/20 to be included in the painful group). The KOOS questionnaire was also used to assess activities of daily living, symptoms, sports and quality of life. A complete clinical and radiological work up was done on the painful group to exclude those with known explanation for pain (i.e. loosening, malrotation, infection and clinical instability). 3D knee kinematics during treadmill walking was captured and computed using the KneeKGTM system.

Results: For the painful and asymptomatic groups, demographic results show respectively: age of 64.4 ± 7.6 and 69.8 ± 8.3 years, BMI of 31.9 ± 5.0 and 28.1 ± 3.6 kg.m−2, speed of 1.8 ± 0.6 and 1.67 ± 0.5 miles/h., and 50% of women in each group. Only age and BMI showed to be statistically different between groups. The painful TKA group exhibited a valgus alignment when walking (at initial contact and during stance, $p<0.001$). No significant difference has been put forward for the flexion/extension and internal/external tibial rotation.

Conclusion: Since a higher valgus alignment increases the Q angle, which lateralize the patella and increases PF stresses, results provide new insight on origin of symptoms. Conservative treatments for PF pain syndrome have shown to address the valgus alignment and improve symptoms, therefore the next step will be to assess the impact on pain level and alignment during gait of a personalized conservative management for the painful TKA group. Additionally, a study assessing the change in the radiological and dynamic alignment from pre to post surgery could bring valuable insight on the impact of surgical procedure on anterior knee pain.

94 - Evaluation of the use of Spinal Epimorph in Total Knee Arthroplasty: A Prospective Double-blinded Randomized Control Trial

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Purpose: The use of spinal anesthesia with adjuvant intra-thecal opioids has been commonly used in total knee arthroplasty without documented clinical benefit. It has been associated with a potential increase in side effects, including nausea, vomiting, pruritus, urinary retention and oxygen usage. This double-blinded RCT investigated whether the addition of epimorph to spinal anesthesia in patients undergoing total knee arthroplasty resulted in superior pain control and decreased narcotic consumption without also causing an increase in postoperative complication rates.

Method: We performed a prospective double-blind trial in patients undergoing primary total knee arthroplasty (TKA). Patients were randomized to receive either spinal anesthesia alone or spinal anesthesia with epimorph (150 ug). All patients received infiltration of a local anesthetic cocktail intraoperatively. Both the study patients and staff measuring outcomes were blinded to the experimental treatment received during data collection. Postoperatively, visual analogue scale (VAS) for pain was recorded at 6, 12, 18, 24, 36 and 48hrs and a final value at 1 week. Narcotic use, Foley insertion, oxygen requirements, nausea, vomiting and pruritus were recorded during the course of hospitalization.