Orthopedic Case Analysis

An 80-year-old veteran with painful Hallux valgus for 5 years

Presented by Intern 洪瑞霞
指導老師：簡瑞騰醫師
Patient Info

- Name: 李QQ
- Age: 80 y/o veteran
- ID: L1025XXXXX
- C.C.: Painful Lt great toe deformity for 5 years
- Admission: April 27, 2006
- Operation: April 28, 2006
- Discharge: May 5, 2006
Present Illness

- 50 yrs ago  Deformity found after a bicycle accident with left foot sprain, without any management performed
- For 50 yrs  Unfit shoe-wearing as a soldier
- 5 yrs ago   Pain over medial eminence region with redness, tenderness, and enlargement
             Tender bunion with local heat, sometimes disabling daily activity

This couple of years

symptoms progressed that he needed to walk with a crutch this year
Past History
No DM, no Hypertension.
Not underwent any operation at left foot before

Family History
No any family member with similar deformity

Social History
As a Veteran, no family in Taiwan

Review of System
No other abnormal findings
Active Problem

- Tender bunion over the metatarsophalangeal joint of Lt great toe
Physical Examination

Local Findings

- Great toe: Dorsiflexion $30^\circ$, lateral deviation
- Great toe axis: pronation $45^\circ$
- No local heat
- Metatarsalgia (+)
- Great toe:
  unable to conduct active motion
  limited passive motion
  ROM: severely restricted
- Second toe: muscle power normal
  ROM: limited by great toe
Pre-op Evaluation
Complex Deformity of this patient

- Valgus angle, 60°
- Increased intermetatarsal angle, 20°
- Pronation of great toe
- Lateral dislocation of sesamoids
- Subluxation of first metatarsophalangeal joint; leaving metatarsal
Pre-op Assessment

Check list of complex deformity of Hallux valgus:

1. Valgus deviation of the great toe
2. Varus deviation of the first metatarsal
3. Pronation of the hallux, first metatarsal, or both
4. Hallux valgus interphalangeus
5. Arthritis and limitation of motion of the first metatarsophalangeal joint
6. Length of the first metatarsal relative to lesser metatarsals
7. Excessive mobility or obliquity of the first metatarsomedial cuneiform joint
8. The medial eminence (bunion)
9. The location of the sesamoid apparatus
10. Intrinsic and extrinsic muscle-tendon balance and synchrony

Canale: Campbell's Operative Orthopaedics, 10th ed
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Operation

- **Surgical indication**: Symptomatic Hallux Valgus
- **Chevron procedure**: distal metatarsal osteotomy
  1. Removal of the medial eminence
  2. A transverse V-osteotomy in coronal plane
  3. A shift of the distal aspect of the metatarsal head
  4. The uncovered portion of the first metatarsal metaphysis removed easily
- Pin fixation
- Bunionectomy
Progress

- Recover well
- Able to walk, start weight-bearing training
- Discharge on POD # 5
- Keep f/u at orthopedic clinic post-op
Discussion

What is the justified treatment for painful hallux valgus?
Hallux Valgus

A deviation of the tip of the great toe, or main axis of the toe, toward the outer or lateral side of the foot.
Normal Range

- Hallux valgus angle
  $< 15 ^\circ \sim 20 ^\circ$

- Intermetatarsal angle
  $< 9 ^\circ$
### Hallux Valgus Surgical Intervention

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medial eminence</td>
<td>Minimal tissue</td>
<td>No realignment</td>
<td>Elderly</td>
</tr>
<tr>
<td>Resection arthroplasty of phalanx (Keller)</td>
<td>Generally good satisfaction Retaining joint motion No foreign materials</td>
<td>Toe shortened Function decreased</td>
<td>Older patient Function not important Need tissue relaxation “Salvage” procedure</td>
</tr>
<tr>
<td>Metatarsophalangeal arthrodasis (McKeever)</td>
<td>Long lasting Excellent pain relief</td>
<td>No joint motion Shoe selection limited Immobilization necessary Function decreased</td>
<td>All ages Men more than women Severe deformity-degeneration “Salvage” procedure</td>
</tr>
<tr>
<td>Resection-realignment (RR) (McBride)</td>
<td>Preserves function Large correction possible</td>
<td>Tissue dissection extensive Three incisions Prolonged recuperation</td>
<td>All ages Moderate-severe deformity No joint degeneration</td>
</tr>
<tr>
<td>Replacement arthroplasty (silicone)</td>
<td>Function retained Toe shortening decreased</td>
<td>Foreign materials inserted Tissue resection infection</td>
<td>Older age groups Degenerative arthritis present Cosmesis important</td>
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<td>Distal metatarsal osteotomy</td>
<td>Stable osteotomy</td>
<td>Limited realignment available</td>
<td>Younger age group No degenerative arthritis</td>
</tr>
<tr>
<td>(Chevron)</td>
<td>Rapid healing</td>
<td></td>
<td>Mild-moderate deformity (IM angle &lt;16°)</td>
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<td>Distal metatarsal osteotomy</td>
<td>Increased correction available</td>
<td>Slow healing</td>
<td>All ages</td>
</tr>
<tr>
<td>(Mitchell)</td>
<td>Non-union</td>
<td>Unstable (require fixation)</td>
<td>No degenerative arthritis</td>
</tr>
<tr>
<td></td>
<td>Patient satisfaction good</td>
<td>Technically difficult</td>
<td>Moderate-severe deformity (IM angle &gt;16°)</td>
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<td>Phalanx base osteotomy (Akin)</td>
<td>Simple</td>
<td>Deformity</td>
<td>All ages</td>
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<td>Hallux valgus interphalangeous &quot;Salvage&quot; procedure</td>
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Surgery vs Orthosis vs Watchful Waiting for Hallux Valgus
— A Randomized Controlled Trial

JAMA, May 2001 Vol 285 No. 19

- Randomized Control Trial
  - Loss follow-up rate < 2%
  - Good adherence
- In Finland in 1997-1998 with 12 months follow-up

- Participants 209 patients with a painful bunion and a hallux valgus angle 35° or less
- Surgery gr. Chevron Procedure but no K-wire fixation of osteotomy, with abduction splint for 6 months
- Orthosis gr. Negative cast technique
- Control gr. Avoid any surgical or orthosis therapy
Conclusion

- Effect of surgery increases during the postoperative years.
- Effect of orthosis favored during 6 months then faded.
- For painful hallux valgus, surgery is the choice of treatment.
The sooner, the better?

What is the Best Timing to Manage Painful Hallux Valgus?
Hallux Valgus: Immediate Operation versus 1 year of Waiting with or without Orthoses


Departments of Orthopaedics, Jorvi Hospital of Espoo, Orthopaedic Surgery, Helsinki University Central Hospital, Helsinki, Finland.

- Randomized control trial with two-year follow-up
- Operation rate:
  - 66/71; in surgery group
  - 43/69; in orthosis group, 62%
  - 48/69; in control group, 70%
Conclusion

- Waiting doesn't jeopardize the result of surgery
- Pain relief most during 1st year post-surgery
- Foot problem may become less severe while waiting and some op can be cancelled. But cost is not reduced.
A CONTROLLED PROSPECTIVE TRIAL OF A FOOT ORTHOSIS FOR JUVENILE HALLUX VALGUS


- **Objectives**  Value of treatment in the asymptomatic early stages is uncertain.
- **Design**  RANDOMIZED CONTROLLED PROSPECTIVE TRIAL
  Three years follow-up with radiography
- **Participants**  Children between 9~10 y/o,
  total 122 children

Biomechanical Orthosis used
Conclusion

- The metatarsophalangeal joint angle had increased in both groups but more so in the treated group.
- Early treatment with orthosis for asymptomatic Hallus valgus is not effective.

**Fig. 2**

The effect of treatment with biomechanical orthoses (n = 74) or no treatment (n = 65) for three years on the metatarsophalangeal and intermetatarsal angles.
Comparison between chevron and the other alternatives.
Is arthrodesis necessary?

“Do we need to include an arthrodesis of first metatarsal joint in the surgical treatment of symptomatic hallux valgus?”
Chevron or Wilson Metatarsal Osteotomy for Hallux Valgus — A prospective randomized trial

- Prospective randomized control study with 87 feet
- Post-op follow-up: 38 months
- Fig 2a: double oblique Wilson osteotomy
- Fig 2b: Chevron osteotomy
Objectives

- Theory:
  - Chevron with potential complication such as avascular necrosis, malalignment, excessive shortening of metatarsal, overcorrection
  - Wilson’s with little soft-tissue damage. Double oblique improves the stability and reduce need of internal fixation.
Conclusion

- Chevron  Return to work earlier, mobilize faster

- Wilson’s  Better functional results, higher patient satisfaction with appearance, better maintenance, better ROM, fewer complication

- Wilson’s procedure was recommended by the author.
Role of First Ray Hypermobility in the outcome of
the Hohmann and the Lapidus procedure

“Is hypermobility of first metatarsal joint one of the
etiology of hallux valgus?”

- Design: Prospective, blinded, randomized study
  involving 101 feet

- Post-op follow-up for 2 years Clinically (with AOFAS
  Score) and Radiographically
Method

- Hohmann  Distal osteotomy of first metatarsal
- Lapidus  Distal osteotomy + arthrodesis
- Mobility of first metatarsal joint was assessed in preoperative clinical examination: 68/101 with hypermobile; 33/101 with nonhyper.
Conclusion

- No significant differences between two procedures or two subgroups based on mobility.
- Patient satisfaction rating were similar.
- Surgical treatment with arthrodesis of first metatarsal joint was not supported as routine.
Arthrodesis or Keller’s Arthroplasty? — Management of Painful First Metatarsal Joint in Older Patients

Department of Orthopaedic Surgery, Leicester University, England

- **Design**  Prospective randomized trial for symptomatic hallux valgus and hallus rigidus, total 110 feet; Especially for elder group, > 45 y/o

- **Post-op f/u**  At least 2 years follow-up

- **Arthrodesis**  Transverse drill holes with 20-gauge wire, at first metatarsophalangeal joint

- **Keller’s Arthroplasty**  Medial exostectomy
  - Dorsal and medial osteophytes trimming
  - Proximal phalanx excision
  - No distraction or soft-tissue interposition
  - Extensor hallucis longus tendon lengthened, if necessary
Conclusion

- Symptoms relief and patient satisfaction are similar
- Risk of metatarsalgia was similar
- But 6/50 arthrodesed toes required revision.
- Suggestion: Keller’s arthroplasty better

| Table IV. Mean hallux valgus angles in degrees before and after surgery (mean ± s.d.) |
|---------------------------------|-------|-------|
|                                 | Before| After |
| Keller’s arthroplasty           | 35 ± 12.3 | 25 ± 12.4 |
| Arthrodesis                     | 41 ± 16.3 | 25 ± 10.0 |

*The management of painful first metatarsal joint in older patients*  
Summary

- Controversial at all.

- “Surgeons could be comfortable to alternate different procedures or even combine some based on individualization of patient and self-experience.”
Thank you for your attention.
Related Text
Pathogenesis and Etiology

- Metatarsus primus varus
- Great toe lateral deviation
- Anatomical Abnormality

Canale: Campbell's Operative Orthopaedics, 10th ed
Dr. 李典錕：報告時間控制宜加強

Dr. 李典錕：Discussion 討論的問題包含太廣，深度不足。可把討論的主題更focus在這個病人的題上進行討論。