Defining the Minimal Clinically Important Difference for Microfracture of Osteochondral Lesions of the Talus: A Psychometric Analysis at Short-term Follow-up

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INTRODUCTION:
Osteochondral lesions (OCLs) are extremely common injuries in the knee, hip, and ankle. The standard reparative technique is arthroscopic debridement and microfracture. Concomitant orthobiologic augmentation with bone marrow aspirate concentrate (BMAC) has demonstrated improved functional outcomes. Numerous studies have explored the failure rates and levels of improvement in patient-reported outcomes after microfracture surgery for osteochondral defects of the knee and hip. However, there is still a paucity in the literature on what constitutes a clinically significant improvement for patients undergoing microfracture for osteochondral defects involving the talus.
The purpose of this study is to establish the time-dependent minimal clinically important difference (MCID) threshold for reparative microfracture with BMAC in patients with OCLs of the talar dome and identify predictors of achieving the MCID in these patients.
METHODS: A secure institution-based registry with foot and ankle patient data from three surgeons were prospectively collected and retrospectively analyzed. The database was queried for all patients with a primary diagnosis of Talar dome OCL who underwent microfracture with BMAC and completed preoperative Foot and Ankle Ability Measure Activities of Daily Living and Sports (FAAM ADL and FAAM Sport) and Visual Analog Scale (VAS) questionnaires between September 2013 and February 2024. The distribution method was used to calculate MCID thresholds for the FAAM and the VAS scores. Multivariate logistic regressions were constructed to determine predictors of achieving the MCID.
RESULTS: A total of 65 patients with a mean age of 31.53 ± 15.94 years and body mass index (BMI) of 27.23 ± 6.64 kg/m2 were included. All thresholds for the MCID increased over time in the FAAM Sports and ADL subscales and the VAS score. MCID for FAAM ADL, FAAM Sport and VAS were 7.14, 8.67 and 0.82 respectively (Figure 1). The proportion of patients who achieved the MCID FAAM ADL (6 months, 30.8%; 1 year, 6.2%; 2 years, 23.1%), FAAM Sport (6 months, 15.4%; 1 year, 3.1%; 2 years, 26.2%) and VAS (6 months, 78.5%; 1 year, 87.7%; 2 years 86.2%). Male sex and younger age were significantly less likely to achieve the MCID for FAAM ADL at 6 months compared to females (odds ratio = 0.30, p = 0.0457) and (odds ratio = 0.929, p = 0.0189) respectively. Neither size of lesion nor BMI were significant predictors of achieving the MCID for FAAM at 6 months (Figure 2).
DISCUSSION AND CONCLUSION: The study findings demonstrate that microfracture surgery with BMAC effectively manages pain and improves function in talar osteochondral lesions. The MCID for function increased over time, while pain relief (VAS) remained high. The highest functional improvement was at 6 months, decreasing at 1 year, with a slight improvement at 2 years. The findings highlight important predictors of success, such as sex and age, which can help surgeons tailor treatment plans and optimize rehabilitation strategies. Males and older patients were less likely to achieve the MCID for FAAM ADL at 6 months. Lesion size and BMI were not significant predictors. Further research is needed for long-term validation.

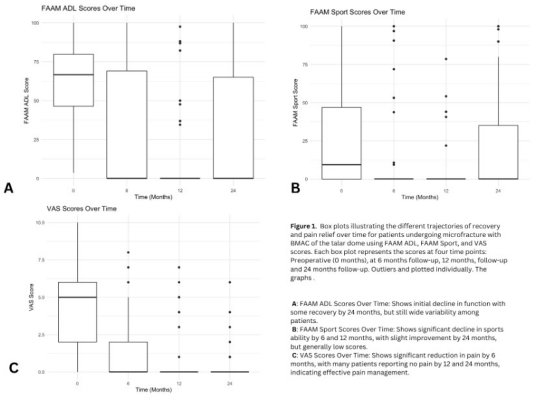

Figure 1. Box plots illustrating the different trajectories of recovery and pain relief over time for patients undergoing microfracture with BMAC of the talar dome using FAAM ADL, FAAM Sport, and VAS scores. Each box plot represents the scores at four time points: Preoperative (0 months), at 6 months follow-up, 12 months, follow-up and 24 months follow-up. Outliers and plotted individually. The graphs .

A: FAAM ADL Scores Over Time: Shows initial decline in function with some recovery by 24 months, but still wide variability among patients.
B: FAAM Sport Scores Over Time: Shows significant decline in sports ability by 6 and 12 months, with slight improvement by 24 months, but generally low scores.
C: VAS Scores Over Time: Shows significant reduction in pain by 6 months, with many patients reporting no pain by 12 and 24 months, indicating effective pain management.

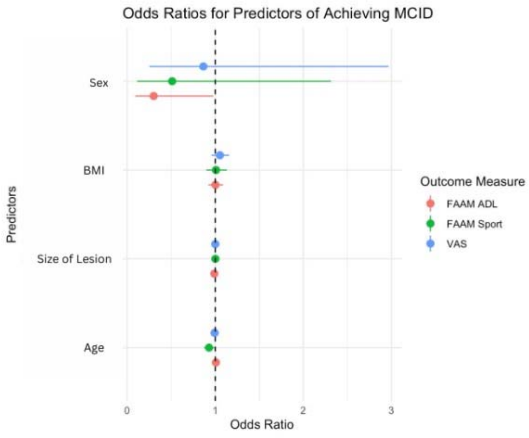

Figure 2. Sex: A significant odds ratio for sex indicating that there is a difference between males and females in achieving the MCID (p = 0.0457). BMI: the odds ratio for BMI indicates that BMI influences the likelihood of achieving the MCID of pain relief (p= 0.8874). Size of Lesion: the odds ratio indicates larger lesions are associated with lower odds of achieving the MCID (p=0.8426). Age: an odds ratio greater than 1 for age suggests that older patients have higher odds of achieving the MCID (p=0.0189).