Rheumatology (Sunnyvale) 2016, 6:2 (Suppl)
http://dx.doi.org/10.4172/2161-1149.C1.013

Measurement of wire deflection on loading may indicate progress to union in fine wire Ilizarov constructs: An *in vitro* model

Beth Lineham[1], [2], **Todd Stuart**[1] and **Paul Harwood**[2]
[1]University of Leeds, UK
[2]Leeds General Infirmary, UK

Introduction: No entirely reliable method exists for assessing union during Ilizarov treatment. Premature removal results in treatment failure and alternative methods warrant investigation. Wire deflection might provide an indication of fracture site deformation on weight-bearing, indicating progress towards union. This study aimed to test a method for assessing wire deflection within an Ilizarov frame.

Materials & Methods: Tests were performed on clinical grade, all tensioned wire, 4 ring Ilizarov constructs stabilizing a simulated bone, with and without an unstable defect. Models were sequentially loaded to 700N using an Instron testing machine. A digital depth gauge attached to the superior ring measured relative wire displacement at the ring closest to the fracture. Tests were repeated 3 times.

Results: In the unstable model, wires tensioned at 882N and 1274N produced mean maximum deflections of 2.76mm and 2.69mm compared with 0.050mm and 0.046mm in the intact bone model (significant $p<0.0001$ Students T-test). Both models produced highly linear load deformation curves ($R2=0.983$ and 0.997).

Conclusions: A measurable difference in wire deflection between stable and unstable situations exists using this method, which appears valid and reliable with clear correlation between displacement and load. This approach might be clinically applicable and further clinical testing is required.

bethbrown@doctors.org.uk

PSI: New instruments for a new generation of knee arthroplasty

Cesare Chemello
Asiago Hospital, Italy

Introduction: Custom Made Surgery seems to be the future of total knee replacement (TKR). "Patients specific instrument" (PSI) helps the surgeon to perform a real tissue sparing surgery (TSS) and it allows to customize the technique and to standardize the results. Usually rheumatologic knees have important axial deviation and important bone loss, for this reason it is difficult to use a traditional prosthesis. The aim of our study was to illustrate the advantages and disadvantages of PSI in a prospective study of 100 pre-navigated total knee replacements.

Materials & Methods: 100 patients, affected by knee advance osteoarthritis and by axial deviation exceeding 3°, underwent to TKR (Advance Prophecy Wright). In the pre-operative examination, a TC was performed following strict protocols. We used a strict radiological protocol Post operative axes were compared to the planed ones and the following angles were examined: between anatomical and mechanical femoral axis (α-AAM), femoral flexion shield (FSF), tibial slope (ST) and frontal angle of the tibial component (α-CT). Negative outcome was considered as axial deviations ± 2 for FSF, ST and ±3 for α-CT e α-AAM.

Results: All patients achieved an excellent clinical and functional result according to KSS. Unplanned gender prosthesis was implanted in two patients. In only 1 case we changed the component size (femoral). In two cases, a 17 mm insert was necessary. Final knee flexion was necessary always more than 105°. Only 2 errors of the final α-AAM

Conclusion: This technique allows performing a TSS surgery, to reduce surgical time, to obtain optimal alignments. This technique also allows converting a challenging knee in a normal knee.

cesarechemello@gmail.com