

COMPLETE VERSUS INCOMPLETE PERCUTANEOUS OBLIQUE DISTAL CLOSING WEDGE OSTEOTOMY FOR BUNIONETTE (TAILOR’S BUNION) DEFORMITY CORRECTION: A COMPARATIVE STUDY

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Background:

There has been increasing interest in the use of minimally invasive osteotomy techniques for bunionette (Tailor’s bunion) correction. The aim of this study was to investigate the clinical and radiographic outcomes following an unfixed, minimally invasive oblique distal diaphyseal osteotomy for bunionette deformity correction, and to assess whether there were any differences in outcomes between complete and incomplete osteotomy groups.

Methods:

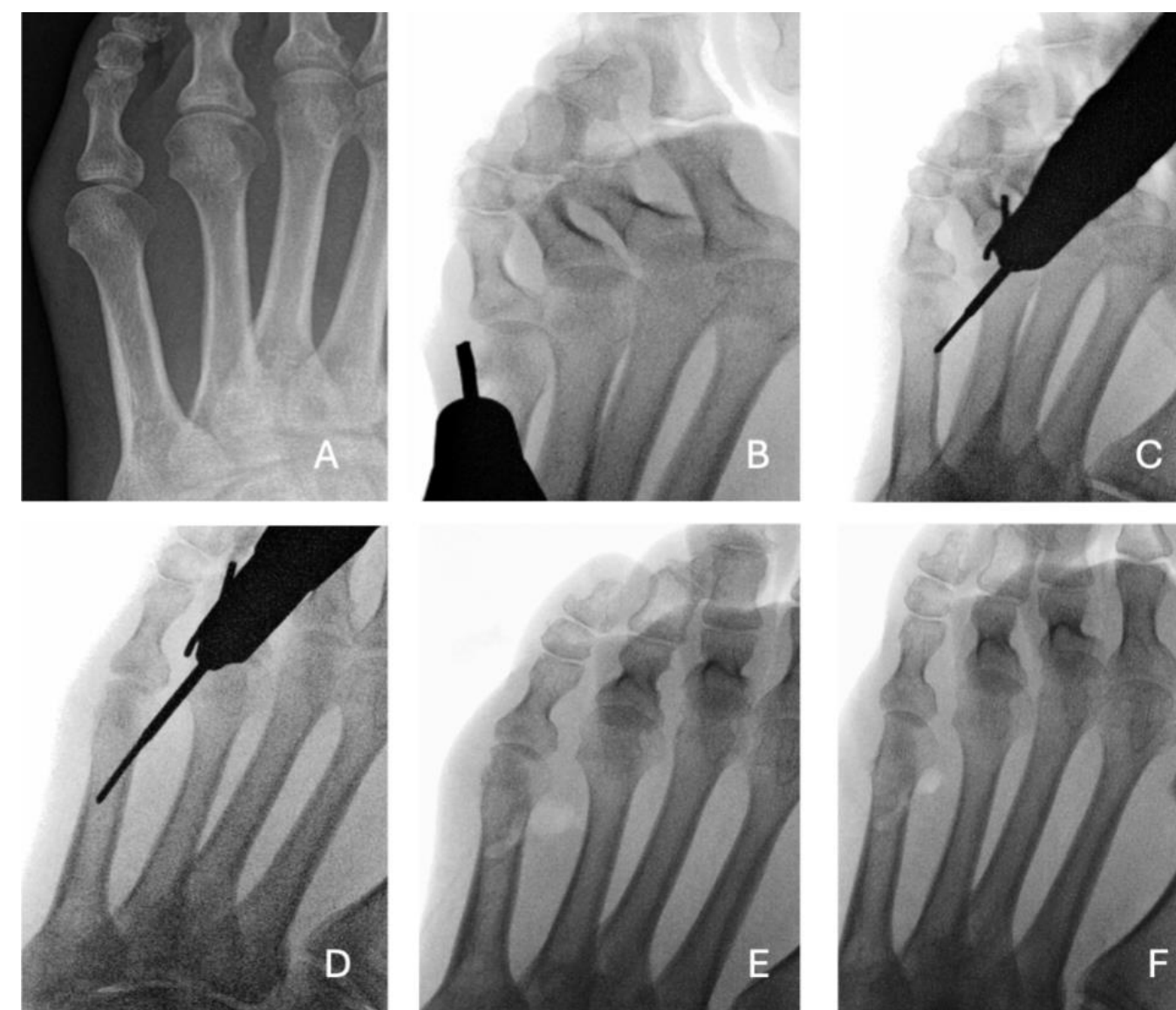
A total of 43 feet (mean age 54.2±17.1) underwent minimally invasive oblique distal osteotomy for bunionette deformity correction by a single surgeon over a 4-year period. The primary outcome was the presence of significant postoperative callus at the osteotomy site (greater than 150% of the width of the 5th metatarsal shaft). Secondary outcomes included radiographic parameters 4th-5th intermetatarsal angle (IMA), metatarso-phalangeal angle (MPA), and Patient-Reported Outcome Measures (PROMs) of MOXFQ (Manchester-Oxford Foot Questionnaire), EQ-5D-5L(EuroQol 5-Dimension 5-Level), and VAS(Visual Analogue Scale) Pain (minimum 12 months follow-up).

Results:

30 patients had a complete osteotomy, and 13 patients had an incomplete osteotomy with the lateral cortex remaining intact. In the complete osteotomy group, 60% of patients (p=.0003) had callus equivalent to greater than 150% of the metatarsal width at 6-week follow up, this reduced to 19% (p=.31) at 6 months and 0% (p=1) at 12 months. All PROMs, except EQ-5D-5L VAS, showed significant improvements (p<.05). The IMA and MPA significantly decreased postoperatively across both groups (p<.001). There were no significant differences between the incomplete and complete osteotomy groups at follow-up.

Conclusion:

Unfixed, minimally invasive oblique distal osteotomy for bunionette deformity correction is a safe and effective procedure that significantly improves radiographic and clinical outcomes. Whether or not the osteotomy is complete does influence callus formation but does not significantly affect the radiographic or clinical outcomes.



Pre and intraoperative fluoroscopic sequence of bunionette correction using a Shannon burr. A) Pre-operative anteroposterior radiograph showing lateral prominence of the fifth metatarsal head consistent with bunionette deformity. (B) Fluoroscopic image showing minimal lateral condylectomy performed using a Shannon burr. (C) Establishing the entry point for the osteotomy just proximal to the metatarsal head using the same burr. (D) The burr is advanced in a controlled manner to complete the osteotomy by cutting through both the dorsal and plantar cortices. (E) Completion of the osteotomy; the distal fragment is manually manipulated to achieve desired correction and closure. (F) Final fluoroscopic image showing the corrected alignment and final position of the fifth metatarsal following osteotomy and manual reduction.

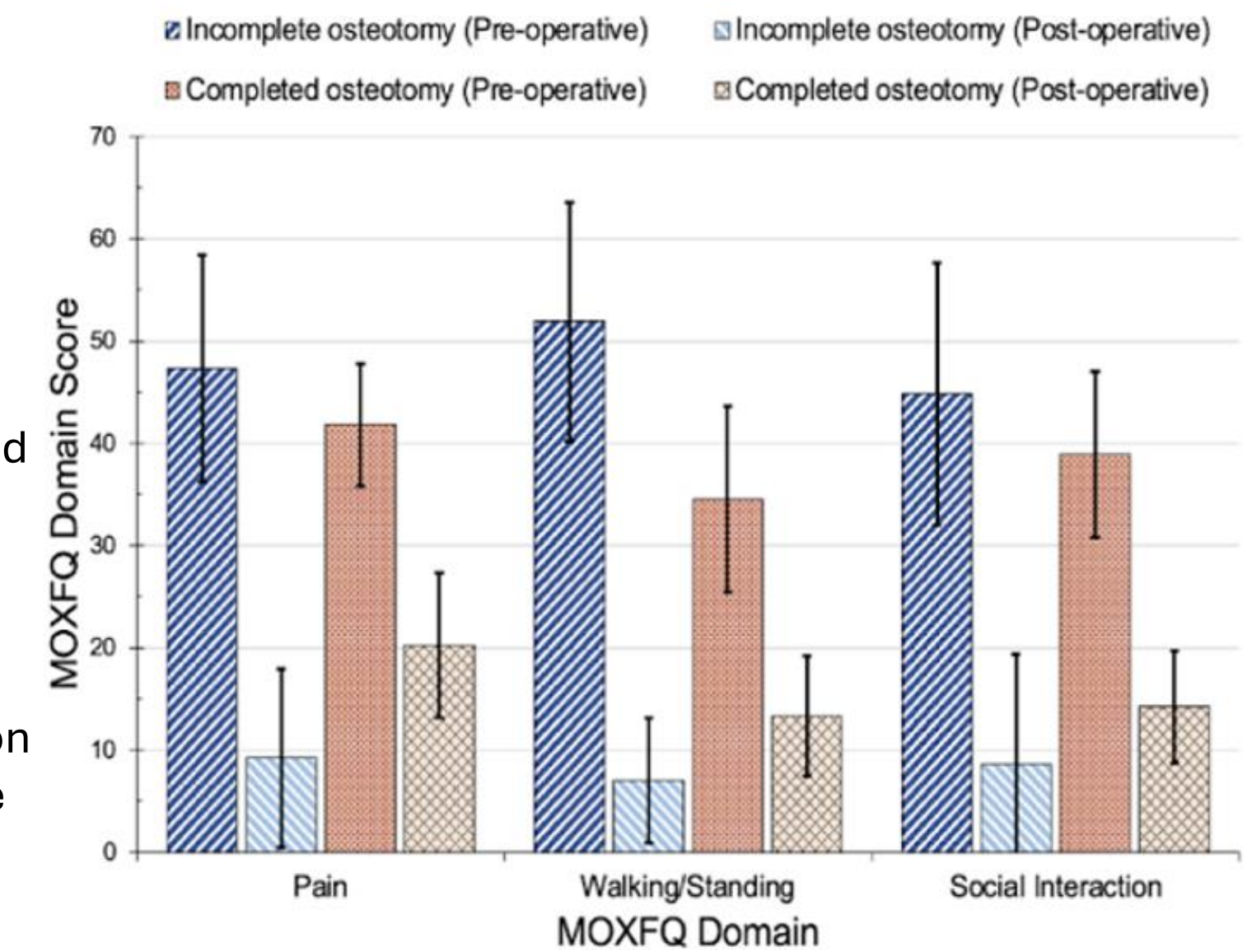
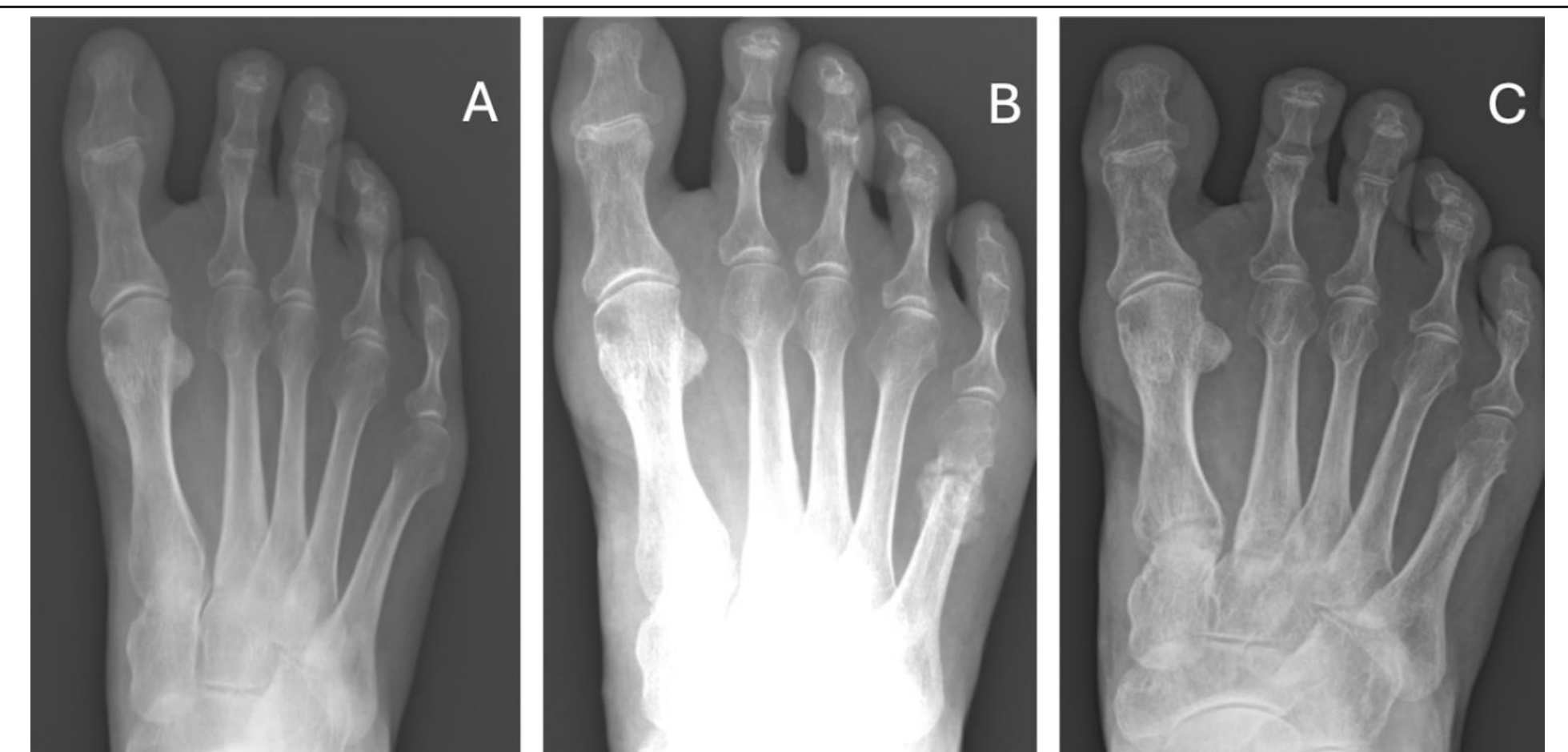


Table 2: Radiographic Outcome Analysis Stratified by Completion of Osteotomy of 5 th Metatarsal					
Time point		Pre-operative	6 week	6 month	12 month
Incomplete Osteotomy (n=13)	Number at time point	13	12 (92.3%)	5 (38.4%)	5 (38.4%)
	Time post-surgery (Mean±SD)	-	8.2±3.7 weeks	5.6±0.9 months	14.6±4.3 months
	Coughlin classification	7 Type I (54%) 2 Type II (15%) 4 Type III (31%)	-	-	-
	IMA (Mean±SD)	9.0±1.9	5.4±1.2	4.8±1.4	5.5±1.0
	MPA (Mean±SD)	12.5±4.9	7.2±2.9	5.0±3.2	5.9±3.3
	Callus >150%	-	0 (0%)	0 (0%)	0 (0%)
Completed Osteotomy (n=30)	Number at time point	30	30 (100%)	25 (83%)	18 (60%)
	Time post-surgery (Mean±SD)	-	7.4±2.6 weeks	5.5±2.3 months	14.0±3.7 months
	Coughlin classification	9 Type I (30%) 6 Type II (20%) 15 Type III (50%)	-	-	-
	IMA (Mean±SD)	10.5±2.7	6.4±2.3	5.2±2.4	5.0±1.9
	MPA (Mean±SD)	14.4±5.5	5.6±3.5	4.7±2.9	4.6±2.5
	Callus >150%	-	18 (60%)**	5 (19%)	0 (0%)
IMA 4 th /5 th intermetatarsal angle (degrees), MPA 5 th metatarso-phalangeal angle (degrees), SD Standard deviation					
**p<0.01					

Table 1: Patient Demographics				
Demographic		Incomplete Osteotomy (n=13)	Completed Osteotomy (n=30)	All Cases (n=43)
Gender	Male	4	3	7
	Female	9	27	36
Age (mean±SD)		40.0±15.4	60.4±14.0	54.2±17.1
BMI (mean±SD)		26.8±3.9	24.3±3.9	25.1±4.0
Side	Left	6	13	19
	Right	7	17	24
Other procedures	Isolated bunionette	6	6	12
	HV correction +/- lesser toe procedures	7	23	30
	Other lesser toe procedures	0	1	1
BMI Body Mass Index, HV Hallux Valgus				

Table 3: Patient Reported Outcome Measures Stratified by Completion of Osteotomy of 5 th Metatarsal						
Outcome Measure			Pre-operative (Mean±SD)	Post-operative (Mean±SD)	Improvement Mean (95% confidence interval)	Partial vs Completed p-value
Incomplete Osteotomy (n=13)	MOXFQ	Pain	47.3±20.4	9.2±16.1	38.1 (24.7-51.4)**	0.06
		Walking/Standing	51.9±21.5	7.0±11.2	44.9 (31.2-58.7)**	0.014*
		Social Interaction	44.8±23.6	8.6±19.8	36.2 (22.1-50.4)**	0.22
	EQ-5D-5L	VAS Pain	37.3±24.8	11.5±21.9	25.8 (8.9-42.7)**	0.36
		EQ-VAS	83.5±14.4	86.5±11.3	3.0 (-8.5-14.5)	0.56
Index		0.72±0.13	0.91±0.19	0.2 (0.1-0.3)*	0.12	
Completed Osteotomy (n=28)	MOXFQ	Pain	41.8±16.7	20.2±19.8	21.6 (12.1-31.2)**	0.06
		Walking/Standing	34.5±25.4	13.3±16.3	21.2 (10.0-32.4)**	0.014*
		Social Interaction	38.9±22.6	14.2±15.3	24.7 (13.7-35.7)**	0.22
	EQ-5D-5L	VAS Pain	34.2±26.8	18.6±21.5	15.6 (2.2-29.0)*	0.36
		EQ-VAS	74.9±15.3	73.3±23.2	-1.6 (-11.7-8.5)	0.56
Index		0.74±0.16	0.78±0.20	0.1 (0.0-0.1)	0.12	
MOXFQ Manchester-Oxford Foot Questionnaire, EQ-5D-5L EuroQol 5-Dimension 5-Level, VAS Visual Analogue Scale						
*p<0.05, **p<0.01						



A) Pre-operative radiograph showing lateral deviation of the fifth metatarsal head. (B) 12 week postoperative radiograph demonstrating complete osteotomy site healing with significant callus formation. (C) 12 month radiograph showing complete remodeling and resolution of callus at the osteotomy site.