

# Correction of Hallux Abductus Valgus Deformity Utilizing Closing Base Wedge Osteotomy: A Study of 101 Patients

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## Statement of Purpose

- Hallux abducto valgus (HAV) is a functionally disabling deformity with lateral deviation of the hallux and medial prominence of the first metatarsal head
- Various surgical techniques have been utilized in the treatment of this deformity
- Proximal closing base wedge osteotomy (CBWO)
  - Used for large intermetatarsal angles (severe deformities)
  - May be technically demanding, little margin for error, many settle for for fusion of first metatarsal cuneiform joint
- In this retrospective review, we assess the outcomes of CBWO
  - Radiographic and functional outcomes
  - Complications
- Hypothesis:** Correction of large hallux abductus valgus deformities with closing base wedge osteotomy produces excellent radiographic and functional outcomes with minimal complications and preservation of first ray range of motion

## Literature Review

- Early studies - high complication rates (First metatarsal elevatus, shortening, delayed bone healing, and unstable fixation)
- Overall literature has no clear consensus with variable outcomes
  - Small sample sizes
  - Need for larger study

### Lagaay and Hamilton et al.

- CBWO (34 patients) vs. Austin vs. Lapidus
- CBWO rates of reoperation were 2.94% for recurrent hallux valgus and 2.94% for iatrogenic hallux varus

### Dreeban et al.

- 28 patients underwent CBWO
- Satisfaction rate 85%
- 1 recurrent HAV, 3 hallux varus

## Literature Review Continued

### Trnka et al.

- 56 patients underwent CBWO
- Hallux varus deformity (16 feet), elevatus (15 feet), and metatarsalgia (14 feet)
- Advocated alternative surgical techniques

### Jeremin et al.

- 24 patients underwent CBWO
- 50% had elevatus → 75% plantar lesions

Variable	Value
Age	49 (13 to 80) years
Gender	
Female	86 (85.1%)
Male	15 (14.9%)
BMI	29 (19 to 53) kg/m <sup>2</sup>
Current Smoker	19 (18.8%)
Former Smoker	10 (9.9%)
Comorbidities	Number of Patients
Osteoarthritis	15 (14.9%)
Thyroid disease	11 (10.9%)
Diabetes with a component of neuropathy	7 (6.9%)
Osteoporosis	5 (4.5%)
Rheumatoid arthritis, psoriatic arthritis, gout	3 (3.0%)
Fibromyalgia	3 (3.0%)
Cancer	2 (1.9%)
History of osteomyelitis (foot)	1 (1.0%)
Idiopathic neuropathy	1 (1.0%)

### Nigro et al.

- 61 patients underwent CBWO
- 34% had elevatus, 11% clinical symptoms
- 79% satisfaction rate

### Mann et al. studied proximal crescentic osteotomies

- Concluded “dorsiflexion of the first metatarsal did not influence presence of transfer lesions”



## Methodology and Procedure

- Single surgeon database
- January 1<sup>st</sup>, 2012 - December 31<sup>st</sup>, 2017
- 101 patients identified

- Radiographic outcomes** - Time to heal, intermetatarsal angle, true intermetatarsal angle, tibial sesamoid position, hallux valgus angle, shortening of the 1<sup>st</sup> metatarsal, elevatus, and average loss of correction
- Functional outcomes** - Pain on visual analog scale
- Complications**

### Surgical Technique

- Dorsomedial incision, resection of medial eminence
- Transverse proximal cut perpendicular to the longitudinal axis and weightbearing surface
- Distal cut in transverse plane to converge medially
- Osteotomy site reduced and fixated with a k-wire
- Lateral simulated weightbearing view
- Fixation techniques: Single screw, double screw, neutralization plate, and locking plate

### Post-operative

- 2 weeks: Non-weight bearing in a well-padded below-the-knee fiberglass cast
- 4-6 weeks: Partial-weight bearing in a fracture boot
- At time of radiographic union → normal shoe gear and return to full activity
- Pre-operative, immediate post-operative, postoperative imaging (every two weeks)

## Results

- Excellent correction of all measurable angles - significant
- Minimal shortening
- Minimal loss of correction
- Elevatus of 2.73mm without clinical sequela
- Improved functional outcomes - significant
- Low complication rate

Measurements	Pre-operative	Post-operative	P Value
Intermetatarsal Angle	15.45° (10° to 21°)	3.75° (0° to 10°)	< 0.05
True Intermetatarsal Angle	20.39° (15° to 29°)	9.21° (4° to 15°)	< 0.05
Hallux Valgus Angle	34.57° (12° to 60°)	9.24° (0° to 30°)	< 0.05
Tibial Sesamoid Position	5.46 (2 to 7)	2.54 (1 to 5)	< 0.05
Metatarsal Length	N/A	3.72	N/A
Shortening			
Loss of Correction	N/A	1.02	N/A
Metatarsus Elevatus	N/A	2.73	N/A
Time to Radiographic Union	N/A	9 weeks	N/A

Complications	# Cases	Complications	# Cases
Hallux Varus	0 (0%)	Dehiscence	1 (1%)
Metatarsalgia	0 (0%)	DVT	2 (1.9%)
Transfer Lesions	0 (0%)	Superficial Infection	2 (1.9%)
Revision	1 (1%)	Displacement	6 (5.9%)
		Fixation/Osteotomy	

## Analysis & Discussion

- Some studies report high complication rates
- We have demonstrated minimal complications with excellent correction of deformity in the **largest reported study**
- Effective and safe for high IM angles → excellent functional outcomes with correction of intermetatarsal and hallux valgus angles.
- Metatarsus elevatus: Purportedly associated with higher complication rates
- The mean post-operative elevatus of 2.73 did not result in any adverse sequela.
- Our study demonstrated no complications associated with elevatus

REFERENCES AVAILIABLE UPON REQUEST