Introduction

Total ankle arthroplasty (TAA) is the process of replacing a diseased ankle with a prosthetic ankle. The procedure is employed as an alternative to ankle arthrodesis for conditions such as severe osteoarthritis, posttraumatic arthritis and rheumatoid arthritis of the ankle ***(Clare and Sanders, 2003)***. Conservative management typically consists of medications for pain control, limiting activity, the use of ankle braces to stabilize the joint, shoe modifications, heat, and physical therapy to control the pain associated with ankle arthrosis. When conservative management fails, ankle arthrodesis typically has been the surgical treatment of choice to control the pain of severe ankle arthritis. During an ankle arthrodesis, the joint is fused together, limiting up-and-down movement. While pain may be relieved with ankle arthrodesis, the development of progressive degenerative arthritis in adjacent joints is common ***(Fuchs et al., 2003)***. Ankle arthroplasty, an alternative to arthrodesis, is intended to improve mobility and function of the joint and is thought to reduce progression of arthritis in adjacent joints ***(Gottrup, 2005)***.

With new joint replacements, designs can be divided into two groups: two-component, fixed-bearing designs and three-component, mobile-bearing designs ***(Stengel et al., 2005)***. These designs differ not only in the bearing

surface, but also in the portion of the ankle joint that they replace. Two-component systems can be further categorized as constrained, semiconstrained and unconstrained ***(Easely et al., 2004)***.

Devices currently available for ankle replacement are:

- Agility™ Total Ankle System (DePuy, Inc., Warsaw, IN), a two-component design.
- Scandinavian Total Ankle Replacement (STAR) (Waldemar Link GmbH & Co., Hamburg, Germany), a three-component design
- Buechel-Pappas (BP) Ultra Total Ankle Replacement (Endotec, South Orange, New Jersey), a three-component design
- TNK Ankle (Kyocera Corporation, Kyoto, Japan), a two-component design ***(Knecht et al., 2004)***.

Currently, intermediate and long-term results of total ankle arthroplasty (TAA) are not equal to those of total hip and knee arthroplasty. The available evidence suggests that the lifespan of the device is short-term and therefore not practical for use in younger patients. Many authors agree that further development in prosthetic design is required ***(Gill, 2004; Rippstein, 2002)***.

Complications such as wound infection, delayed healing and poor implant survival have been associated with TAA ***(Wood et al., 2004)***. While uncemented and

unconstrained second-generation replacements have shown better short-term results ***(Tarasevicius et al., 2004)***, there are currently no ankle replacements that have shown improved long-term results, and none are currently approved by the U.S. Food and Drug Administration (FDA) for uncemented use. While TAA is supported as a treatment option by the American Orthopedic Foot and Ankle Society (AOFAS), the long-term results of most new designs remain unknown ***(Valderrabano et al., 2004)***. As a result, further scientific research involving randomized controlled clinical trials is necessary to provide long-term data in assessing patient outcomes associated with the procedure***(Clare and Sanders, 2005)***.

Over the past decade, total ankle replacement surgery has evolved as an acceptable and viable alternative to ankle arthrodesis in select patients with ankle arthritis. These include adult patients with primary, post-traumatic, and rheumatoid arthritis who have moderate or severe pain, loss of mobility, and loss of function of the involved ankle. Before considering total ankle replacement, patients should have completed several months of conservative treatment, should have satisfactory vascular perfusion in the involved extremity, and must have adequate soft-tissue coverage about the ankle that affords a safe surgical approach to total ankle replacement**.(Karantana et al.,2009).**