

Achieving Better Clinical Outcomes after Total Knee Arthroplasty in Valgus Knee Deformity: The Role of Alignment Strategies

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INTRODUCTION:

The personalized alignments in total knee arthroplasty (TKA) have demonstrated satisfying survival and low complication rates with good functional outcomes for preoperative varus alignment. However, there is limited research specifically addressing optimal approaches for valgus knees. The aims of this study were to: 1) assess the impact of postoperative knee alignment on functional outcomes and satisfaction in a population with preoperative valgus knee, 2) assess the influence of the degree of correction of knee alignment on mid-term functional outcomes and satisfaction in this population, and 3) evaluate complication and revision rates based on postoperative alignment at mid-term.

METHODS:

This retrospective study included primary posterior-stabilized TKA for osteoarthritis with a preoperative hip-knee-ankle (HKA) angle $\geq 180^\circ$, excluding associated procedures and significant flexion contractures, with a minimum two-year follow up. According to these inclusion criteria, 460 knees were included between 2008 and 2018, divided into three groups: preoperative neutral alignment (180° to 183°) (n=162), preoperative mild valgus (184° to 190°) (n=204), and preoperative severe valgus ($>190^\circ$) (n=94). The mean age was 69.3 years old ± 10.3 . The mean body mass index was $27.3 \text{ kg/m}^2 \pm 4.6$. The demographic parameters were similar in the three groups of deformity. A standardized surgical technique was employed to achieve neutral postoperative alignment. Radiographs, Knee Society Scores (KSS), range of motion, and satisfaction rates were collected at 2 and 12 months after surgery and at the last follow up.

RESULTS:

The mean follow up was 68.3 months ± 12.4 . In the preoperative mild valgus group, postoperatively, 10.8% of patients had HKA $< 176^\circ$, 81.4% had HKA between $177-183^\circ$, and 7.8% had HKA $> 184^\circ$. In the preoperative severe valgus group, postoperatively, 4.3% had HKA $< 176^\circ$, 83.0% had HKA between $177-183^\circ$, and 12.8% had HKA $> 184^\circ$. Range of motion and KSS knee score were not significantly different according to the postoperative alignment or the degree of correction of knee alignment.

In the preoperative severe valgus group, functional outcomes and range of motion showed no difference based on postoperative alignment or the degree of correction.

In the preoperative mild valgus group, patients with postoperative neutral alignment had significantly higher satisfaction ($p=0.0004$) and KSS function score ($p=0.031$) at the last follow up compared to patients with postoperative valgus alignment.

Patients with preoperative mild or severe valgus demonstrated higher rates of dissatisfaction ($p=0.005$) and lower KSS function score ($p=0.014$) if they had postoperative varus alignment. There were no significant differences in complication or revision rates based on postoperative alignment or the degree of correction.

DISCUSSION AND CONCLUSION:

When dealing with preoperative valgus deformity, it is crucial to avoid overcorrection into varus, which is associated with poorer functional outcomes. For mild preoperative valgus knee (183° to 190°), correction to neutral alignment achieved better outcomes than leaving a residual valgus. For severe valgus ($>190^\circ$), preserving residual valgus postoperatively avoided higher rates of complications and revisions while ensuring satisfactory functional outcomes.