Foot Width Changes Following Hallux Valgus Surgery

Shay Tenenbaum, MD, Jason Bariteau, MD, Amir Herman, MD, Oded Coifman, MD

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Introduction/Purpose: Hallux valgus is one of the most common deformities of the adult foot, and can adversely affect quality of life, with common complaints including pain, footwear restrictions and cosmesis.
Every clinician is familiar with the patients' concerns regarding the postoperative foot appearance and footwear anticipations. Surprisingly, although patients are concerned with postoperative foot width, there are only scarce reports on this issue. This study was undertaken to evaluate the impact of hallux valgus surgical treatment on foot width.

Methods: Study included 71 consecutive cases with moderate to severe hallux valgus treated with Scarf osteotomy, distal soft tissue release and Akin osteotomy as needed. Patients were included only if pre- and postoperative weightbearing X-rays at minimum 6 months followup were available.
The average age was 55.7 years (range, 20 to 76), with average follow-up of 20.7 months (range, 6 to 96).
Patients' medical records were reviewed for clinical data, surgical technique and radiographic measurements.
The radiographic measurements included hallux valgus angle (HVA), intermetatarsal angle (IMA), distal metatarsal articular angle (DMAA), and foot width.
Foot width was assessed by measuring both the bony width (BW: maximal distance between the medial cortex of 1st metatarsal head and lateral cortex of the 5th metatarsal head) and the soft tissue width (STW: maximal distance between most medial soft tissue outline and the most lateral soft tissue outline at the level of metatarsal heads).

Results: Preoperative HV deformity (mean HVA 35.8, IMA 14.1 and DMAA 15.2) was successfully corrected (postoperative mean HVA 13.7, IMA 6.9 and DMAA 7.7).
Overall bony foot width was reduced by 5% and soft tissue foot width by 2% postoperatively.
Further analysis showed there were 13 feet (18.3%) with increased (>5%) bone width, 26 feet (36.6%) with no change (±5%) and 32 feet (45.1%) for which width decreased in more than 5% postoperatively.
Patients with the widest foot before surgery, had a decrease in foot width following surgery whereas, patients with the narrowest foot width, had an increase in foot width.
Magnitude of preoperative deformity (as assessed by HVA, IMA and DMMA measurements) or amount of correction had low correlation (<0.2) with postoperative foot width.

Conclusion: While the ability of surgery to correct HV deformity is well established and reported in the literature, its effect on foot width is less understood or predictable. Overall, the postoperative reduction of foot with was modest. Furthermore, while postoperative foot width (both bony and soft tissue) decreases or does not change in 4 out of 5 patients, there are cases in which foot width actually increases.

Angular deformity data					
	Total N=71 mean (±SD)	Post-surgery foot width (Bone)			P value
		Group 1 Increase >5% N=13	Group 2 change ±5% N=26	Group 3 Decrease >5% N=32	
Pre HVA (180-X)	35.8 (±7.9)	34.6 (±9.4)	36.4 (±8.1)	35.9 (±7.3)	0.795
Post HVA	13.7 (±9.6)	13.6 (±7.1)	15.8 (±9.6)	11.9 (±10.4)	0.494
Delta HVA	-22.2 (±11.7)	-21 (±8.4)	-20.6 (±10.4)	-23.9 (±13.7)	0.844
Pre DMAA(90-x)	15.2 (±7)	14 (±8.1)	14.7 (±5.6)	16.1 (±7.7)	0.674
Post DMAA	7.7 (±6)	8.3 (±4.6)	8.7 (±6)	6.7 (±6.5)	0.184
Delta DMAA	-8.7 (±12.7)	-12.4 (±23.5)	-6 (±7.7)	-9.4 (±9.3)	0.290
Pre IMA	14.1 (±2.9)	13.2 (±2.3)	13.5 (±2.6)	14.9 (±3.3)	0.242
Post IMA	6.9 (±3.4)	6.6 (±2.3)	6.8 (±3.9)	7.1 (±3.4)	0.940
Delta IMA	-7.1 (±3.6)	-6.6 (±2.4)	-6.6 (±2.9)	-7.8 (±4.4)	0.416
Foot width data					
Corrected bone width pre-operative	1.27 (±0.13)	1.2 (±0.11)	1.27 (±0.13)	1.31 (±0.14)	0.023
Corrected bone width post-operative*	1.21 (±0.15)	1.31 (±0.13)	1.26 (±0.12)	1.13 (±0.15)	<0.001
Corrected soft tissue width pre-operative*	1.45 (±0.16)	1.36 (±0.12)	1.44 (±0.16)	1.48 (±0.17)	0.050
Corrected soft tissue width post-operative*	1.42 (±0.18)	1.53 (±0.15)	1.47 (±0.14)	1.33 (±0.19)	0.001

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