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Forefoot Surgery in Rheumatoid Arthritis: An Overview

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Editorial

Rheumatoid Arthritis (RA) is a chronic systemic progressive inflammatory arthropathy with the potential to cause destructive changes affecting synovial joints. The peak age of onset is between 35 and 55 years [1]. Whilst the exact causes and triggers for RA are unknown, it is likely that the aetiology is multifactorial including both genetic and environment factors. Autoantibodies are thought to be involved in an immunological cascade that results in the release of inflammatory cytokines and synovial inflammation. If synovitis is not adequately controlled, cartilage destruction and bone destruction ensues with dysfunction of surrounding structures such as tendons and muscles [2]. Damage to joints can lead to progressive disability and handicap. There is a significant health and cost burden related to RA with approximately 50% of patients unable to work after 10 years of the onset of disease [3].

Forefoot involvement often results in pain and disability in addition to having a significant impact on the quality of life in patients with RA. Metatarsophalangeal Joint (MTPJ) inflammation is frequently found in RA, leading to joint damage and deformities within the forefoot, with associated poor functioning of the supporting ligaments and capsular structures. This results in subluxation and ultimately dislocation of the involved joints. Plantar fat pads are distally displaced, predisposing to the formation of painful callosities. The hallux develops a valgus deformity, whilst the lateral four toes dislocate dorsally at the MTPJs. The imbalance created between the flexor and extensor tendons leads to the claw-toe deformities in the foot. This predisposes to the formation of the dorsal corns at the interphalangeal joints, which further aggravates pain and footwear problems. Ulcers and poor wound healing, sometimes secondary to medications, cause further disability.

Management of RA needs a multidisciplinary team approach involving an orthopaedic surgeon, rheumatologist, podiatrist, and physical therapist. Diseases Modifying Anti-rheumatic Drugs (DMARDs) form the mainstay in the management of disease by altering the disease progression and reducing pain and stiffness.

The National Institute for Health and Clinical Excellence (NICE) guidelines in the UK recommend a surgical opinion for patients with persistent arthralgia, worsening joint function, progressive deformity or persistent localised synovitis, despite optimal non-surgical management. The aims of surgery are pain relief, improvement of the function or prevention of further deterioration of joint function and prevention of deformity.

Hoffman et al. first described forefoot reconstruction in 1912 with excision of all five metatarsal heads using a distal transverse plantar incision. It was reported that this approach relaxed the soft tissues. The disadvantage of the Hoffman procedure is an increased risk of neurovascular damage. Recurrent hallux valgus and stiff metatarsophalangeal joints are usually the main concerns of unsatisfied patients following resection arthroplasty.

The Fowler procedure encompasses both a dorsal and plantar incision. The dorsal incision features five longitudinal extensions towards the metatarsals. This is used for the resection of the metatarsal heads and proximal portions of the phalanges. The plantar incision allows for the repositioning of the fat pad beneath the metatarsals.

Clayton et al. developed the Fowler procedure with the addition of extensor tendon transections and used only a dorsal transverse incision. A cohort review which followed up patients who underwent Clayton resection arthroplasties showed that postoperatively, 21% of patients struggled to stand on tiptoes [4]. Fibular drift of lateral toes and prominent metatarsal stumps were found on x-ray. However, these patients still felt an improvement in contrast with their postoperative state and would still recommend surgery. 6% of patients did not experience any improvement from the surgery and recurrent splay-foot deformity was observed. The authors put the unfavourable outcome in this group down to improper surgical technique and progression of the disease.

Metatarsal head excision can also be performed using an elliptical plantar incision, with K- wire to stabilise the first MTP joint. A dorsal approach has also been described.

The Stainsby procedure can be used to correct the claw toe. The aim of the Stainsby procedure is to correct the dorsally displaced plantar plate and reposition the metatarsal heads so they do not sink below the fat pad of the foot. Bony resection is performed on the lesser toes, the plantar plate freed, realigned underneath the metatarsal heads and intramedullary wire is then used to stabilise each toe.

Fusion of the first MTP joint is commonly used. The first MTP joint can be fused and rays 2-5 treated with a resection arthroplasty such as the Stainsby procedure. The disadvantage of arthrodesis is that joint mobility is lost. The aim of the procedure is pain management.

Current research in rheumatoid forefoot surgery focuses on joint sparing procedures. Scarf osteotomy for the first MTP joint combined with Weil osteotomy of the lesser metatarsal heads has been used with three in four patients describing the result as excellent at mean follow up 51 months [5]. A trial of 43 patients who underwent first tarsometatarsal fusion and distal realignment, shortening oblique osteotomies of the bases of metatarsals 2-4 and fifth ray osteotomy had significantly improved post-operative clinical outcome scores at a mean follow up of 77 months [6].

Most studies report favourable outcomes for the first few years post-operatively using scores such as the American Orthopaedic Foot and Ankle Society Score. Few studies report outcomes beyond the first five years postoperatively. This is an area for future research.

In conclusion, a range of procedures have been developed in the management of the rheumatoid forefoot. Studies into new techniques continue. It is thought that early intervention, early mobilisation and a multi-disciplinary team approach give the most favourable outcomes.

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