



Bunionette Correction: Indications and Treatment (Outline)

© J ORTHOP TRAUMA SURG REL RES 4 (12) 2008

Outline (Congress of the Polish Foot & Ankle Society (PFAS), Jastarnia 2-4 October 2008, Poland)

STEVEN L. HADDAD

Associate Professor of Clinical Orthopaedic Surgery
Northwestern University
(Glenview, IL., USA)

INTRODUCTION

Davies: Initial Description (1949)

- pressure over lateral condyle 5th metatarsal head
 - bursa irritation

Tailor's Bunion

- cross-legged sitting creates irritation

DEFORMITY

Recognize the specific anatomic variation to select appropriate surgical procedure

- Structural causes
 - Abnormal transverse metatarsal ligament insertion
 - Lateral bowing 5th metatarsal shaft
 - Primary hypertrophy of 5th metatarsal head
 - Malposition of hindfoot surgery with residual forefoot varus
 - Brachymetatarsia for the 4th metatarsal
 - Symptomatic inflammatory arthropathies
 - Rheumatoid nodules, bursa inflammation

RADIOGRAPHIC ASSESSMENT

Weight bearing Radiographs are Critical

- Metatarsal–5th toe angle
 - Normally ≤ 16 degrees
- 4th–5th Inter-metatarsal angle
 - Normally 7 to 8 degrees
 - Symptomatic at 10 degrees
- Lateral deviation angle
 - Measures lateral bowing of 5th diaphysis
 - Bisect neck of 5th metatarsal at articular surface
 - 2nd line adjacent and parallel to medial proximal surface of metatarsal
 - Average value <3 degrees
 - Symptomatic at 8 degrees (Coughlin FA, 1991)

CLASSIFICATION

Type 1

- Enlarged 5th metatarsal head
 - true hypertrophy
 - exostosis
 - pronation rotating plantar lateral condyle laterally

Type 2

- Bowing of the diaphysis laterally
 - congenital

Type 3

- Widened 4th–5th intermetatarsal angle

INCIDENCE

Kitaoka (FA, 1991)

- Type 1 and Type 2
 - Less than 10% cases

Coughlin (FA, 1991)

- Type 1: 27%
- Type 2: 23%
- Type 3: 50%

SURGICAL MANAGEMENT

Type 1 Deformity

- Davies: Shave 5th metatarsal head
- Isolated prominence of 5th mt head WITHOUT structural deformity

Type 1 Deformity: Metatarsal Head Shaving

- Advantages
 - Technical ease
 - Immediate weightbearing
 - Rapid recovery and return to footwear
- Disadvantages
 - Destabilization of the lateral 5th mtp joint
 - Resultant medial drift and recurrence
 - Excessive valgus deviation of the 5th toe

SURGICAL MANAGEMENT

Type 1 Deformity: Metatarsal Head Shaving

- Results
 - Kitaoka (CORR, 1991)
 - 21 Feet
 - 71% satisfied
 - No correlation between amount of correction and patient satisfaction
 - Contraindicated in isolated plantar keratotic lesion
 - Must repair lateral capsule and abductor tendon

Type 1: Salvage

- **Metatarsal head excision**
 - Joint destructive procedure
 - McKeever (CORR, 1959) advocated as primary procedure
 - Now best employed in inflammatory conditions, ulceration, and post-surgical arthritis
- Problems
 - Retraction of the 5th toe
 - Transfer lesion under 4th metatarsal head
 - Flail 5th toe

Kitaoka (FA, 1991)

- 82% Fair or Poor results at 8 years
- 64% complications
 - Severe shortening (36%)
 - Transfer lesions to 4th (75%)
 - Stiffness (25%)
 - Persistent pain (27%)
- Increase in 4th-5th intermetatarsal angle 4.5 degrees

SURGICAL MANAGEMENT

Metatarsal Osteotomy: Distal Procedures

- Advocated for Type 1 and Type 3 deformity
 - Greater effect than condylectomy alone
 - No significant correction of the 4th—5th IM angle
 - Technical ease
 - Consistent results
- First described by Hohmann (1951)
 - Transverse osteotomy of the fifth metatarsal neck

Metatarsal Osteotomy: Distal Procedures

- Distal Oblique Osteotomy
 - Addresses 2 planes of deformity
 - Sponkel (Orthop Clin, 1976)
 - No fixation used—metatarsal allowed to float to appropriate position
 - 11% delayed union rate
 - Keating (J Foot Surg, 1982)
 - 75% transfer lesions
 - 12% recurrence rate
 - 56% success rate
- Distal Oblique Osteotomy
 - Kitaoka and Leventen (CORR, 1988)
 - Modified technique—impaled head upon medial spike of bone
 - Correction of 4th-5th intermetatarsal angle 5 degrees
 - Forefoot width decreased 4mm
 - 87% satisfaction rate
 - 1 nonunion

SURGICAL MANAGEMENT

Metatarsal Osteotomy: Distal Procedures

- **Chevron osteotomy** (Throckmorton and Bradlee, J Foot Surg, 1978)
 - Predominantly for lateral keratoses
 - Confers stability while minimizing sagittal plane displacement
 - Transposed 33 to 40% of the width of the metatarsal
 - 1mm shift reduces 4th—5th IM angle by 1 degree
 - Usual displacement 3 to 4mm
 - Limitation imposed by width of metatarsal neck
- **Chevron osteotomy** (Kitaoka, FA, 1991)
 - 19 feet
 - 7.1 year follow-up
 - 89% good results, 11% fair results
 - Correction of 4th-5th IM angle 2.6 degrees
 - 11.8 degrees preop to 9.2 degrees postop
 - Correction of 5th toe—metatarsal angle 7.9 degrees
 - 20.7 degrees preop to 12.8 degrees postop
 - Average forefoot width decreased 3mm

SURGICAL MANAGEMENT

Metatarsal Osteotomy: Midshaft Osteotomy

- Addresses both Type 2 and Type 3 deformity
- May be uniplanar or biplanar
 - Adds advantage of correcting plantar AND lateral keratoses
 - Medial capsule release may be added to improve correction of 5th toe
- Oblique diaphyseal 5th metatarsal osteotomy described by Mann (1986)

METATARSAL OSTEOTOMY: MIDSHAFT OSTEOTOMY

Procedure

- 1) Lateral incision
 - a. Carefully avoid sural nerve
- 2) Expose 5th metatarsal head with longitudinal incision
- 3) Osteotomy 5th metatarsal head
 - a. Do NOT resect too much head, the power of correction is great with this procedure
- 4) Extend incision along 5th metatarsal shaft
 - a. Expose shaft to base
- 5) Mark site of osteotomy
- 6) Begin saw cut
 - a. DO NOT violate the medial cortex (*except* at central portion of osteotomy)
- 7) Drill for first compression screw
 - a. 2.7mm screw system
 - b. Overdrill dorsal cortex with 2.7mm drill bit
 - c. Countersink head carefully
 - d. Plantar cortex with 2.0mm bit
- 8) Place screw across osteotomy, but DO NOT compress
- 9) Finish osteotomy proximally and distally
- 10) Rotate shaft around the screw
 - a. Tighten screw securely following rotation

- 11) Check position under Fluoro
- 12) Place second 2.7mm screw
 - a. Not necessary to compress, this screw prevents rotation
- 13) Resect exposed "tails" of bone proximally and distally with saw
- 14) Repair longitudinal capsular incision after excising redundancy
- 15) Add vertical capsulotomy with repair if necessary

Metatarsal Osteotomy: Midshaft Osteotomy

- Complications
 - Malunion with elevatus
 - Nonunion (mostly cortical bone)
 - Injury to branches of the sural nerve
 - MP stiffness
 - Painful hardware
- Results: Coughlin (FA, 1991)
 - 30 feet
 - All patients united the osteotomy
 - Correction of 4th-5th IM angle 9.8 degrees
 - 10.6 degrees preop to 0.8 degrees postop
 - Correction of 5th toe—metatarsal shaft angle 15.5 degrees

- 16 degrees preop to 0.5 degrees postop
- 93% satisfaction rate
- Average foot width decreased by 6mm
- Shortening 0.5mm
- Demographics
 - 70% with lateral keratotic lesion
 - 10% with plantar keratotic lesion
 - 20% combined lesions
 - 87% of patients underwent removal of hardware

SURGICAL MANAGEMENT

Metatarsal Osteotomy: Proximal Osteotomy

- High intermetatarsal angles
- Severe bowing a contraindication
 - Not providing correction at apex of deformity
- Consider potential for disruption of blood supply
 - Shereff (FA, 1991)
 - Extraosseous blood supply
 - Interosseus supply has nutrient artery penetrating medially
 - Both aspects easily disrupted with proximal osteotomies within 2 cm of the proximal extent of the bone
 - Risks avoided through mid-shaft osteotomies