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Objective Quantification of Soft Tissue Balancing using VERASENSE in Measured-Resection and Gap-Balancing Total Knee Arthroplasty

Kyu-Jin Cho, Gun-Woo Kim, Nam-Hun Lee, Young-Woo Chung
Jong-Keun Seon and Eun-Kyoo Song

Center for Joint Disease, Chonnam National University Hwasun Hospital
seonbell@chonnam.ac.kr

Abstract

1. Introduction

The aim of this study was to evaluate: (1) objective quantification of ligament balancing in total knee arthroplasty, (2) types and effectiveness of additional procedures to compartment pressure, and (3) change of pressure values in both compartment throughout the range of motion in total knee arthroplasty.

2. Methods

Eighty-four patients underwent total knee arthroplasty (TKA) using VERASENSE Knee System. TKA was performed by two techniques. Compartment pressure was recorded through the range of motion (ROM) initially, after each additional procedure, and after final implantation. Balanced knees were defined as when the compartment pressure difference was less than 15 pounds.

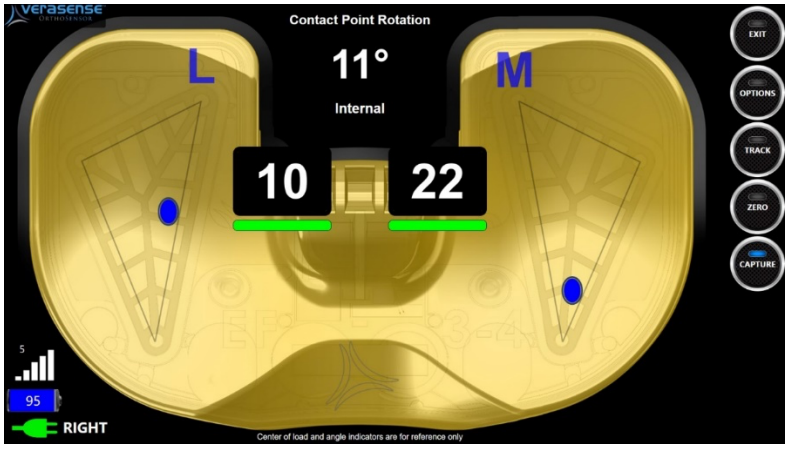

Figure 1: Quantification of medial and lateral compartment pressure using VERASENSE

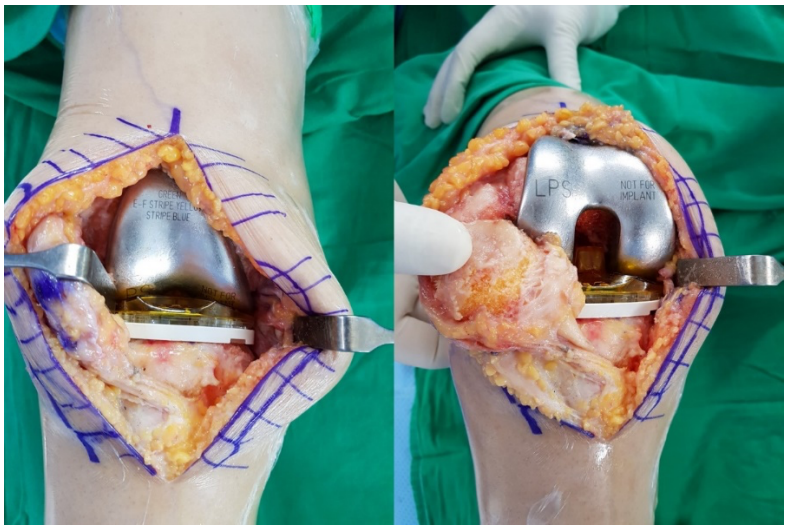

Figure 2: VERASENSE inserted in the tibial tray in extension and flexion.

3. Results

Thirty patients (35.7%) showed "balanced" knee on initial pressure measurement. Modified gap balancing TKAs showed significantly higher proportion of "balanced" knee than measured-resection TKAs (P = 0.004). Both medial and lateral compartment pressure were generally decreased on both TKA methods. Linear correlation showed statistically significant through ROM on both compartment. Total 66 additional ligament balancing procedures were performed.

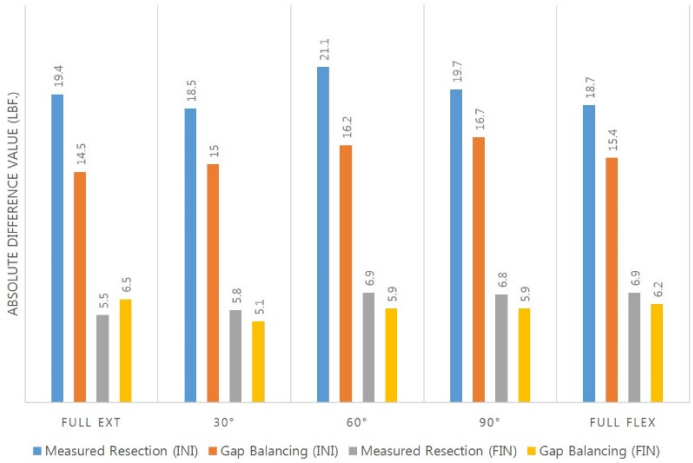

Figure 3: Initial (INI) and final (FIN) absolute mediolateral pressure difference in measured resection (M) and modified gap balance techniques (G)

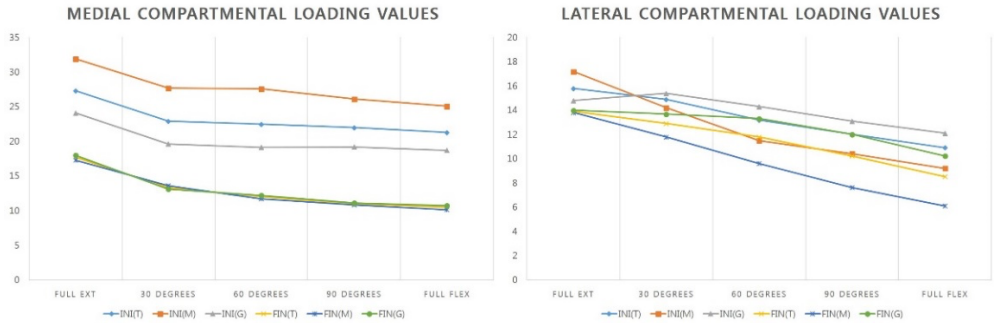

Figure 4: Initial (INI) and final (FIN) average compartment pressure of overall (T), measured resection (M) and modified gap balance technique (G)

4. Conclusion

Using the objective orthosensor, we were able to obtain 94% of well-balanced total knee arthroplasty finally. Furthermore, acquired objective data can lead to proper ligament balancing for both experienced and young surgeons and consequently reduce the complications associate with soft tissue imbalance in the future.

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