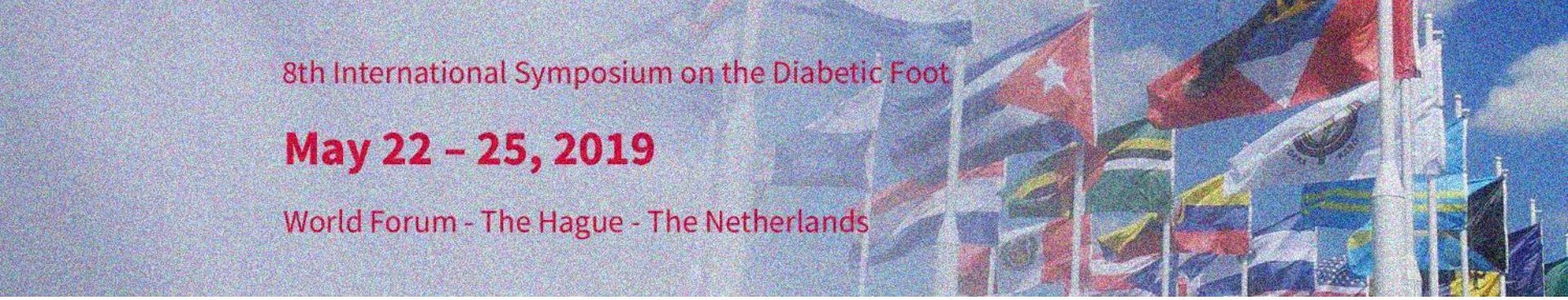

Internal Pedal Amputations and Two-Stage Procedures for the Infected Diabetic Foot

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Conflict of Interest

- Orthofix
- BoneSupport

Internal pedal amputations

Lessons from history

- Link in 1887 and Witzel and Hoffmann in 1889, when skeletal tuberculosis was a common problem, performed internal Chopart amputations
- With advancements in orthopaedic (footwear) technology, a revival of some of the ancient techniques seems to be justified

Ssabanejeff‘s amputatio subtalica osteoplastica

Features of internal pedal amputations

- Osteomyelitis with dead bone, deformity, ulcer
- Skeletal shortening facilitates wound closure
- Tendons retract only marginally
- Motoric dysbalance is less pronounced
- Patients do not feel amputated
- Polyneuropathy allows for pain-free ambulation
- Longitudinal incisions do not interrupt blood supply

Examples of internal amputations

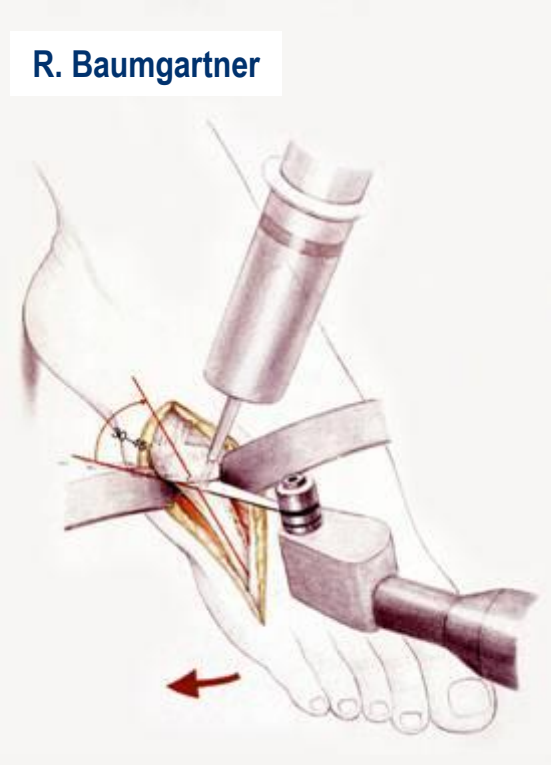
- Internal forefoot amputation (1-5 metatarsal bones)
- [MIC technique for metatarsal resection]
- Internal midfoot amputation (metatarsal and tarsal bones)
- Internal tarsal resection
- Internal Syme amputation

2012 Infectious Diseases Society of America Clinical Practice Guideline for the Diagnosis and Treatment of Diabetic Foot Infections

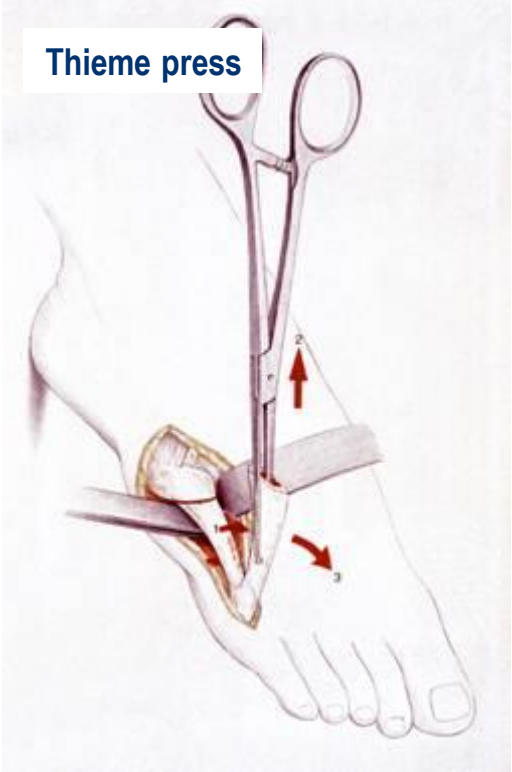
- Elective amputation may be considered for the patient who has recurrent ulceration (despite maximal preventive measures), has irreversible loss of foot function, or would require unacceptably prolonged or intensive hospital care
- The surgeon must consider vascular, reconstructive, and rehabilitation issues in selecting the level of amputation


1

Internal transmetatarsal and tarsal-metatarsal amputations



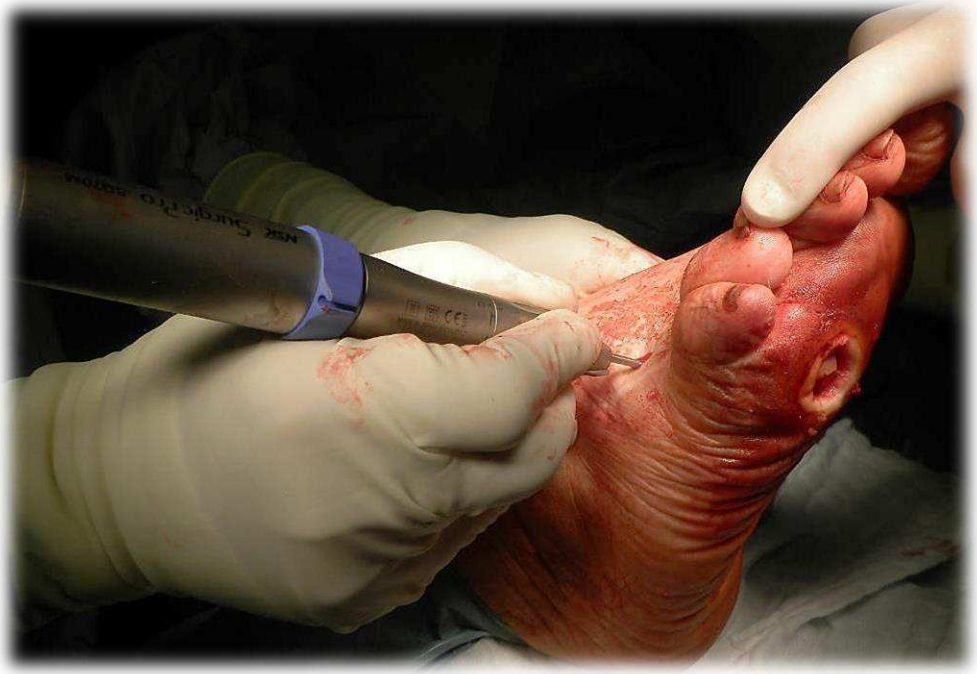
- Dorsal approch with two parallel incisions
- Proximal resection of one or all metatarsals
- Retrograde removal
- Excision of plantar ulcer not always necessary
- Alternative: proximal mini-incision and anterograde resection



MI Internal amputation

MI Internal amputation

MI Internal amputation



MI Internal amputation

5 metatarsals

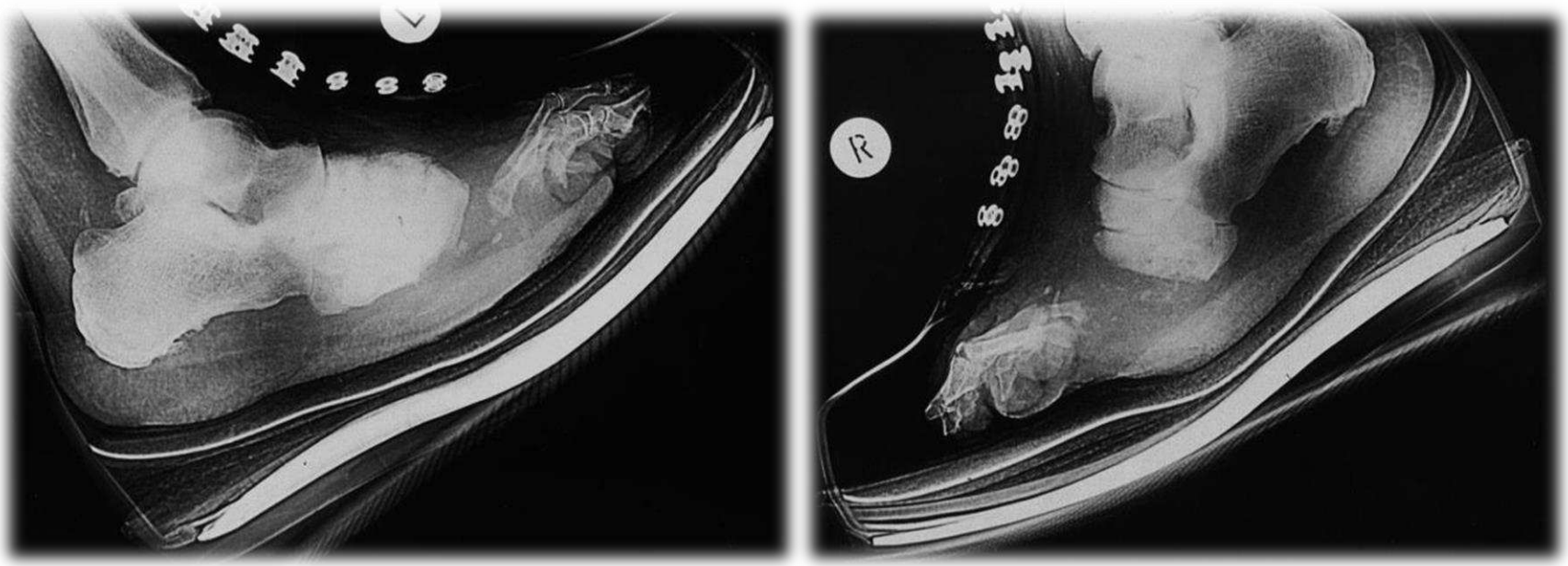
The surgeon may preserve…

- 3 lesser metatarsals or
- 1 lesser metatarsal plus the first ray
- If not possible, conversion into a total internal metatarsal resection is recommended

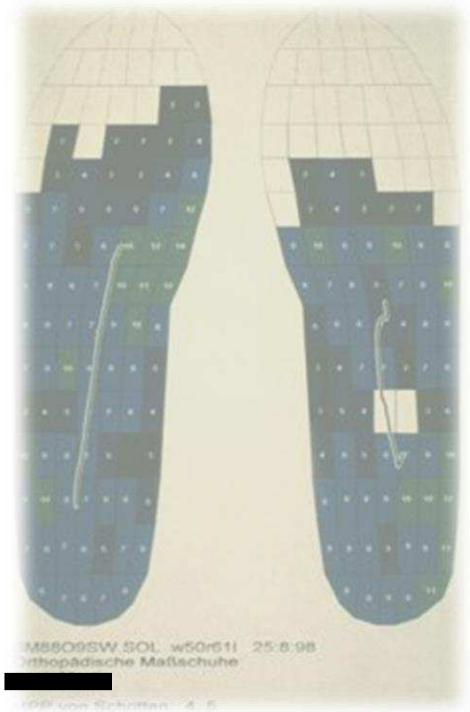
Internal transmetatarsal and tarsal-metatarsal amputations

Internal transmetatarsal and tarsal-metatarsal amputations

Internal transmetatarsal and tarsal-metatarsal amputations



Internal transmetatarsal and tarsal-metatarsal amputations

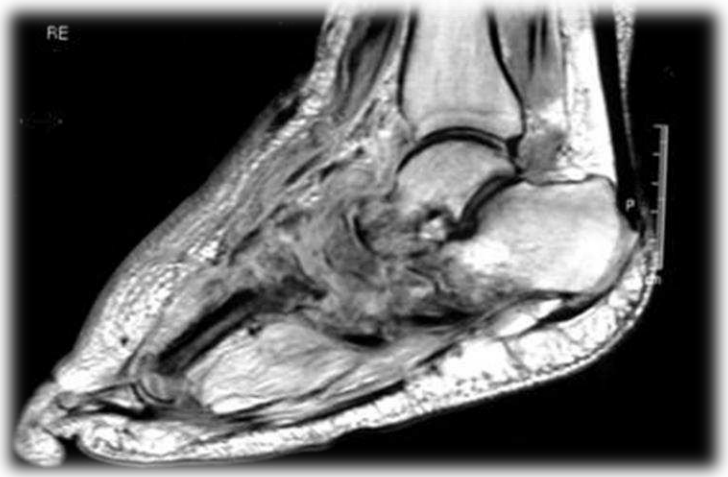


Internal transmetatarsal and tarsal-metatarsal amputations

Internal transmetatarsal and tarsal-metatarsal amputations


2

Internal midtarsal amputations

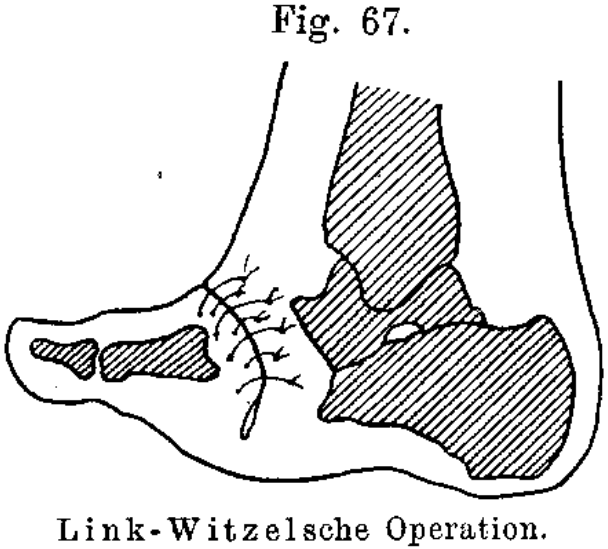


Internal midtarsal amputations

Internal midtarsal amputations

- Better balance compared to typical Chopart stump
- Patient does not feel like an amputee
- Fitting of custom made shoes

Internal midtarsal amputations



Historical figure from 1907

in: „Amputationen und Exartikulationen. Künstliche Glieder“ by *H. Petersen* and *H. Gocht*, Band 29a „Deutsche Chirurgie“, Enke Press, Stuttgart

X-ray after internal Chopart-amputation after *Link* and *Witzel* with typical and advanced foot shortening


3

Internal Syme Amputation

Internal Syme Amputation

Internal Syme Amputation

Internal Syme Amputation

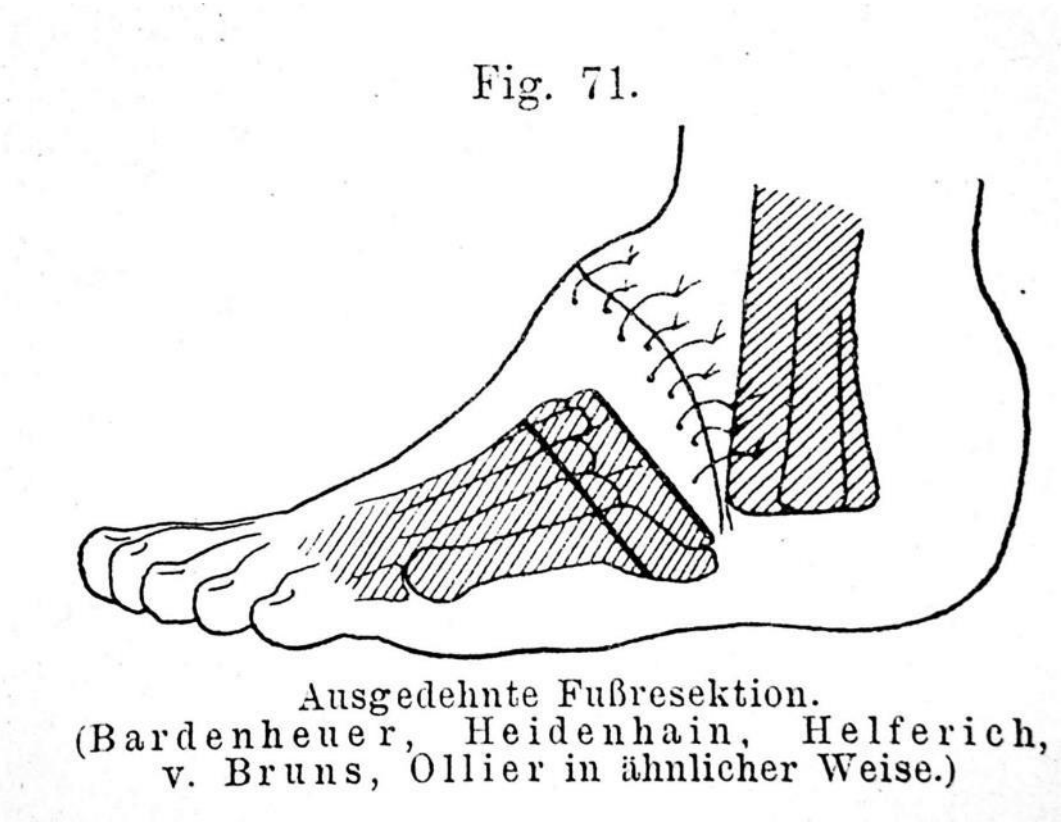


Fig. 71.

Ausgedehnte Fußresektion.
(Bardenheuer, Heidenhain, Helferich, v. Bruns, Ollier in ähnlicher Weise.)

Historical figure from 1907

in: „Amputationen und Exartikulationen. Künstliche Glieder“ by *H. Petersen* and *H. Gocht*, Band 29a „Deutsche Chirurgie“, Enke Press, Stuttgart


4

Intercalary Resection WITHOUT External Fixation

Intercalary Resection WITHOUT External Fixation

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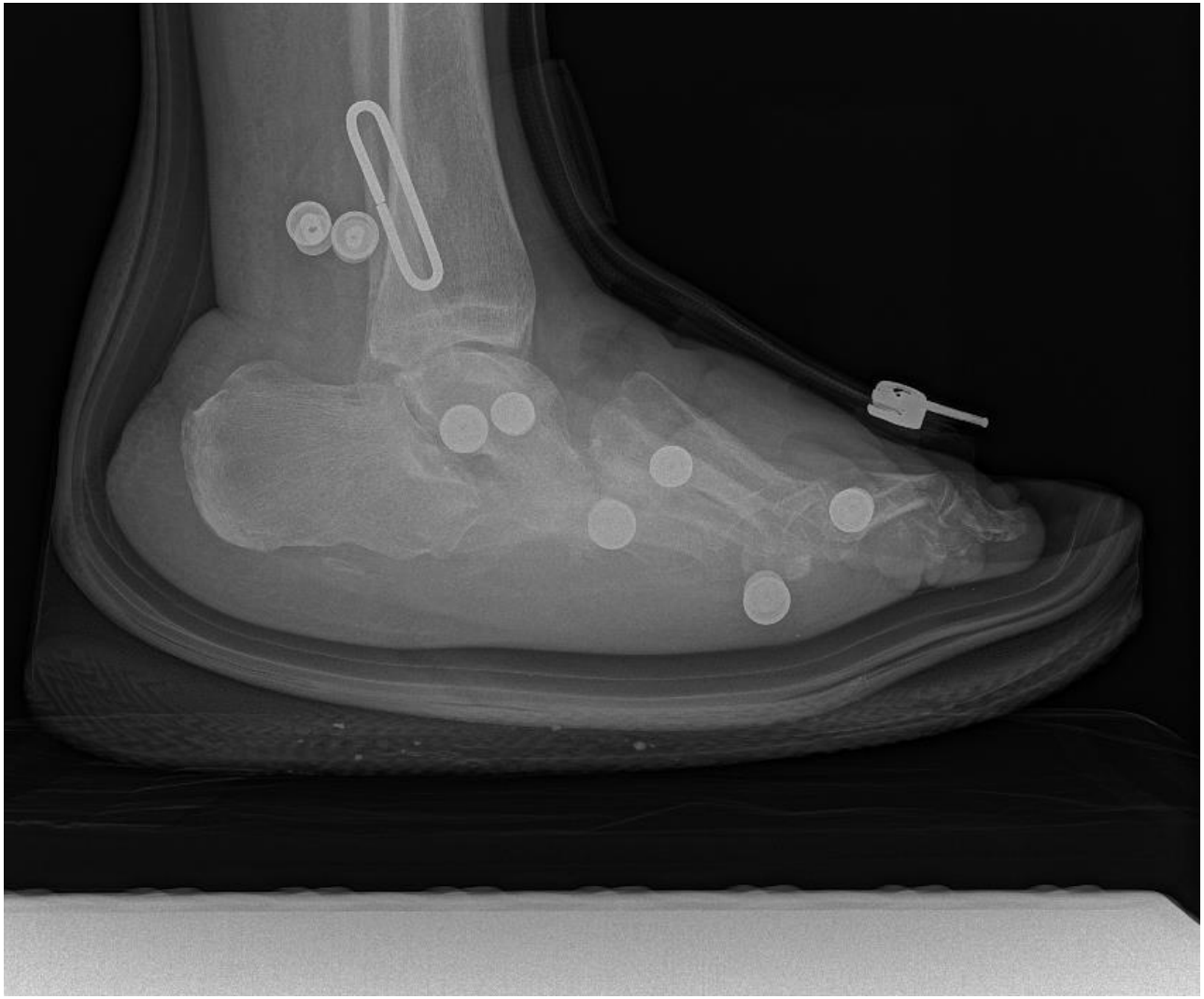

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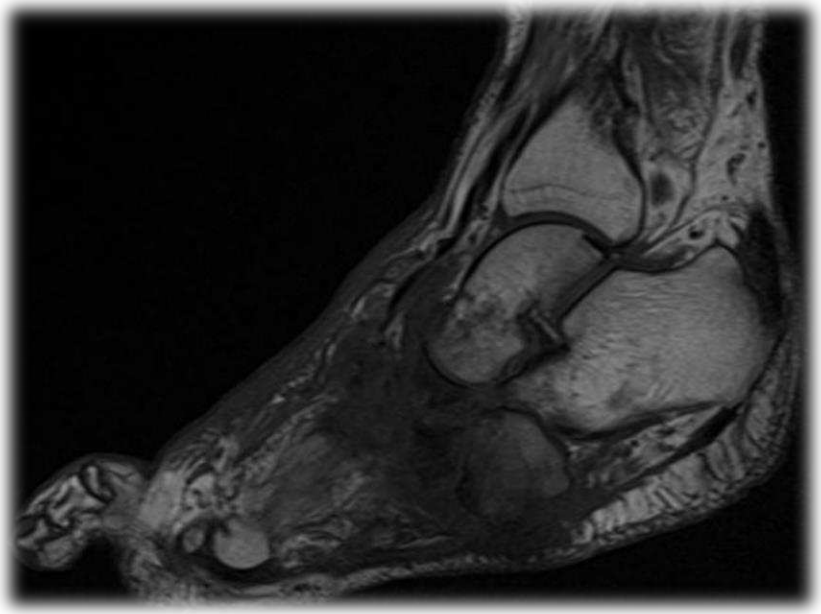

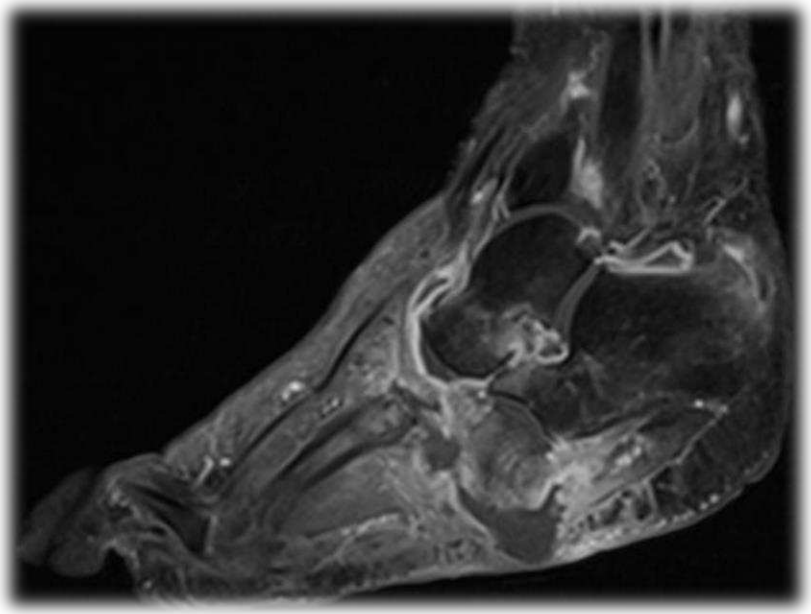

Intercalary Resection WITHOUT External Fixation

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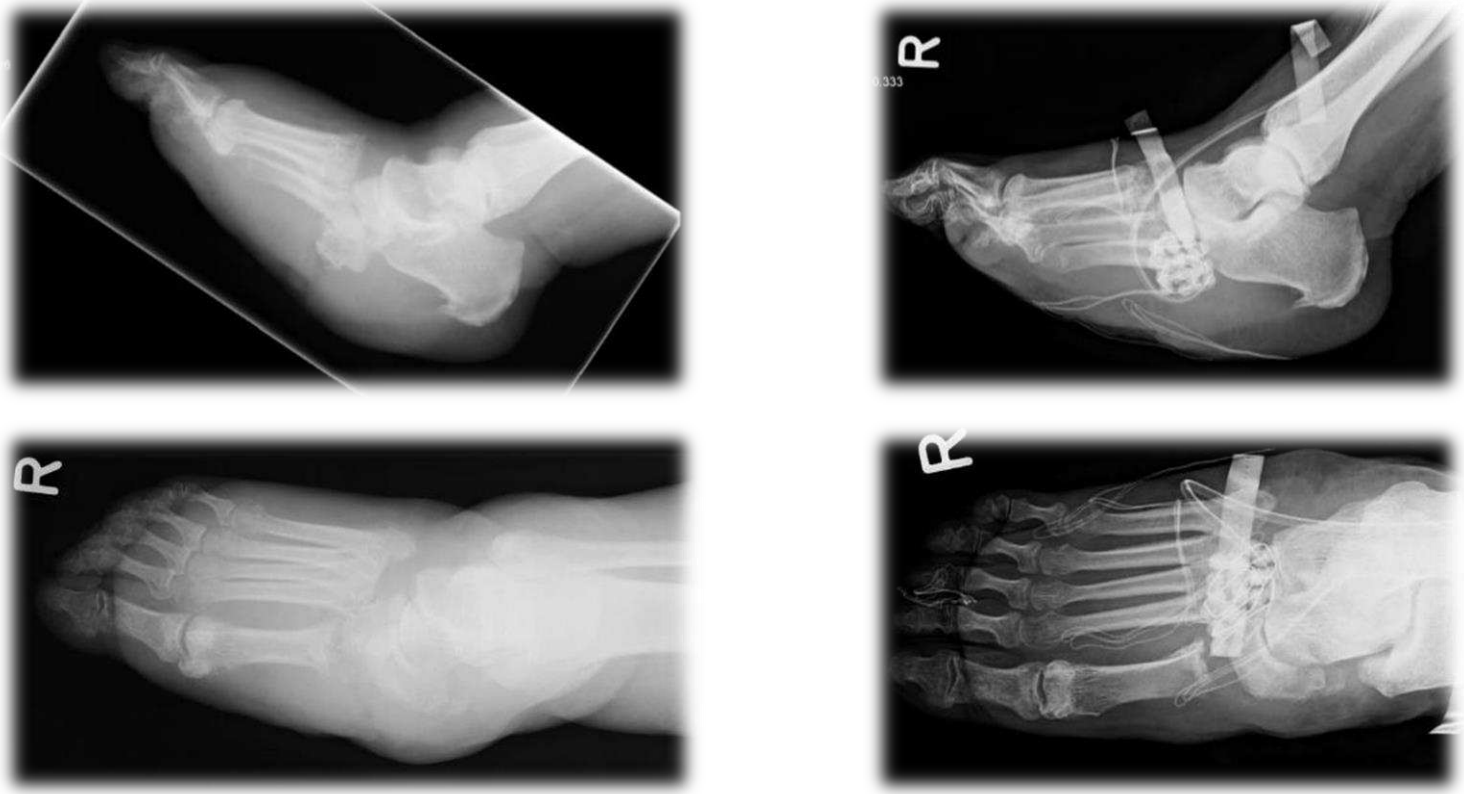
Intercalary Resection WITHOUT External Fixation


5

Intercalary Resection WITH External Fixation



Intercalary Resection WITH External Fixation

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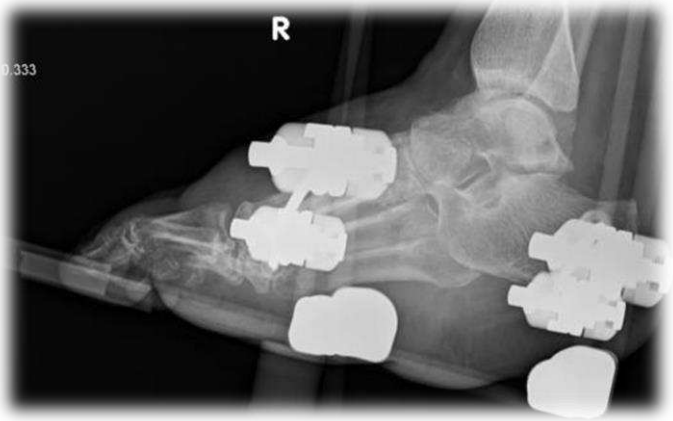
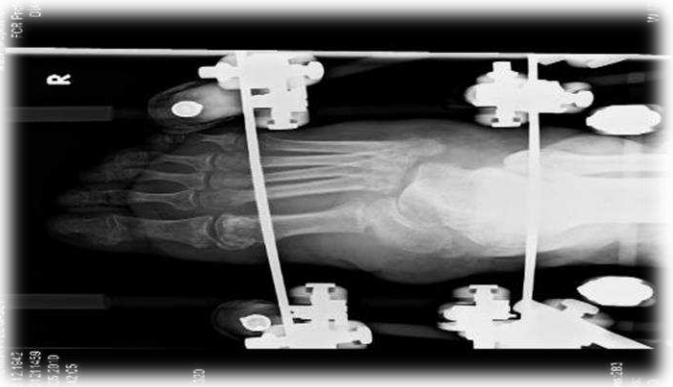




Intercalary Resection WITH External Fixation

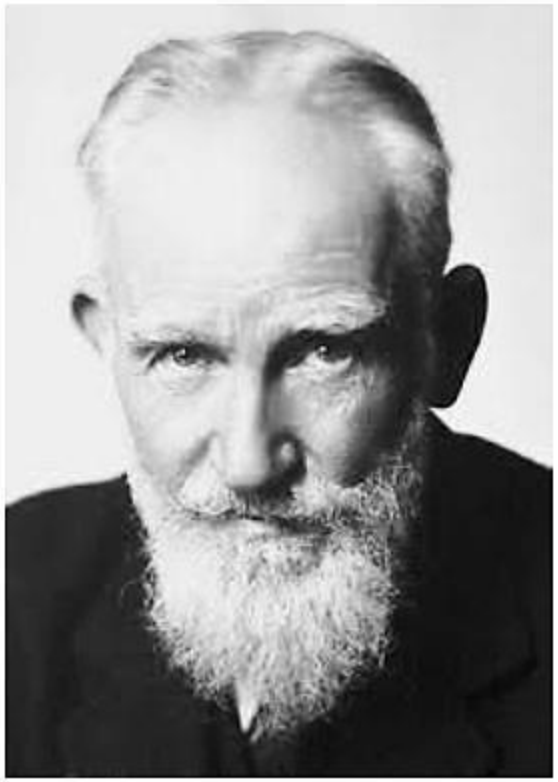
Intercalary Resection WITH External Fixation

Conclusion I

- Internal pedal amputations represent an elegant solution to severe pedal soft-tissue and osseous infections
- They produce a stable, plantigrade residual foot that can be properly placed into custom made orthopaedic shoes
- Arthrodesis across the resected segments is not necessary for a favorable outcome, as the development of a stable pseudoarthrosis offers an adequate degree of stability

Conclusion II

- Omission of permanent internal fixation is beneficial because future problems such as perforating ulcerations or osteomyelitis are less disastrous and easier to manage
- The use of internal pedal amputations and two-stage procedures allows for maximum functional limb preservation and associated improved patient outcomes
- **Neuropathy makes the difference**



George Bernard Shaw

"I marvel that society would pay a surgeon a large sum of money to remove a person's leg - but nothing to save it."

Thank your for your attention

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