

Resident Impact on Primary Total Knee Arthroplasty by a Single Fellowship Trained Orthopaedic Surgeon

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INTRODUCTION:

Residency programs are essential to fostering the proper development of orthopaedic surgeons. As residents become more involved in surgeries throughout their training, the safety and quality of the procedures should not be jeopardized. However graduate autonomy is necessary to help further the development of future orthopaedic surgeons. Recent studies report similar outcome scores and complication rates when comparing orthopaedic procedures performed by senior surgeons and resident physicians. Patients had similar satisfaction with reported outcomes. The one consistent variable seen with addition of resident help in surgical cases is an increase in overall surgical time, which was anticipated. Coronal plane balancing with primary total knee arthroplasty (TKA) is critical for realignment of the mechanical axis and restoring function after arthroplasty. While under guidance of an experienced surgeon, one of the primary outcomes of this research was to assess if knee alignment was altered with residents. Other factors that could be impacted include OR time, tourniquet time, blood loss, complications, and infection rate. Purpose of this study is to assess for differences in these outcomes and if residents have any impact on them.

METHODS:

We retrospectively reviewed patient electronic medical records having received TKAs from February 25, 2019, to October 2, 2019 for the pre-resident cohort (n=100). The post-resident cohort (n=100) included review from October 4, 2019 to September 21, 2020. All patients were 18+ adults, randomly selected, and propensity matched for demographics (age, gender, BMI). Postoperative AP knee radiographs were analyzed for medial distal femoral angle (MDFA) and medial proximal tibia angle (MPTA). The sum angulation of MPTA+MDFA was also calculated. Several other surgical outcomes and intraoperative parameters were assessed. These included: OR time, tourniquet time, reoperation rate, infection rate, overall complications, postoperative hematocrit, average people in OR room. Continuous variables were assessed with two tailed t-tests and non-continuous variables were assessed using chi-squared analysis. P-value of <0.05 was considered statistically significant.

RESULTS:

Pre-resident and post-resident MDFA, MPTA, and total post TKA prosthesis angulation revealed no significant difference between groups. MDFA for pre- and post-resident cohorts 90.3° vs. 90.9° respectively (p = 0.46). MPTA for pre and post residents 89.3° vs. 88.9° (p = 0.21). Total sum angulation for pre and post residents 179.6° vs. 179.7° (p = 0.88). Infection rate for the pre-resident cohort was found to be 0.06% vs. 0% post-resident (p=0.04), complication rate 0.16% vs. 0.14% (p=0.56), reoperation rate 0.05% vs. 0.03% (p=0.42), average OR time 118 mins vs. post-resident OR 159 mins (p<0.001), average number of people in the room 7.1 vs. 8.9 persons post resident (p<0.001) average tourniquet time 58 mins vs. 86 mins (p<0.001), and average 1 day post op hematocrit 35.3 vs. 35.9 (p = 0.28).

DISCUSSION AND CONCLUSION:

The addition of residents in surgical procedures can always result in variability in outcomes. However, the goal of incorporation of residents is to not alter the quality of outcomes while allowing for a teaching environment and educational growth. While certain aspects may be altered such as tourniquet time, residents are still under the supervision of the attending surgeon so it would not be expected that critical outcomes would be significantly altered. This study shows that the addition of residents working with a single joint reconstruction specialist does not impact the quality of TKA implant coronal positioning, postoperative blood loss, reoperation rate, or complication rate. The addition of residents does however increase OR time, number of people in the room, and tourniquet time. These increases are all expected but do not cross a threshold that is detrimental to the procedure. Interestingly the infection rate was found to go down in our procedure with the addition of residents. While there are limitations to this paper overall it demonstrates that critical aspects of a primary TKA are not significantly impacted by the addition of resident physicians allowing for the appropriate fostering of future orthopaedic surgeons.

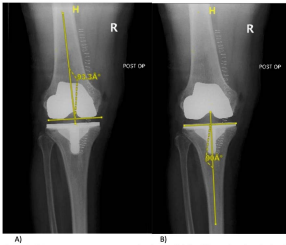


Figure 1. A) Demonstrates measurement for the medial distal femoral angle calculated using a line parallel to the shaft of the femoral and a perpendicular line corresponding with the angle of the inferior edge of the femoral prosthesis. B) Demonstrates the medial distal tibial angle calculated using a line parallel with the tibial shaft and a perpendicular line with the superior aspect of the tibial prosthesis.