

# Our experience using CAS for total knee replacement

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**Introduction:** Total knee arthroplasty is well documented to be a very successful operation. Proper alignment is one important parameter to a successful and long lasting procedure. Precise alignment is dependent on accurate placement of the components in all six degrees of freedom. Soft tissue balancing is another variable that is important to assure a successful outcome as well. Computer navigation for TKA has been available for more than 10 years and is a tool that can help achieve proper alignment. This paper reviews our outcomes and the lessons we have learned from CAS.

**Materials and Methods:** October 1, 2001 we preformed the first clinical case of a navigated TKA in North American with an FDA approved system. We tracked our early results at with 1 year of follow up of 150 navigated knee cases and compared there data to 50 non- navigated knees. Long standing lower extremity X-rays were measured to determine mechanical alignment. In 2011 we reviewed all cases today to determine if there was pin site problems since some articles had surfaced about fracture at the location of pin sites. In 2012 we looked at are recurvatum data. Oct 2011 was our 10 year anniversary for using the computer navigation system for total knee arthroplasty. We reviewed what we have learned and began to look at outcome data on patients who were at least 9.5 years post surgery. Starting in Oct. 2011 our first navigated knee patients began coming in for 10 year follow up. All patients received long standing lower extremity X-rays pre-operatively and at their 10 year follow up visit. Any problems or revisions were noted. Our early results will be compared to our 10 year results.

**Results:** Our early 1 year results showed no difference in clinical outcome or range of motion compared to the non-navigated group. The navigated knee group had better alignment; 52% were in neutral alignment, vs. 23% in the non-navigated group. Overall the navigated group had 80% of all alignment was within 1.5 degrees of neutral while the non-navigated group 80 % of cases were between 5 degrees valgus and 4 degrees varus. Our data for 10 year follow up (range 9.5-10.5 years) is the similar to our early results. We have seen 42 patients, 44 knees. The alignment from long standing lower extremity X-rays, 53% were neutral or +/- 1°. Twenty eight knees of 43 were +/- 3°. There is 1 patient who did not get the alignment X-ray due to spine problems and restricted weight bearing. The patient has not been revised and the knee is not a problem. There were 3 revisions in this small group. One patient was revised for a loose tibial base plate with osteolysis on the tibia and femur. The revision was 10 years after the index surgery and pre-revision alignment was 14° varus. There were 2 other revisions both for infection. They were treated with a poly exchange and wash out. To date we have done 2030 navigated knee cases and our data shows that we have 282 cases, 13.9%, that demonstrate genu recurvatum. The range was 0.5° to 30°, 104 patients, 5.1% had more than 5° recurvatum. In the literature recurvatum rates are reported at about 1%. After reviewing all case to date in we did not observe any pin site problems.

**Discussion:** Approximately 14% of joint replacement surgeons are using navigation for all their total knee arthroplasty cases, with another 10% using the technology for selected cases (hand poll AAKHS 2012). Although these numbers aren't significant CAS is still the main objective measure we have in the operating room to date. The advantages of CAS are it provides real time assessment of the true varus/valgus deformity, initial extension and medial/lateral soft tissue imbalance and anticipates final trial reduction. We are performing less soft tissue releases most likely because our tibia and femoral cuts are

more precise. Our 10 year follow up data while encouraging requires more investigation. The data presented here is only on a small cohort and more patients need to be reviewed for follow up data.