

No Difference Between a Closing and Opening Wedge High Tibial Osteotomy: 10 Year Results of an RCT

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Summary:

Similar results 10 years after a closing-wedge or opening-wedge HTO in terms of clinical outcome and radiological alignment.

Abstract:

Background Varus deformity increases the risk of progression of medial compartment knee osteoarthritis (OA). Patients with this condition can be treated with a valgus high tibial osteotomy (HTO) with either a closing-wedge or opening-wedge technique. Little is known about the long-term results of closing-wedge versus opening-wedge osteotomy. The aim of this study was to investigate the clinical and radiological long-term results of closing-wedge and opening-wedge HTO.

Methods

From January 2001 to April 2004, ninety-two patients were randomized to receive either a closing-wedge or an opening-wedge high tibial osteotomy. The clinical outcome and radiographic results were examined preoperatively, at one year, six years, and, for the present study, at ten years postoperatively. The outcomes that we reviewed included maintenance of the achieved correction, progression of osteoarthritis (based on the Kellgren and Lawrence classification), severity of pain (as assessed on a numeric rating scale visual [NRS]), knee function (as measured with the Hospital for Special Surgery [HSS] score and Knee injury and Osteoarthritis Outcome Score [KOOS]), walking distance, complications, and survival with conversion to a total knee arthroplasty as the end point. The results were analyzed on the basis of the intention-to-treat principle.

Results

Out of the original 92 patients included 79 completed 10-year follow-up (52 all measurements, 3 only questionnaires, and 24 TKA), 13 patients were lost to follow-up (6 deceased, 5 emigrated, and 2 unwilling to participate).

Sixteen (36%) patients in the closing-wedge and eight (22%) in the opening-wedge group were converted to a TKA after ten years ($p = 0.15$).

Ten years post-operatively, the mean hip-knee-ankle (HKA) angle was $1.5^\circ (\pm 4.0^\circ \text{SD})$ of valgus after a closing-wedge HTO and $0.8^\circ (\pm 5.9^\circ \text{SD})$ of varus after an opening-wedge HTO ($p = 0.276$). The mean difference was 2.3° (CI 95%: $-0.6 - 5.1$), with no statistical significant difference ($p = 0.12$). In both groups the 10-year post-operative HKA-angles did not differ from the one- and six-year post-operative angles. No difference in severity of pain or knee function was found between the two groups.

The mean NRS-pain was $2.6 (\pm 2.8 \text{SD})$ during rest and $3.7 (\pm 3.1 \text{SD})$ during activity in the closing-wedge group. The mean NRS-pain was $2.9 (\pm 3.0 \text{SD})$ during rest and $4.1 (\pm 3.1 \text{SD})$ during activity in the opening-wedge group. No difference in pain (rest or activity) was found between the groups.

The mean HSS was $82.2 (\pm 13.6 \text{SD})$ in the closing-wedge group. The mean HSS was $78.6 (\pm 13.0 \text{SD})$ in the opening-wedge group. No difference in function was found between the groups.

Conclusions Of the patients who had no conversion to a TKA, no difference in clinical outcome and radiological alignment was seen 10-years post-operatively between the closing-wedge and opening-wedge HTOs. In our six-year

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follow-up closing-wedge HTO was associated with more conversions to a TKA. This is in contrast to the results of our new results at ten-year follow-up of the same cohort.