

Rheumatoid Arthritis and Total Ankle Joint Replacement

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Abstract

Rheumatoid arthritis is a systemic autoimmune condition of unknown etiology which may present to the orthopedic surgeon with multi joint involvement. Rheumatoid arthritis can involve the ankle, hindfoot and forefoot. We review the historical surgical treatments for the rheumatoid ankle. We also discuss the results of the varying generations of total ankle replacement in rheumatoid arthritis. We conclude the results of the latest generation of ankle arthroplasties are limited in the rheumatoid population. This demands a frank discussion between patients and surgeons prior to embarking on surgery.

Keywords: Rheumatoid; Arthritis; Ankle; Arthroplasty

Rheumatoid Arthritis (RA) is an autoimmune disorder of unknown etiology characterized by symmetric, erosive synovitis and in some cases, extra-articular involvement [1].

There are approximately 400,000 people with RA in the UK. The incidence of the condition is low, with around 1.5 men and 3.6 women developing RA per 10,000 people per year. This translates into approximately 12,000 people developing RA per year in the UK. The overall occurrence of RA is two to four times greater in women than men. The peak age of incidence in the UK for both genders is the 70s, but people of all ages can develop the disease [2].

Traditionally, the mainstay of surgical management for advanced degenerative disease of the ankle due to RA has been arthrodesis. Arthrodesis has been shown to be associated with a higher rate of fusion as reported by Maurer when evaluating transarticular cross-screw fixation as a technique for ankle arthrodesis. He reports 100% fusion rates using the above technique and a lower rate of fusion with Charnley compression arthrodesis [3]. This was found to be coupled with good post-operative function [4], however, was associated with ipsilateral foot arthritic changes in the long term [5]. Further adverse effects of ankle fusion such as slowed velocity of gait and shortened length of stride while barefoot have also been noted [4].

In an attempt to try and overcome some of the highlighted problems, ankle arthroplasty has been developed. Historically, first generation designs have been associated with poor outcomes. In 1985, an editorial in the British volume of the

Journal of Bone and Joint Surgery stated that arthroplasty could not be recommended at that time given the available results. He suggested that prior to considering ankle arthroplasty surgery, there have to be improvements in prosthetic design, uncemented implants have to be routinely available and improved surgical technique was required [6].

Second generation ankle replacements were largely uncemented prosthesis with minimal bone resections. They are semi constrained and allow for improved joint kinematics [7]. This prosthesis can be divided into two and three component designs [7]. The three most common second generation ankle replacements commercially available are: Low Contact Stress (LCS), the Agility and the Scandinavian Total Ankle Replacement (STAR) [7]. With further developments, third generation total ankle replacements are now available.

To date, the available studies in relation to Total Ankle Arthroplasty (TAA) in rheumatoid patients are observational in nature which reflects inconsistent survival analysis outcomes between studies. Although studies have reported success rate of > 90% at 10 years using the STAR and Buechal Pappas (BP) implant [8], this data needs to be interpreted with caution as other studies using such implants are unable to reproduce similar success. Woods et al. [9], an independent high volume unit, compared two different implants (STAR Vs BP) and reported only 79 % six year survivorship of the BP design as compared to 95% survivorship with the STAR design. This study had a relatively good sample of 200 patients, was a single centre study and was prospective in nature. 62 of the patients in the trial had an underlying diagnosis of rheumatoid arthritis. In a further paper from the same unit, Wood [10] demonstrated an impressive 80.3% survivorship with the STAR in 200 patients in whom the majority had rheumatoid arthritis. A total of 24 patients had required revision surgery.

San Giovanni et al. [11] at an independent unit reported an overall survivorship of 93% at a mean 8.3 year follow up using the BP implant. However this was a retrospective review that involved a much smaller sample size of 31 patients with rheumatoid arthritis.

A Norwegian group [12] has demonstrated similarly impressive results, on this occasion principally with the STAR prosthesis, with 10 year data demonstrating 76% survivorship.

A systematic review by Zaidi et al. [13] revealed 73% ten year survival rate in long term registry data as compared to 89% ten year survival rate in pooled non registry data. The registry results would describe a more realistic expected outcome as compared to non-registry data that may have a strong inventor-related influence.

The newer ankle arthroplasty designs have abandoned the use of cemented implants following increased failure rates due to component subsidence and early loosening [14]. Kofoed et al. [15] reinforced this in their designer series in 2004 reporting a remarkable 95.4% survivorship at 12 years with uncemented implants compared to 70% at 12 years with cemented implants. Patients in this study required ankle arthroplasty due to either underlying osteoarthritis or rheumatoid arthritis.

Roukis and Prissel [16] performed an observational analysis of worldwide ankle replacement registry data comprising 13 different ankle replacement systems, involving 6 countries that had available data regarding ankle replacement performed between 2000 & 2011. The Mobility ankle replacement was the most frequently implanted replacement system worldwide (33%) with a significant increase in use since 2007. There was also a significant increase in the usage of newer systems such as Hintegra and Salto Mobile Prosthesis in the last 4 years of the study period. The established STAR system noted a significant decline in usage trend from 179 cases in 2000 to 31 cases in 2011.

The increasing trend of Mobility system over the recent past has only made short and midterm analysis of outcome possible. The initial report of 100 cases using the Mobility system was published in 2010. This study revealed a 93.6% 4 year survival with a mean follow up of 43 months [17]. This trial assessed the outcomes of the mobility implant in patients with osteoarthritis. Survivorship in a rheumatoid population has not been assessed. Therefore, it is difficult to make comments regarding this implant in such a population.

Table 1 summarizes the results of ankle arthroplasty in patients with rheumatoid arthritis. The number of papers to list is limited due to the small numbers of papers assessing arthroplasty surgery in a rheumatoid population.

Conclusion

TAA is an established and valid option in patients suffering from ankle joint dysfunction. Despite the availability of newer third generation implants, the available data is limited. The older second generation implant such as the STAR acceptable

Table 1: Results of ankle arthroplasty in patients with rheumatoid arthritis.

Author	Implant	Follow up (years)	Survivor ship (%)
Buechel	STAR, BP	10	>90
Woods	STAR BP	6	95 79
San Giovanni	BP	8.3	93

outcomes; patients and surgeons should be cognizant of the results of surgery prior to embarking on it. Further research is needed to look at long term survival, prosthesis design along with surgical technique in patients who undergo surgery with newer third generation implants.

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