

## Limb-threatening Deep Infections Associated With Hardware Complications After Intramedullary Hindfoot Nailing in Charcot Feet

Michael Strauss, MD, David Lee, MD

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**Introduction/Purpose:** Multiple experiences with hindfoot intramedullary nailing (HINs) have demonstrated their usefulness for salvage of even the most severe ankle and foot deformities. However, special precautions must be employed when using this procedure in the diabetic with sensory neuropathy and advanced Charcot neuroarthropathy (CN) bone changes. A series of limb threatening complications after using the HIN in this subset of patients occurred. All failures were due to further bone collapse associated with the CN and penetration of the distal interlocking screws through the skin. This has led to the establishment of a protocol for reducing the chances of adverse occurrences when utilizing HIN in the named patient group.

**Methods:** Three index cases in diabetes with failed HINs, two resulting in below knee amputations, were analyzed retrospectively. All initially presented with severe deformities with impending ulcerations at the apices of the deformities. Satisfactory realignments of the foot and ankle were achieved with lateral malleolus resections and tibia-talus osteotomies to restore the foot to the plantigrade position. The corrected position was maintained with the HIR and patients were allowed to fully weight bear in protective diabetic equipment 3 months after the surgeries.

**Results:** Twelve to 18 months later, one or more of the tips of the distal interlocking screws of the HIRs penetrated the skin of the foot. Even with immediate removal of interlocking screws, two of the three patients subsequently required transtibial amputations. The patient in whom a transtibial amputation was avoided continues to ambulate with a CROW boot more than three years after complications of the rodding were managed. This experience has led to the generation of a protocol to potentially minimize the risk of limb-threatening complications related to hardware.

**Conclusion:** The proposed protocol includes: First, proximal interlocking screws are not inserted to allow proximal migration of the rod in anticipation of further CN bone collapse. Second, the hindfoot interlocking screws are removed one year post-op and protective footwear continued. Third, if there is skin breakdown by screw, all hardware is removed and the medullary canal is reamed, plus antibiotic course and wound care. After this if infection markers are negative, 2nd-stage revision surgery is considered. The protocol seeks to minimize deep infections associated with HINs of severe CN foot deformities and further study to assess its impact is needed.

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