Background: In relatively young patients with end-stage knee osteoarthritis (OA), total knee arthroplasty (TKA) comes with the risk of revision surgery. Knee joint distraction (KJD) is a joint preserving surgery technique, which has been shown to provide clinical and structural improvement for at least five years and postpone the need for TKA.

Objectives: To evaluate long-term clinical and structural results and identify characteristics predicting survival of the native knee joint after KJD.

Methods: End-stage tibiofemoral OA patients (n=20; age <60 years) indicated for TKA were treated with KJD. WOMAC questionnaires (100 best) and VAS pain scores (0 best) were used for clinical evaluation at baseline and every year after treatment, up to 9 years. Minimum and mean joint space width (JSW) and mean cartilage thickness of the most affected compartment (MAC) were measured using KIDA software on standardised radiographs (baseline and 1, 2, 5 and 7 years after treatment). The mean cartilage thickness of the MAC was measured on MRI scans (baseline and 1, 2 and 5 years after treatment). Survival after treatment was analysed (failure defined by TKA). Prediction of KJD survival was studied by logistic regression analyses.

Results: Three patients withdrew consent. Survival 9 years after treatment was 46%. Survival percentages differed significantly for gender (women 14%, men 70%; p<0.035; figure 1A) and for increase in minimum JSW in the 1 st year (<0.5 mm increase 0%, >0.5 mm increase 72%; p=0.002; figure 1B). Survivors reported clinical improvement compared to baseline: ∆WOMAC+29.9 points (95% CI +16.9 to +42.9; p=0.001; figure 1C), ∆VAS –46.8 mm (95% CI –31.6 to –61.9; p<0.001). In addition, a significant increase of the minimum JSW (0.62 mm; 95% CI +0.13 to +1.11; p=0.020; figure 1D) was found after 7 years. No significant changes were found for the mean JSW (+0.36 mm; 95% CI +0.13 to +0.62; p=0.205) and mean JSW (+0.21 mm; 95% CI +0.13 to +0.36; p=0.505). In patients whose treatment failed over time, last reported clinical scores in survivors and patients whose treatment failed within nine years. Mean values change over nine years and (D) minimum joint space width change over seven years, (B) by increase in minimum joint space width one year after treatment, less than 0.5 mm increase and (C) by increase in minimum JSW in the 1 st year. Minimum and mean joint space width (JSW) and mean cartilage thickness of the most affected compartment (MAC) were measured using KIDA software on standardised radiographs (baseline and 1, 2, 5 and 7 years after treatment). The mean cartilage thickness of the MAC was measured on MRI scans (baseline and 1, 2 and 5 years after treatment). Survival after treatment was analysed (failure defined by TKA). Prediction of KJD survival was studied by logistic regression analyses.

Conclusions: Joint distraction for end-stage knee OA shows long-lasting clinical and structural improvement with a survival of 48% at 9 years. Clinical scores in patients failing treatment were still improved compared to baseline and cannot fully explain the subsequent TKA surgery. Positive predicting factors for survival of the native knee are male gender and a larger initial increase in minimum JSW (both, 70% survival at 9 years). Potentially, an initial decrease in bone density and an increase in mean cartilage thickness are predictive as well.

Overall, the initial structural response after KJD appears to be important for long-term success of the treatment.

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