Outcomes Of Revision Surgery for Distal Femoral Nonunions: A Retrospective Cohort Study of 103 Patients

Robert Wagner[1], Jochem Henrik Raats, Noa Helena Maria Ponds, Devon Tracey Brameier, Jacob Samuel Wolf Borgida, Emily N McDonald, Mitchel B Harris[2], Stein Jasper Janssen, Peter Kloen, Thuan V Ly[2], Michael John Weaver[3]
[1]Amsterdam UMC, [2]Massachusetts General Hospital, [3]Brigham and Women's Hospital

INTRODUCTION: Distal femur fractures lead to nonunion in 9% to 35% of cases. However, there is limited evidence on surgical outcomes after revision for a distal femur nonunion. The objective of this study was to assess (1) healing rates after surgical revision and (2) factors associated with failure to heal after surgical revision for distal femur nonunions.

METHODS: We identified 103 patients at two Level 1 trauma centers who underwent surgical revision by a fellowship trained trauma-surgeon for a distal femur nonunion between 2004 and 2023 and had at least 3 months follow-up. Nonunions that required no further revision to promote bone union were considered healed. Univariable analysis was performed to identify patient, injury, and treatment factors associated with failure to heal after the primary revision surgery and described as odds ratios (OR) with 95% confidence intervals (CI).

RESULTS: Of 103 nonunions, 10 (10%) were considered infected. Definitive fixation was most commonly achieved using a lateral locked plate (55%, n = 57) or angled blade plate (25%, n = 27), and autograft or allograft was used in 54% of cases. Overall, 15% (n = 15) of patients required one or more additional nonunion revision procedures. Higher BMI (one-unit increase, OR: 1.09 [95%CI: 1.01 – 1.18], p = 0.024), 3 or more previous surgeries (OR: 4.1, [95% CI: 0.95 – 16.1], p = 0.045), and atrophic nonunion (OR: 4.8 [95% CI: 1.45 – 16.1], p = 0.010) were associated with failure to heal after the primary revision procedure. There were no differences in outcomes comparing infected and non-infected nonunions.

DISCUSSION AND CONCLUSION: In this study of 103 distal femur nonunions treated with a variety of surgical strategies, more than 8 in 10 patients healed after the primary nonunion revision procedure. Higher BMI, number of previous surgeries, and atrophic nonunion may be associated with failure to heal after the primary revision.