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CORR Insights®: Can a Three-component Prosthesis be Used for Conversion of Painful Ankle Arthrodesis to Total Ankle Replacement?

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Where Are We Now?

One option for patients with painful ankle fusions is total ankle replacement conversion. The current study by Preis and colleagues adds to our overall understanding of how these fusion conversions (sometimes called take-downs) work, and helps illuminate the benefits and pitfalls of this approach. The authors observed frequent (but

generally not catastrophic) complications, and although the patients improved, the improvements were not as great as one might expect after primary ankle replacement.

With fewer than 100 reported instances of this procedure in five single-center, retrospective, Level-IV studies [4–6, 10, 11] and two case reports, [1, 12] we are just beginning to understand appropriate patient selection, surgical technique, learning curve, and expected outcomes with this procedure. The most-frequent indications for ankle replacement after fusion include development of symptomatic hindfoot arthritis, malunion, nonunion, or unexplained persistent pain. Patients with an identifiable source of pain do better than patients

with pain alone as the indication for conversion [4].

The learning curve for ankle replacement is steep. Learning how to convert ankle fusion to an ankle replacement can reasonably be expected to be even more difficult. Intraoperative and early postoperative complications including fracture, loosening, subsidence, delayed wound healing, and arthrofibrosis can thwart a patient's recovery. Complications likely occur more frequently than after primary total ankle replacement, according to the current study. Preis and colleagues suggest prophylactic pinning to minimize intraoperative fracture risk.

After conversion of a painful ankle fusion to replacement in the presence of a defined source of pain, patients can expect improvement in pain, ROM, and quality of life. In the current study, the pain VAS decreased from 9 to 2, and the arc of motion was 23°.

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Where Do We Need To Go?

Numerous studies support the premise that conversion of a painful total ankle

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replacement provides clinical improvement [4–6, 11, 12]. However, numerous gaps in our understanding of the procedure's benefits persist.

Objective measurements, as well as patient reported outcomes for pain and function, should be included in studies comparing traditional treatments with this new intervention to prove its benefit. The first question to consider when contemplating ankle fusion conversion is how it compares to the current standard treatment. Is pain relief better with revision fusion or ankle replacement in patients with symptomatic nonunions? How does function compare with tibiotalar-calcaneal (pantalar) fusion in the case of subtalar arthritis under a previously successful ankle fusion? Currently available data do not allow direct comparisons on these questions.

A second pitfall concerns the results of conversion based on etiology of pain. Ankle nonunion, malunion, and the development of subtalar arthritis cause pain in different parts of the foot through different mechanisms. Can one procedure be expected to solve them all? Are adjuvant procedures required in the case of malunion to correct all aspects of the deformity? Is a subtalar fusion required in the setting of ankle fusion conversion for painful subtalar arthritis?

The greater risk of complications after ankle fusion conversion

compared with modern primary ankle replacement is concerning, but may partially be explained by the learning-curve effect of a new, technically-demanding procedure. Much attention was given to complications and the learning curve required to reach proficiency in the early days of third-generation ankle replacements. A better understanding of the number of cases required to reach a steady-state of complications would guide training efforts, and provide reassurance that the procedure can be generalized to everyone with experience replacing ankles.

Finally, longer followup is needed to judge the success of ankle fusion conversion. We are just beginning to see long-term survival data for third generation primary total ankle joint replacements, so we should not expect to see long-term results for this newer technique at this time [2, 3, 9]. But caution is advised; early short-term successes with many ankle arthroplasty designs did not always lead to high rates of long-term survivorship [7, 8].

How Do We Get There?

The remaining questions surrounding the conversion of ankle fusion to ankle replacement can be answered using a variety of strategies. Continued

prospective data collection including radiographic results and patient-reported outcomes in single-institution registries is needed to document long-term results. As individual series grow, stratification based on etiology of pain will become powerful enough to differentiate outcomes. Researchers should identify the complication rates at various levels of experience with the procedure, as it will help us define the learning curve.

Case-control studies would provide a greater confidence in the benefits of ankle fusion conversion to replacement compared with conventional treatments. Randomization of treatment type and controlling for observer bias may be difficult given the small number of procedures performed at individual institutions. However, multicenter studies may improve the number of cases available. Systematic reviews could combine the results from a number of individual case series now that these are publicly available.

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