CHAPTER 3
What Went Wrong with the First Generation of Ankle Arthroplasties?

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3.1 Introduction

Ankle arthroplasty is currently regarded by the majority of orthopaedic surgeons as an operation which, in view of the alleged virtues of arthrodesis, is at best irrelevant and at worst somewhat disreputable; perhaps even unethical in view of the severe complications that may result! Comments in the literature tend to range from total disparagement of its use in osteoarthritis or even in rheumatoid arthritis to a grudging concession that with improved technique, it might come to have a place in the management of the severely disabled rheumatoid arthritic patient [1, 2, 4–6].

Normal hind-foot function and normal gait demand fully coordinated action in the ankle, sub-talar and mid-tarsal joints. A healthy and fully mobile mid-tarsal joint can, however, compensate to a large degree for loss of ankle movement. Thus, in many post-traumatic problems, an arthrodesis can leave the patient with a remarkably normal gait [3, 7]. In most rheumatoid arthritic patients, this potential functional reserve is no longer available and the whole hind-foot complex and ankle might become largely ankylosed.

3.2 Ankle Arthroplasty

One of the earliest arthroplasties introduced by Richard Smith attempted to restore composite ankle and hind-foot movement through ball and socket articulation. However, some patients found this implant inherently unstable and, thus, failed to regain satisfactory confidence in walking [3]. Kirkup has pursued this approach via the Bath and Wessex prosthesis with greater success by reversing the high-density polyethylene and metal articulations and by tensing the ligamentous support by means of graded thickness of the talar domes (2–6 mm). Nevertheless, there have continued to be considerable complications with this technique.

In a recent review, Kirkup found that of 51 Bath prostheses available for follow-up, 44 (86%) were in situ at an average of 4.2 years, and 32 (63%) were
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either free from pain or experienced only mild discomfort after activity – none experienced severe pain. Most had radiolucent lines without symptoms, six were under observation for loosening, while two were revised and one underwent arthrodesis for loosening. This led him to the cautious conclusion that, for severely disabled rheumatoid arthritic patients with bilateral, tarsal ankylosis and crippling ankle pain, spherocentric joint replacement is justified on one side and sometimes on both [5]. It seems that the idea of substituting a simple ball and socket mechanism for a two-tier and highly complex axial arrangement of joints may be much too simplistic to achieve success.

At the other extreme, the Oregon ankle attempted to replace the entire ankle mortise. The increased constraint and displacing forces inherent in such a design, especially in the presence of a mobile inferior tibio-fibular joint, led to such a high incidence of loosening that this prosthesis met with a fairly rapid demise.

The more common approach was to resurface the dome of the talus with a curved metal plate and the plafond of the tibia with a concave surface of high-density polyethylene, with both components of the joint being secured with cement. Examples of such prostheses are the Liverpool, Mayo, Imperial College London Hospital (ICLH), and TPR (Thompson, Parkridge and Richards) implants. My own experience of the first generation of ankle arthroplasties was based on the latter. Between 1977 and 1986, 32 of these arthroplasties were carried out in 24 rheumatoid arthritic patients, 17 of whom were seropositive, 5 seronegative, and 2 suffering the late effects of juvenile chronic arthritis. Their ages ranged from 30 years to 79 years (mean 50 years). A review of this series was carried out in 1988 when the follow-up varied from 2 years to 11 years (mean 5.7 years) [8].

Pain relief had been remarkably satisfactory. Prior to surgery, all 32 joints were the seat of severe pain. At 1 year after surgery, 25 joints were completely pain free, 2 were subject to only occasional twinges of pain, and a further 4 were only affected by mild pain; only 1 joint was still the seat of severe pain. However, what was even more impressive was that in the 15 joints followed for 8 years or more, the results remained fairly satisfactorily consistent, with 10 of the 13 having no more than mild pain.

With regard to walking ability, there had also been quite dramatic improvement. Prior to surgery, only 4 of the 24 patients had been able to walk more than 100 yards, whereas at 1 year after surgery, 17 were in this category. Moreover, at the final follow-up, averaging 5.7 years, ten patients were still able to walk a quarter of a mile or more, although considerable fall-off in walking performance had occurred, as might be expected in the presence of chronic inflammatory polyarthritic disease.

3.3 Complications

Unfortunately, in spite of relatively satisfactory results with the surgery, there was an alarmingly high incidence of complications which included: