The INBONE II Total Ankle System

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KEYWORDS

• Arthroplasty • INBONE • Joint pain • Joint replacement • Tibiotalar joint

KEY POINTS

- Advancements in implant design, surgeon experience, and patient selection have led to improved outcomes in total ankle replacement, making it a viable alternative to ankle arthrodesis.
- Apart from being only 1 of 4 Food and Drug Administration (FDA)-approved ankle implants in the United States, the INBONE II Total Ankle System boasts a unique tibial intramedullary modular stem fixation structure characterized by customizable length patterns specific to patient anatomy and a talar component with sulcus articulating geometry that provides increased coronal plane stability.
- Preoperative templating gives surgeons an estimate of the size and position of the desired implant, but the final position and size should be determined intraoperatively through direct visualization and confirmed with multiple views using image intensification.
- Proper alignment with anterior-posterior and medial-lateral guide rods is pivotal for the success of the remaining steps of the case.
- Gentle tissue handling and proper execution of step-by-step technique lead to fewer complications, better outcomes, and increased survivorship of the implant.
- Adherence to a strict postoperative protocol is imperative to achieve optimal outcomes for both patients and surgeons, with ongoing periodic surveillance to check for any untoward signs of complication or impending failure.
- Despite significant improvements in total ankle replacement, patients should be well informed preoperatively of the potential for complications, including the risks versus benefits of proceeding with total ankle replacement.

INTRODUCTION

Total ankle replacement has witnessed resurgence in popularity over the past decade, making it a viable alternative to ankle arthrodesis and other definitive surgical treatments for debilitating tibiotalar joint pathology. Third-generation implants demonstrate advances in implant design, are less constrained, and rely on noncemented fixation for

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increased stability. These advances, in combination with improved surgeon training, a less formidable learning curve, better surgical instrumentation guiding implantation, and more clearly defined patient selection, have translated to lower implant failure rates with improved outcomes for primary and revision total ankle replacement cases. Furthermore, a recent literature review of implant survivorship reports ranges from 70% to 98% at 3 to 6 years and from 80% to 95% at 8 to 12 years.[1]

One implant, responsible in part for the aforementioned advancements, is the INBONE Total Ankle system (Wright Medical Technology, Arlington, Tennessee), more specifically, the company's current model, the INBONE II Total Ankle System. This implant remains 1 of 4 designs in the United States cleared by the FDA and in widespread clinical use. The INBONE (http://documents.wmt.com/Document/Get/FA180-308; accessed July 1, 2012) and INBONE II (http://documents.wmt.com/Document/Get/FA093-210; accessed July 1, 2012) total ankle systems are based on previous success achieved in other total joints, mainly the knee, and boast a unique intramedullary tibial stem composed in modular fashion and introduced into the distal tibial metaphysis (http://www.inbone.com/DesignRationale.aspx; accessed July 1, 2012).[2] The INBONE total ankle replacement, formally marketed as the Topez Total Ankle Replacement, became FDA 510(k) cleared in November 2005 (http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/DeviceApprovalsandClearances/510kClearances/ucm089876.htm?utm_campaign=Google2&utm_source=fdaSearch&utm_medium=Web site&utm_term=topez%20total%20ankle%20replacement&utm_content=6; accessed July 1, 2012) and the INBONE II Total Ankle System became FDA 510(k) cleared in August 2010 (http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/DeviceApprovalsandClearances/510kClearances/ucm239168.htm?utm_campaign=Google2&utm_source=fdaSearch&utm_medium=Website&utm_term=inbone%20II%20total%20ankle%20replacement&utm_content=4; accessed July 1, 2012). Interconnecting stem pieces allow surgeons to build a tibial stem to custom length, which provides optimal strength and stability by dispersing bone implant interface. For the INBONE Total Ankle System, two anterior-posterior lengths exist for each size tibial tray to allow improved fit and coverage of anterior and posterior tibial cortices without the need for further bone resection from the medial or lateral malleoli. Also, for the INBONE II Total Ankle System, the talar component boasts a sulcus design to its proximal articulating aspect and a central stem with 2 4-mm anterior talar dome pegs to its distal surface. The sulcus articulating geometry provides increased coronal plane stability, permitting liberal medial and lateral gutter débridement (http://www.wmt.com/footandankle/FA701-1210.asp; accessed July 1, 2012).[3] The talar component's central stem and anterior pegs provide 3 points of fixation resulting in increased rotational stability (http://www.wmt.com/footandankle/FA701-1210.asp; accessed July 1, 2012). Four ultra–high-molecular-weight polyethylene (UHMWPE) insert thicknesses are available for each size implant, including two standard and two thicker revision UHMWPE inserts, which is particularly advantageous in the setting of total ankle replacement revision. A greater thickness of the polyethylene insert in combination with a broader constrained design of the INBONE II Total Ankle System results in less edge-loading effect and reduced delamination wear of the UHMWPE insert. The implant is FDA indicated for use with polymethylmethacrylate cement.

Despite significant design improvements established by the INBONE II Total Ankle system, indications and contraindications for total ankle replacement must be considered no matter which implant is preferred. Degenerative, inflammatory, and posttraumatic arthritis of the ankle remain the primary indications for total ankle replacement. Various investigators have noted that the results of total ankle replacement may be