

Case Study:

Use of Cutting Edge Precision Alignment Technology for Total Knee Arthroplasty

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Case Introduction

Patient is an 80-year old female who sustained a right distal femur fracture and underwent a successful ORIF about 1 year ago. Fracture healed uneventfully, but presented with increasing right knee pain and deformity and increasing inability to ambulate (Figure 1, Figure 2). She complained of severe pain when walking on uneven surfaces or trying to go up and down stairs. She denied any signs or symptoms of infections.



Figure 1



Figure 2

Case Presentation

The patient presented with significant pain and difficulty walking even with a cane or walker. She had a severe valgus deformity with a valgus thrust and mild recurvatum of the knee. On exam she had significant crepitus and limited ROM. Her prior incisions were well healed without evidence of erythema or drainage.

X-rays were taken which showed collapse of the lateral femoral condyle and severe DJD. There was good healing of the prior distal femur fracture. There was significant valgus deformity. The hardware in place consisted of a distal femoral locking plate running almost the entire length of the femur. There were also four smaller screws that appear to be outside of the plate crossing perpendicular to the fracture site.

Pre-operative Plan

Because of the significant valgus deformity, recreation of

the mechanical alignment was paramount. Further, due to the hardware in the femur that was both extensive and difficult to remove, the decision was made to proceed with OrthAlign navigation for the procedure. This would allow accurate recreation of the mechanical alignment of the right lower extremity and allow us to perform this without the need to remove the proximal hardware, especially the screws that were outside of the plate and may be difficult to find intra-operatively. We planned to use constrained style components due to the severe valgus deformity and laxity of the MCL.

Operative Findings and Approach

Intra-operatively, the lateral femoral condyle was found to have severe AVN and had simply sheared off the distal femur. These were exposed distal 4.5 screws from the lateral plate. The midline exposure was carried proximally to allow removal of the distal 4.5 screws. The smaller screws were found to be buried underneath the plate and could not be removed without removing the entire plate. OrthAlign navigation was used to perform the distal femoral resection at neutral to the mechanical axis as well as neutral to the sagittal plane of the femur. A minimal lateral resection was performed as would be expected. OrthAlign navigation was then used to perform the proximal tibial resection and the remainder of surgery was performed using our standard modified Gap Balancing/Measured Resection techniques. Femoral rotation was determined by Whiteside's line. A constrained prosthesis was used as per plan with a tibial stem and a revision style femur without a stem extension due to the presence of intramedullary hardware.

6-Week Followup

Postoperative clinical exam and x-rays showed good positioning of all components and excellent long-leg alignment. The patient returned at six weeks with greater than 90 degrees of flexion and full extension (Figure 3, Figure 4, Figure 5) and said, "I cannot remember the last time my knee didn't hurt and was so straight!"



Figure 3

Discussion

For this case, the use of OrthAlign navigation was imperative. This case could not have been performed with standard intramedullary guides without removal of all of the patient's hardware which would have been a significantly increased morbidity to the patient and increased operative time and costs. Further, with such severe valgus and a prior fracture, using intramedullary guides would not have been able to produce the precise alignment needed to avoid putting the knee back into mechanical valgus and putting undue stress on the implants.

The presence of pre-operative hardware is a continuing challenge to arthroplasty surgeons. When the hardware is within the surgical field it can often simply be removed. However, when hardware extends well beyond the surgical field, such as a long plate with screws, the use of conventional arthroplasty instrumentation often requires the removal of this hardware, either in a single or staged procedure. This issue is often combined, as with this case, with significant bony or ligamentous deformities that must be accurately addressed in order to give the best chance of long term success.

The use of intra-operative imageless navigation, such as OrthAlign, is a simple, accurate and precise way to address all these issues with a single intra-operative tool without the need to change any other aspects of the patient's surgery.



Figure 4



Figure 5

A surgeon must always rely on his or her own professional clinical judgment when deciding whether to use a particular product in treatment of a particular patient. The information presented herein is intended to educate the surgeon community on OrthAlign's technologies and applications. A surgeon must always refer to the Product labeling and instructions for use before using any OrthAlign Product. The Products depicted are only to be used by a trained licensed physician. Please refer to the Product's Instructions for Use for complete important safety information. Prescription Only (Rx): Federal Law restricts this device to sale by or on the order of a physician. The author was a paid consultant of the Company at the time that this case study was prepared.