

Metal Allergy in Foot & Ankle: A Systematic Review

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Introduction/Purpose: Metal hypersensitivity is common in the general population, affecting between 10-15%. Many different metals are constituents of orthopaedic devices used for foot and ankle surgery; therefore, it is expected to influence patient outcomes. A variety of different reactions, both systemic and localized, have been reported, along with treatment strategies. However, there is no accepted protocol to evaluate, diagnose and manage patients with suspected metal hypersensitivity reactions. Current literature characterizing metal hypersensitivity in foot and ankle and guidance on management is lacking.

Methods: A comprehensive literature search of Ovid MEDLINE and EMBASE was performed from inception to 23-Nov-2021 using MeSH search terms focusing on the foot and ankle, orthopaedic surgeries, a variety of metal types, and hypersensitivity reactions. A total of 43 studies were identified. All full-text, English, experimental and observational studies, reporting on metal hypersensitivity in the context of foot and/or ankle surgeries using metal-containing orthopaedic devices were included. Article screening, quality assessment, and data extraction was performed by two reviewers. Disagreements were resolved by discussion or the vote of a third reviewer.

Results: A total of 45 patients (18 male and 27 female) were included from 15 papers. Mean age was 55.5 years. There were 42 static and three arthroplasty implants included. Metal hypersensitivity diagnosis was performed with specialist consults, and most commonly, patch testing (e.g. with standard array or implant components). Patch testing was most commonly positive to nickel (thirteen), followed by cobalt (four), vanadium (three), and other less commonly used metals. Mean follow up was 20.8 months. Fifteen patients (12 with a positive patch test, 1 with a negative patch test and two not tested), all symptomatically improved following metallic implant removal; four patients had implants removed for unclear reasons; one patient remained symptomatic despite implant removal but had a negative patch test. The remaining 25 patients retained their implants without significant symptoms regardless of patch test result.

Conclusion: Metal hypersensitivity in the context of foot and ankle surgery is not widely reported. It should be considered as a differential diagnosis in patients who present with hypersensitivity-type symptoms with previous surgery with metallic implants, after infection and mechanical failure have been ruled out. Patch testing can be helpful in identifying these patients. Removal of static implants after fracture union in trauma cases typically resulted in symptom resolution. Metallic arthroplasty implant removal presents more of a clinical challenge. Future research should focus on creating a framework to identify at risk patients and diagnose foot and ankle patients with metal allergy.

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