

**出國報告（類別：參加國際醫學會議專題演講）**

**第 41 屆日本足踝外科醫學會**

**The 41st Annual Meeting of Japanese  
Society for Surgery of the Foot**

**第 6 屆亞洲足踝醫學會**

**Asian Federation of Foot and Ankle  
Surgeons**

**服務機關：衛生福利部屏東醫院**

**姓名職稱：鄭裕民 院長**

**派赴國家：日本大阪**

**出國期間：2015.11.17 - 2015.11.24**

**報告日期：2015.12.01**

## 摘要

此次出國受邀出席參加第41屆日本足踝外科醫學會(The 41st Annual Meeting of Japanese Society for Surgery of the Foot)及亞洲足踝醫學會(Asian Federation of Foot and Ankle Surgeons (6th AFFAS))，並在會中專題演講。專題演講以英文發表，題目為：台灣變形性足關節炎之過去現在與未來(Hind foot Arthrosis : the past, the present & the future in TAIWAN)。



攝於日本奈良會場(本人演講盛況)

## 以下是此篇論文之英文摘要：

Most patients come to orthopedic surgeons for foot and ankle problems can be characterized as a combination of pain with instability, deformity, and arthritis. The goal of ankle foot surgery is to provide a basically functional foot with painless, plantigrade, stable weight bearing. Instability, deformity and arthritis may have interfering effect on each other. The etiology may be congenital, traumatic or disease etc.

In the past, trauma was the main cause resulting in ankle arthritis. After 1995, Taiwan started National Healthcare Insurance policy. Therefore, people seek for orthopedic treatment instead of traditional bone setter. Education and emphasize on anatomic reduction also reduced mal-practice and mal-union. The development of orthopedic sports medicine and ankle foot surgery also promotes the early treatment of ligamentous injuries which decrease the incidence of late arthritic sequale. So salvage surgeries for traumatic ankle arthritis are decreasing. As for infective arthritis, TB prevalence is high in Taiwan before 1980 ' s and then disappeared but MRSA or ORSA infection especially combined with Charcot foot is increasing now. Ankle fusion still plays an important role in the present orthopedic practice in Taiwan. Degenerative arthritis is increasing as the population age distribution is getting older rapidly. In the other hand, rheumatoid arthritis needing surgical intervention is decreasing which is the result of recent anti-rheumatic drug development. Both are candidate of TAR. Since TNHI does not pay for the expense of ankle prosthesis, TAR was not popular in Taiwan during last 3 decades until recent 2-3 years. The increasing TAR may make orthopedist omitted the earlier salvage procedures such as LTO, and it is a concern that future mid-to-long term complications of TAR may increase.

Subtalar arthritis is mainly due to mal-union of calcaneal fractures. But with repeated education and the development of locking plate, open reduction with plating gradually becomes the current trend which improves the result of calcaneal fracture. The frequency of subtalar fusion will be observed in the following years.

Triple arthrodesis is powerful to correct hindfoot deformities. During the past 3 decades cavovarus deformities are getting less while planovalgus deformities are getting more. Foot ankle deformities resulted from poliomyelitis were common in 1940 ' s & 1950 ' s in Taiwan and then disappeared because effort on public health. So there is no more polio foot can be seen in younger population in Taiwan. Those cases we see now are old age and their foot problems are either already treated or given up by themselves. As the development of pediatric orthopedics, club foot were treated early since birth and left only a few sequale to adult foot which needs further operation such as triple fusion. However, the case of adult or acquired flat foot is increasing. Because the population is aging and the prevalence of chronic diseases such as hypertension, obesity is increasing, the cases of PTT

dysfunction and degenerative flat foot are also increased. So in the recent 10 years, triple arthrodesis is mainly used to treat planovalgus while the in the earlier 20 year it was used for covovarus deformities.

The other important chronic disease related to foot is Diabetes. Since DM control is getting better, the life span is elongated and the long term sequale of eye, kidney, and the foot will proportional increase. DM foot will be a hot issue and the case number of Charcot foot will get more and more. Because the difficulty of care and common complications such as nonunion and infection. Charcot foot surgery will be the future challenge of ankle foot surgeon.

## 照片集



攝於日本奈良會場外



攝於日本奈良會場外

(左起鄭裕民、台灣骨科足踝醫學會陳永仁  
理事長、高醫黃鵬如副教授)



攝於日本奈良會場外

(左起胡顯宗教授、鄭裕民)

## 目的

此次出國參加三年一度的亞洲足踝醫學會(Asian Federation of Foot and Ankle Surgeons (6th AFFAS))，並在會中發表論文。同時在會議中與來自世界各地的足踝專科醫師互相討論，吸取這方面的最新知識。

## 過程

此次世界足踝醫學大會舉行地點在日本奈良，雖說是亞洲會議，但實際參與有20國(還包括俄羅斯)共400人參加。但以論文數而言，大會會長田中康仁教授亦在致詞中提到，200多篇論文中地主國80餘篇，韓國57篇，而台灣26篇，我們排名第三，是以台灣在足踝學術之國際舞台亦算是大國，這是頗值得引以為傲的。

## 心得及建議

本次三年一度的亞洲足踝醫學會(Asian Federation of Foot and Ankle Surgeons (6th AFFAS)), 是由日本奈良醫大主辦, 雖說是亞洲會議, 但實際參與有20國(還包括俄羅斯)共400人參加。但以論文數而言, 大會會長田中康仁教授亦在致詞中提到, 200多篇論文中地主國80餘篇, 韓國57篇, 而台灣26篇, 我們排名第三, 是以台灣在足踝學術之國際舞台亦算是大國, 這是頗值得引以為傲的, 本人除在會中擔任座長, 亦受邀在會前的日本足外科學會 (Japanese Society for Surgery of the Foot (JSSF2016)), 受會長杉本和也教授之邀, 於 “Meet the Excellent Doctors from Asia” 專題演講30分鐘, 所講題目為 “台灣變形性足關節炎之過去現在與未來(Hind foot Arthrosis : the past, the present & the future in TAIWAN), 以從事足踝外科30年來經驗檢視足踝外科之變遷, 如之前之小兒麻痺足, 先天杵形足或因防疫成果、或因小兒骨科即早治療, 已顯有需後期重建之個案, 反倒是糖尿病足導致之神經性關節炎有增加之趨勢, 這將是我們未來的挑戰 等等。

值得一道的是, 大會安排參與各國學會理事長報告各國足踝外科狀況, 由於本人自此學會草創即已參與亦積極參加歷屆各國所辦之學會, 故於各國報告slide中, 均看到自己年輕到老一路走來之照片, 心中不無感慨。尤其奈良醫大是我1988、1989進修之地方, 老師高倉義

典教授雖已退休，他本人及奈良醫大舊識仍十分熱絡，和日本足踝外科及亞洲區，甚至歐美的老朋友相會敘舊，實是一大樂事，這真是除學術交流外，友誼長存，促進國際參與亦是一大收穫。



攝於日本奈良

(與日本足踝外科、亞洲區及歐美老朋友相會敘舊)



## Disclosure of the Conflict of interest

**CHENG Yuh-Min M.D.**

In relation to this presentation,  
I declare that there are no conflicts of interest.



The 1<sup>st</sup> Asian Symposium of Foot and Ankle Surgery, Nara, 1993

The 2<sup>nd</sup> Asian Symposium of Foot and Ankle Surgery, Kaohsiung, 1996

## Hind foot Arthrosis : the past, the present & the future in TAIWAN

台灣變形性足關節炎之過去現在與未來

2016 Nara 41<sup>th</sup> JSSF



Superintendent,  
Pingtung Hospital, Ministry of Health and Welfare, TAIWAN

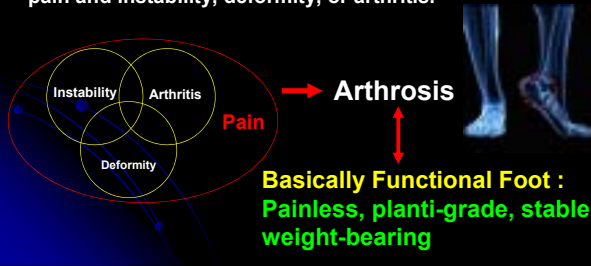


Professor,  
Department of Orthopedic Surgery, Kaohsiung Medical University

Kaohsiung City

## Aim of Hind foot Surgeries : Arthrosis ---What?

Excepting cosmetic issue, the reasons that patients are seen by orthopedic surgeon for foot and ankle problems can be characterized as a combination of pain and instability, deformity, or arthritis.



## Ankle Arthritis

Treatment include a variety of non-surgical and surgical options to relief pain, correct deformity, and restore function.

### Etiology

- osteonecrosis of talus ↔
  - Inflammatory arthritis ↓
  - degenerative arthritis ↑↑↑
  - traumatic arthritis ↓↓
- chronic ankle instability  
squeal of fractures



## Ankle Fractures — pitfall, error, complication.

### Goal for Treatment

34<sup>th</sup> JSSF,2009

to achieve a stable congruent joint for maintaining ankle function and preventing traumatic arthritis.

traditional bone setter is almost out of service because :  
people are well educated and acknowledged,

and the chip **TAIWAN National Healthcare Insurance (TNHI)**  
1995



salvage with ORIF & Free Flap

## Ankle Fractures — pitfall, error, complication.

34<sup>th</sup> JSSF,2009

### Current Trend ?.....

- Anatomic Reduction !
- Rigid Fixation !
- Early Motion !

prospective randomized study revealed better long term results following surgical treatment.  
-- Phillips, JBJS, 1985

How could it be !



### However .....

- Diagnosis pitfall
- Decision error
- Surgical pitfall
- Technical miss
- Post-op complication
- Varied prognosis



Poor reduction & Early arthritis



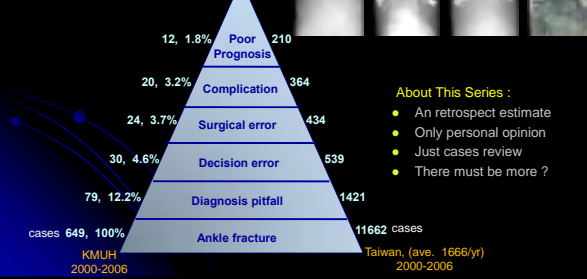
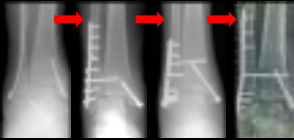
It could be a disaster !

# Ankle Fractures — pitfall, error, complication.

34<sup>th</sup> JSSF, 2009

Does improvement of implants decreased post-traumatic arthritis ?

Well-known knowledge  
Well-trained technique

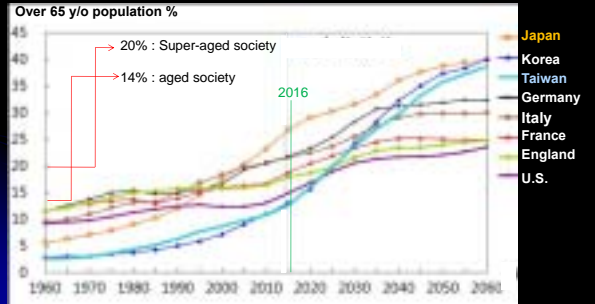


About This Series :

- An retrospect estimate
- Only personal opinion
- Just cases review
- There must be more ?

# Ankle Arthritis for Surgeons

Degenerative ↑ : ageing population --- 24,000,000 x 13.2%  
Rheumatoid ↓ : better new medicine control  
Traumatic ↓ : improving fracture management



# Ankle Arthritis in KMUH

Over All Results : good & excellent 85.7%

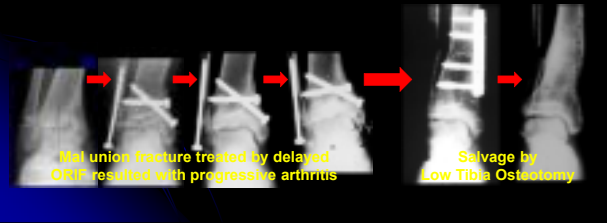
- Cheng, Int. ortho, 2000

KMUH Protocol for the management of ankle arthritis according to the degree of arthritis



# Surgery for Ankle Arthritis

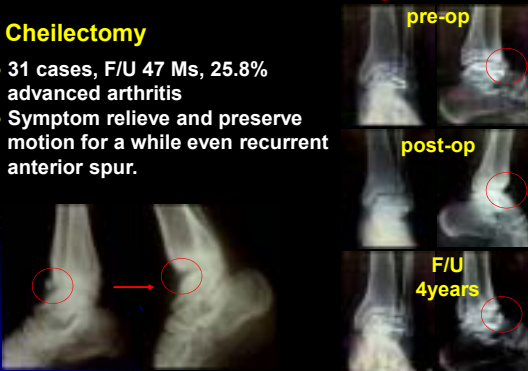
- Ankle arthrodesis is considered as the last alternative treatment
- It's reasonable trying to preserve the joint in earlier stages as possible.



# Ankle Arthritis Management

## Cheilectomy

- 31 cases, F/U 47 Ms, 25.8% advanced arthritis
- Symptom relieve and preserve motion for a while even recurrent anterior spur.



# Low Tibial Osteotomy

Result : - Cheng, Arch Orthop Trauma Surg. 2001

- 18 cases, ave. 41.9 y/o (range 18-78 y/o)
- F/U ave. 47.7 Ms (range 25-82Ms)
- Functional scale ave. 49.6 pre-op → ave. 88.5 post-op
- 44.5% excellent, 55.5% good



## Ankle Arthrodesis

The longest lasting and still is the current standard treatment for ankle arthritis.

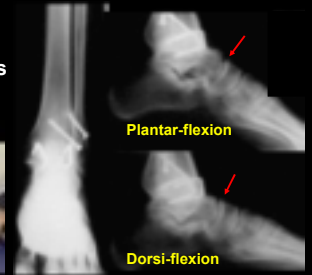
R't Ankle Fusion



## Successful Ankle Arthrodesis

### What If ...

- Solid fusion
- Optimal position
- Good neighboring joints
- Compensatory motion



## Ankle Arthrodesis

**RESULT** - Cheng, Int Ortho, 2000

- 78 cases, Ankle Arthrodesis
- F/U: ave. 38.6 Ms (range 26 Ms-62Ms)
- Functional Scale  
ave. 28.6 (range 3-45), pre-op  
→ ave. 72.3 (range 26-86), follow-up



## Revision Ankle Arthrodesis

**Result** - Cheng, Ankle Foot Int. 2003

- 18 cases, Revision by bone resection to either refresh the fusion site or correct the alignment
- F/U ave. 49.4 MS (range 28-68Ms)
- union time: ave. 4.7 Ms
- union rate: 98.8%



## TOTAL ANKLE REPCEMENT



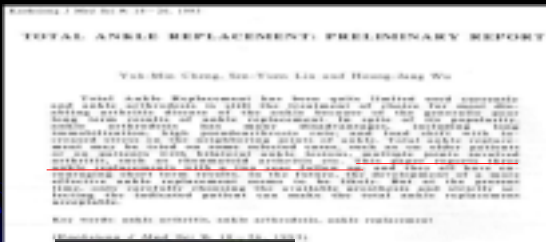
The 1<sup>st</sup> TAR in Taiwan, 1989  
operator : Prof. TAKAKURA

## Total Ankle Replacement, TAR



## Documentation

Oral presentation : 1989 骨科年會 TOA annual meeting  
 Publication : 1993



## 1996 Kaohsiung Grand Hi-Li Hotel

C.I.P + A.O.F.A.S.  
 >> I.F.F.A.S.

SYMPOSIUM Ankle Arthritis :  
 Arthrodesis v.s.  
 Arthroplasty



## Total Ankle Replacement

### STAR Ankle

#### Concerns :

- Non-anatomic shaped tibia
- Oversize impinge and undersize subsidence
- Anterior tibia cortex drill holes
- Ballooning loosening to the bars



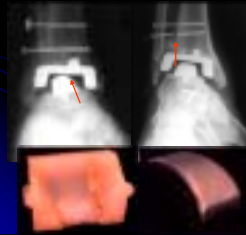
1996 - Traumatic Arthritis, Female, 54y/o

## Total Ankle Replacement

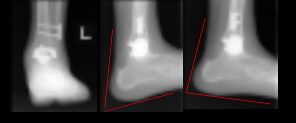
### Concerns

- non-union of syndesmotic fusion
- comparatively wide bone resection
- revision or conversion more difficult
- more talus cut than other design
- Accelerated delamination of polyethylene

### AGILITY™ Ankle



Ankylosing Spondylitis, Male, 37 y/o



## Total Ankle Replacement

### WRIGHT INBONE II Ankle

#### Concerns :

- Tibia component through plantar
- Replace medial and lateral facet
- More suitable for revision ???
- 2012 TOA exhibit & perform
- 4 years cases is much more than the pass 25 years , because:  
 More surgeon involved ? or  
 Social economic change ? or  
 "non-TNHI" is better ?



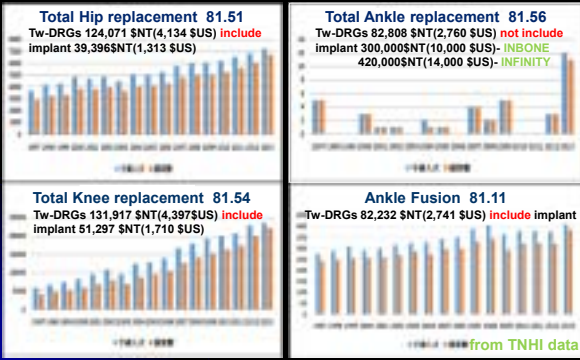
## Future of INBONE II to be follow up ?





## Where Ankle Foot Surgery Stands Today in Taiwan ?

since TNHI is convenient and chip, it concern not only medical academic but also social economic.



## Total Ankle Replacement

### TAR now and then

- The future of arthroplasty is unknown.
- Technique, design, and materials are improving.
- Long term outcomes are to be determined.
- The future and prognosis of arthrodesis is known, will not change unless we enhance union and avoid adverse the adjacent joints.

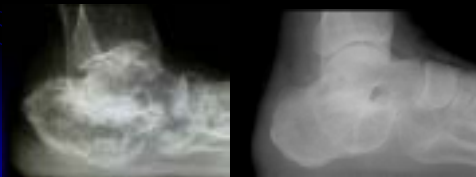
### In TAIWAN : always Supply decides Demands



## Subtalar Arthrodesis

### Indication

- post-traumatic arthritis ↓
- talocalcaneal coalition ↔
- posterior tibia tendon insufficiency ↑↑
- neuromuscular disease (e.g Charcot foot) ↑↑↑↑



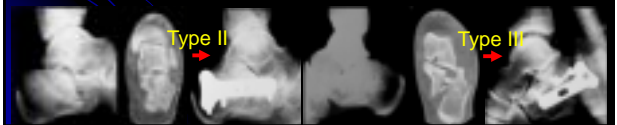
## Treatment for Calcaneal Fracture

- Huang & Cheng, J Trauma 2002

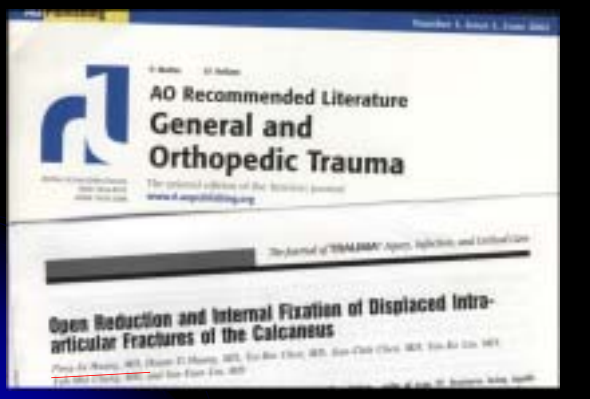
- ORIF of calcaneus fracture: recommended in Sanders fracture to restore subtalar joint and calcaneal shape
- Sander calcaneal fracture : focus on hind foot architecture to facilitate later reconstruction

### Traumatic subtalar arthritis :

well reduction earlier rather than troublesome fusion latter.



## Our Experience : Small AO T-Plate, May 2002



## Calcaneus fracture In the past 10 years

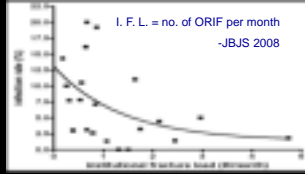
- ORIF is becoming widely accepted.
- Several calcaneal plates have been used.
- Available in Taiwan until recent years.



## Timing of O.R.I.F.

- Ho, Huang & Cheng, J Injury Int. 2013

- Extensile lateral approach & AO calcaneal plate
- 2008 - 2010, 28 cases (30 heels)
- Sanders **type II** : 15 heels, **type III** 10 heels, **type IV** 5 heels
- Early operation, or even immediate ORIF does not contribute to wound complication in calcaneal fractures.
- Direct sharp incision with avoiding the bullas area is the key and the demanded experience is concerned with institutional fractures.



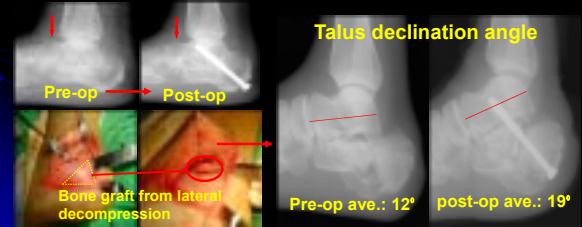
## Mal-union of Calcaneus Fractures

### Subtalar fusion with osteotomy, 1989~1995



Huang & Cheng, 1997:  
no change of talar declination

### Subtalar Distraction Arthrodesis, from 1999

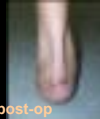


## Treatment for Mal-union Calcaneus

### Our Alternatives

- Lateral impingement → lateral decompression.
- Isolated subtalar arthritis without marked decrease of heel height → in situ fusion.
- Subtalar arthritis & marked heel height decrease → subtalar fusion with osteotomy.
- Ant. ankle impingement → distraction fusion with local or tri-cortical bone block.
- Marked deformity or Chopart joint involvement → triple fusion.

Results: AOFAS score  
ave. 45 pre-op to 80 post-op



## Triple Arthrodesis

- Huang & Cheng, Foot Ankle Int. 2003

### Indication

- residual clubfoot deformity
- cerebral palsy
- hindfoot traumatic arthritis
- painful pes planus
- hindfoot instability
- rheumatoid arthritis



## Triple Arthrodesis

- Huang & Cheng, Foot Ankle Int. 2003

### Result

- 36 patients (45 feet), follow up: average 6 years
- Overall satisfaction rate : 91%
- Cavovarus more satisfied than planovalgus
- Ankle Progressive Arthritis : 18/45 (40%)



## Triple Arthrodesis

Triple arthrodesis is recommended in cases with moderate to severe hind foot deformities no matter how many joints were arthritic.



Because the development of pediatric orthopedics, congenital club foot and CP neurogenic foot are seldom left to foot surgeon for late reconstruction.

# Triple Arthrodesis

37

## Current trend

- Cavovarus : polio foot, club foot ↓
- Planovalgus : adult & aquired flatfoot ↑
- Chacot foot ↑↑



Polio prevalence 1940's, 1950's  
WHO relieve epidemic 2006



Old polio foot over 60 y/o will no surgery unless arthritic pain

# Chopart's Fusion

38

- Isolated Talonavicular (TN) Arthrodesis
- Isolated Calcaneocuboid (CC) Arthrodesis
- Double (TN & CC) Arthrodesis

However, Talonavicular is an essential joint, it's loss result in almost complete motion loss of subtalar and transverse tarsal joint.



# Isolated T-N Arthrodesis

39

Limited used on single talonavicular arthritis



Muller-Weise disease

# Isolated T-N Arthrodesis

40

- Chen & Cheng, Foot Ankle Int. 2001

## Results

- 1987-1998, KMUH
- f/u 16 Feet, 16 cases
- 5 males, 11 females
- age: ave. 49y/o, range 18-63 y/o
- follow up: ave. 51 Ms, range 24-105Ms

## Satisfactory rate

- satisfied : 15/16 (94%)
- unsatisfied: 1/16 (6%)
- \* union without functional improvement

## Fusion

- solid union: 15/16 (94%)
- fibrous union: 1/16 (6%)
- no other complication

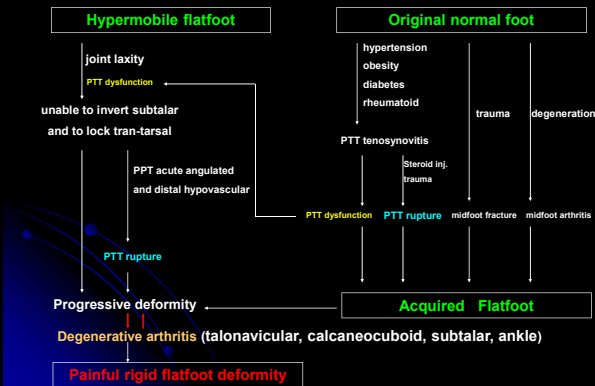
## AOFAS ankle-hind foot score

- pre-op ave. 77.3 (rang 55-85 )
- post-op ave. 92.9(rang 74-100)



# Adult Flatfoot ≠ Acquired Flatfoot

41



# Surgeries for adult flatfoot

42

Treatment of dysfunction of the posterior tibial tendon

Stage	Characteristics	Non-operative	Operative
Johnson & Strom, 1989	Acute medial pain and swelling, can perform heel-rise, sero-negative inflammation, extensive tearing	Anti-inflammatory medication, immobilization for 6 to 8 weeks; if symptoms improve, ankle stirrup-brace; if symptoms do not improve, operative treatment	Tenosynovectomy, tenosynovectomy + calcaneal osteotomy, or tenosynovectomy + tenodesis of flexor digitorum longus to posterior tibial tendon
Tenosynovitis	Medial pain and swelling, hindfoot flexible, can perform heel-rise	Medial heel-and-sole shoe wedge, hinged ankle-foot orthosis, orthotic arch-supports	Debridement of posterior tibial tendon, flexor digitorum longus transfer + calcaneal osteotomy
Stage	Valgus angulation of heel, lateral pain, hindfoot flexible, cannot perform heel-rise	Medial heel-and-sole wedge, stiff orthotic support, hinged ankle-foot orthosis, injection of steroids into the sinus tarsi	Flexor digitorum longus transfer + calcaneal osteotomy or flexor digitorum longus transfer + bone-block arthrodesis at calcaneocuboid joint
Stage	Valgus angulation of heel, lateral pain, hindfoot rigid, cannot perform heel-rise	Rigid ankle-foot orthosis	Triple arthrodesis
Stage	Hindfoot rigid, valgus angulation of talus	Rigid ankle-foot orthotics	Tibiotalocalcaneal arthrodesis

and...Where is the talonavicular?

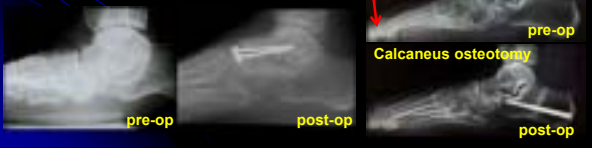
Myerson, 1997

## Surgeries For Adult Flatfoot

- The more severe deformity, the more extensive surgery.
- But how many joints and which joints should be fused?
- For moderate adult flat foot deformities  
fully correct : Talonavicular, Double, Triple  
incomplete correct : Calcaneocuboid, Subtalar
- Realign the medial column at the talonavicular joint is the key to aligning the rest of the foot. —Myerson, 1996, JBJS

Where isolated T-N arthrodesis stands in flat foot surgery ?

Dynamic stability > correct deformity



## Isolated T-N Arthrodesis for the Adult Flatfoot

### Results

- 1989-2002, 38 feet of 37 cases, age : 18-63 y/o, ave. 49 y/o
- Before stage PTT dysfunction with only talonavicular arthritis if there were any. ( even without arthritis )
- follow up: range 24-105 months, ave. 51 months
- Fusion outcome : Solid union 35/38 feet (92%)
- adjacent joints arthritis: 8 joints/6 feet
- Satisfactory rate: 34/38 feet (89%)
- Talo-1<sup>st</sup> metatarsal angle

Lat:  
pre-op 17.1°(2.5°-33.2°)  
post-op 6.3°( 0.5°-19.1°)

AP:  
pre-op 17.5°(7.6°-35.5°)  
post-op 6.9°( 0°-17.1°)



## Isolated Talonavicular Arthrodesis for the Adult Flatfoot

### Surgeries for the flatfoot

- non-arthrodesis procedure

\*tendon transfer      Stage ..... as combined procedure  
calcaneal osteotomy      Stage      Stage

- arthrodesis procedure

Talonavicular ?      Stage  
calcaneocuboid      Stage (more popular)  
subtalar      Stage  
double      Stage  
triple      Stage  
tibiototalcaneal      Stage  
plantalar      Stage

## Isolated T-N Arthrodesis for the Adult Flatfoot

Problems of adult flatfoot: instability, arthritis, deformities.

### Why the talonavicular?

- bone graft for lateral column lengthen is not necessary.
- more powerfully and directly create the arch.  
➔ deformity
- provide mid-foot stability by restrict motion of adjacent joints.  
➔ instability
- arthritis in adult flatfoot most often and early occur in this joint.  
➔ arthritis

### Why not the talonavicular?

- The key joint of mid-foot motion. — Wulker 2000, Foot Ankle Int
- Impair the foot function and adverse the ankle.
- Less extensive arthrodesis but higher non-union rate. — high-tech !

## Adult flatfoot surgery

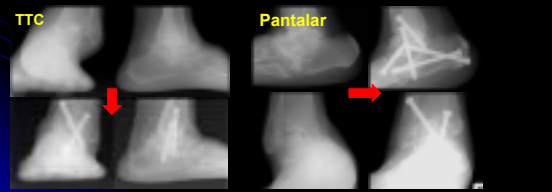
- Bony procedures are more effect to correct deformities.
- Consider the effects of those arthrodesis procedures on the function of the rest of the foot and ankle.
- Talonavicular arthrodesis might be indicated for stage with arthritic change not beyond this joint.
- Calcaneocuboid arthrodesis has lesser power to correct deformity but remains more hind foot motion.
- Double arthrodesis secures talonavicular fusion to correct the arch by adding on calcaneocuboid fusion.

25% subtalar remains      60-80% hindfoot remains      Almost triple effect



## Adult flatfoot surgery

- Triple arthrodesis is for severe or rigid hind foot deformity no matter how many arthritic joints were existed.
- Tibiototalcaneal arthrodesis is for case with ankle lesion.
- Pan-talar arthrodesis is extremely limit function, however, it is the last alternative in some rarely severe cases.
- The goal is to the re-establish stable bony figuration (bony procedures) with adequate soft tissue balance (tendon transfer) to maintain stability in the dynamic situation.

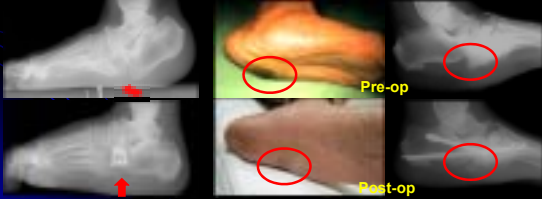




## Charcot Foot

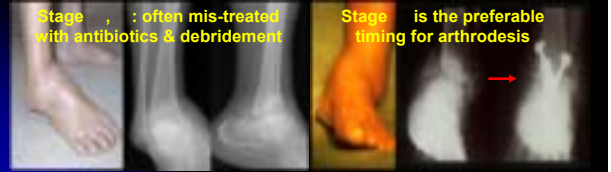
### Surgical treatment

- When diabetic ulcers fail to heal, excessive internal bony pressure must be identified and corrected.
- The purpose of the surgery is to relieve any internal area of pressure produced by bony prominence.
- A team for DM foot in medical center including surgery (orthopedic, plastic, vascular..) and internal medicine (endocrine, metabolism, nephrology, neurology..) should involve combined care with rehabilitate and associates.



## The Charcot Joint

- Stage : acute inflammation
- Stage : coalescence, new bone formation
- Stage : bony consolidation and healing
- type (midfoot), type (hindfoot), type (ankle)
- Arthrodesis are indicated if there were no suitable soft tissue procedure available, and for unstable or irreducible deformities with/without arthropathy.



## Ankle Fractures — pitfall, error, complication

### Diabetes : fracture or Charcot ?

- With systemic comorbidities : higher risk either surgical or non-surgical treatment.
- Without systemic comorbidities : no higher risk in either option than age-match without diabetes. —Meiers Yelden, ASAOS, 2002



## The Charcot Joint

- The longer diabetic life span, the more Charcot foot.
- Arthrodesis should be more extensive than what is expected. (ankle : TTC, chopart : triple, ect.)



## The Charcot Joint

### Fusion difficulty

- To secure fixation
- To enhance union



## Foot Ankle Healthcare Institutes Ltd.

- I have a dream : to form a chain ...



# Foot surgery has potential in Taiwan

## Not Wear Shoes? No Shoes To Wear?

- AOFAS Members 2200 / AOS Members 28047 = 7.84%
- TOFAS Members 128 / TOA Members 1865 = 6.8%
- New bloods should union with code value --- education !

