

Current Data does not Support Routine use of Patient-Specific Instrumentation in Total Knee Arthroplasty

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Introduction: Proposed advantages of patient-specific instrumentation in TKA include enhanced accuracy in component positioning, decreased operative time, and reduced cost. The purpose of this study is to compare patient-specific versus standard TKA instrumentation with regard to: (1) coronal alignment, (2) sagittal alignment, (3) operative time, (4) blood loss, (5) transfusion requirement, and (6) perioperative cost.

Methods: A systematic review of the peer-reviewed literature indexed on Medline and/or Embase was performed in search of Level I, II, or III studies comparing the results of patient-specific versus standard TKA instrumentation. The data published in these studies were aggregated for the purpose of comparing the two treatment groups.

Results: The nine included studies described 957 TKAs (529 performed with patient-specific instrumentation and 428 with standard instrumentation). While patient-specific instrumentation demonstrated improved accuracy in coronal alignment as measured by femorotibial angle (FTA) ($p = 0.0003$), standard instrumentation demonstrated improved accuracy in coronal alignment as measured by hip-knee-ankle angle (HKA) ($p = 0.02$). Importantly, there were no significant differences in the ability of either technique to avoid outliers (> 3 degrees from target alignment) in either FTA ($p = 0.7$) or HKA ($p = 0.7$). Measures of sagittal alignment accuracy were equivalent between the two groups for both the femoral component ($p = 0.5$) and the tibial component ($p = 0.9$). Operative time (93 minutes vs. 104 minutes, $p = 0.1$), blood loss (371 mL vs. 384 mL, $p = 0.2$), transfusion requirement (10.1% vs. 14.1%, $p = 0.1$), and perioperative cost were also similar between treatment groups.

Conclusion: Patient-specific instrumentation does not demonstrate superiority over standard instrumentation with regard to coronal or sagittal alignment accuracy, operative time, blood loss, or perioperative cost. Therefore, current data does not support routine use of patient-specific instrumentation in TKA.