



Modified Scarf osteotomy for treatment of hallux valgus

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With over a hundred described surgical procedures for the management of hallux valgus, it is the purpose of this article to describe a new technique - the modified scarf osteotomy. This technique involves the combined use of a “closing wedge”, with the original two individual cut features of the scarf osteotomy in the surgical correction of hallux valgus. It has been performed for 24 months, and retrospective analysis of the last 12 patients, found it to be an effective means to improve the distal metatarsal articular angle (DMAA) at mean 7°, whilst also improving functional outcome by way of the American Orthopaedic Foot and Ankle Society (AOFAS) score at mean 31.4.

Key words: Hallux valgus, DMAA, Scarf, AOFAS

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Hallux valgus is one of the most common forefoot deformities, most commonly affecting females between the ages of 20-64 [1]. Presenting with discomfort, pain and affecting patients' day-to-day activities, it is a common cause for referral to the foot surgeon. Surgical correction of the condition comprises a variety of different procedures. The author describes a Modified Scarf Osteotomy, which has been used over the last 24 months to create a “closing wedge” within the first metatarsal, to improve both the patient's distal metatarsal articular angle (DMAA), and American Orthopedic Foot and Ankle Society (AOFAS) score - a proven demonstrator of functional outcome [2].

The treatment of hallux valgus using a scarf osteotomy is well described in the literature, and a well understood procedure to correct the DMAA [3]. The DMAA defines the relationship of the articular surface of the distal metatarsal to the longitudinal axis of the first metatarsal.

The scarf osteotomy is a technically demanding procedure with a steep learning curve [4]. It was initially described in 1926 by Meyer who published an operative technique that included a diaphyseal Scarf-like osteotomy of the first metatarsal bone for hallux valgus correction [3,5]. While the surgical technique of an articular preserving Scarf osteotomy for forefoot management was described in detail by Barouk [6].

Nyska et al evaluated the change in position of the first metatarsal head using saw-bone models [7]. They observed that Scarf osteotomy provided less angular correction and shortening but similar lateral displacement in comparison to the basilar angular osteotomies and Ludloff osteotomy [8,9], angular correction is best brought about by rotation of the z-wing. They concluded that Scarf osteotomies are more reliable for patients with mild to moderate deformities, a short first metatarsal or an intermediate deformity with large DMAAs.

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Figure 1 Exposure of the first metatarsal head.

Methods

The original z-scarf osteotomy comprises of two individual cuts – a proximal dorsal fragment, and a plantar fragment – and it is this plantar fragment, which notably comprises the metatarsal head. Two transverse cuts, around 60 degrees to the longitudinal are then performed to create a double chevron.

The author describes a method, whereby medial wedges are cut from the distal and proximal cuts of the scarf osteotomy. After the routine cuts for scarf osteotomy are performed, 2 mm of bone is then cut to form a "closing wedge" from the proximal and distal transverse cuts. This affords the benefit of simultaneous correction of a range of angles, including the DMAA, the intermetatarsal angle (IMA) and the hallux valgus angle (HVA).

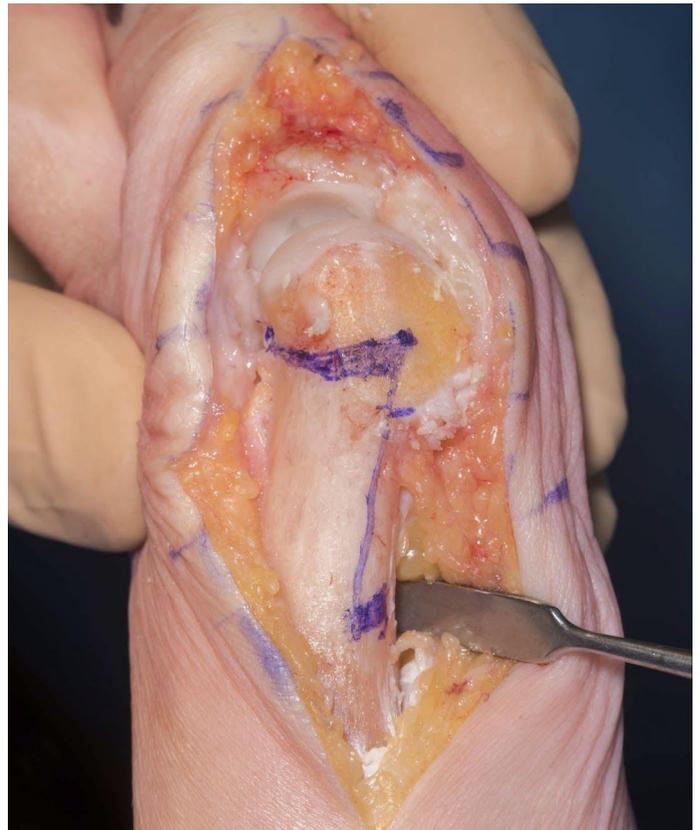


Figure 2 Z-cut and medial wedging of scarf osteotomy.



Figure 3 Medial wedging of Scarf osteotomy.

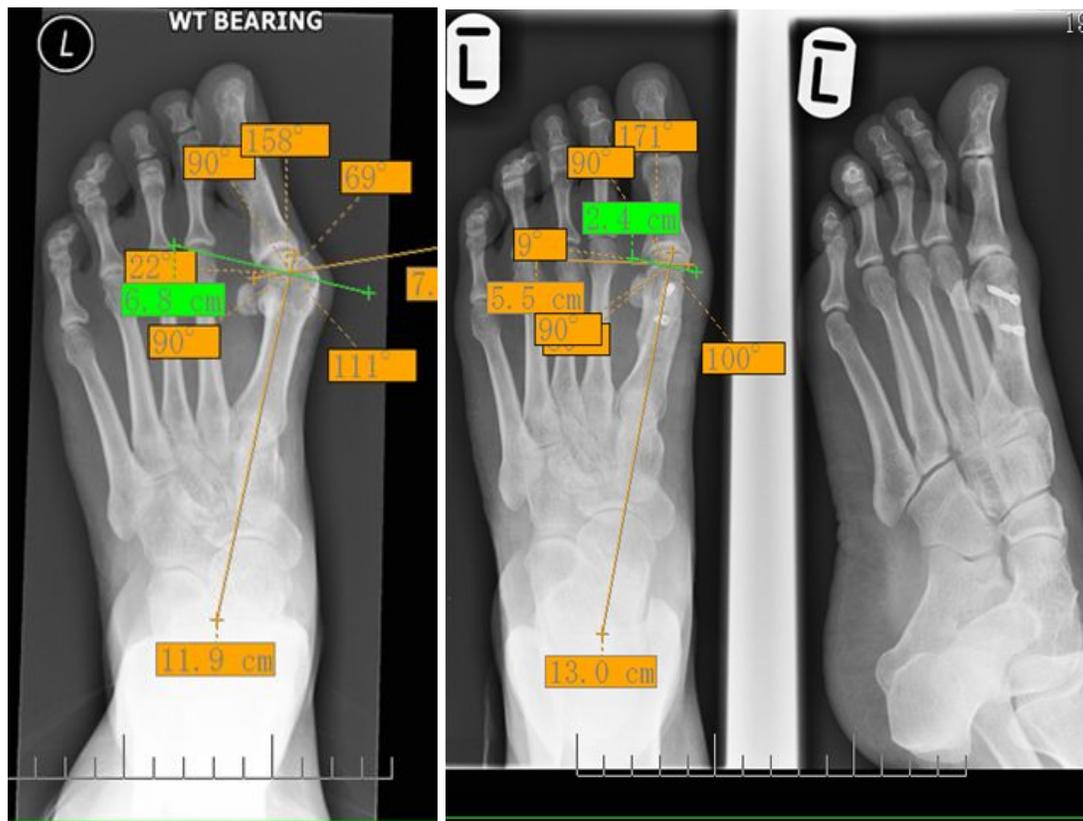


Figure 4 Pre-op and post-op radiographs displayed on computer system GE Centricity™, to highlight the DMA, IMA and, HVA respectively.

Results

Over a 6 month period, 12 patients, all female, with an average age of 52 years underwent surgery with the above mentioned modified scarf osteotomy using a closing wedge. The AOFAS score was completed pre-operatively and 6 months post procedure, at these intervals antero-posterior radiographs of the patients were also studied. The results are demonstrated in the table below.

N=12	Pre-operative	Post-operative
AOFAS score (mean)	50.3	81.7
DMAA(degrees) (mean)	19.3	12.3

Table 1 Pre- and post-operative results of modified scarf osteotomy.

Discussion

Recurrent hallux valgus deformity is probably the most frequent complication of bunion surgery. Recurrence of the deformity can be associated with failure to correct the DMAA [10,11].

Different techniques have been described in the literature to correct the DMAA. A rotational scarf osteotomy is a modification of the traditional scarf osteotomy also has the advantage of decreasing troughing which is a known complication of scarf osteotomy [12]. Another technique using mini-external fixator to correct the DMAA was described by Oznur in 2006 [13].

Our technique is another modification of the traditional scarf osteotomy. All 12 patients had an improved AOFAS score, with a mean improvement of 31.4. All 12 also demonstrated an improvement in the DMAA, with a mean improvement of 7°. Of the 12 patients, none said they regretted undergoing the procedure.

This modified scarf with closing wedges as described, allows for the simultaneous correction of the DMAA, IMA and HVA. It is a simple and effective technique to reproduce, which delivers good outcomes.

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