

## Der superinfizierte Diabetische Charcotfuss Möglichkeiten des Extremitäten-Erhalts

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# CASES LIKE THESE



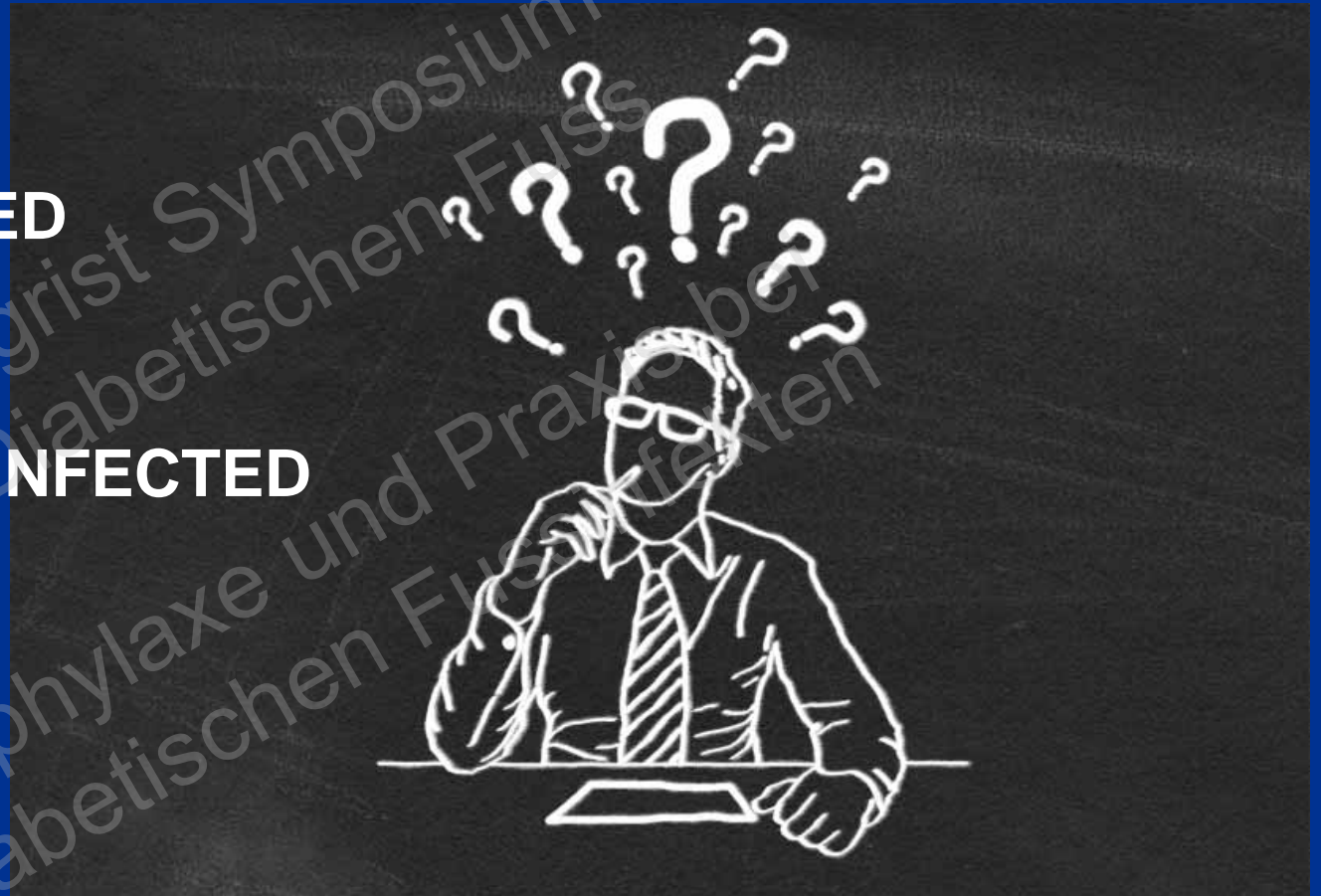
# CASES LIKE THESE



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**CAN WE SAFE INFECTED  
CHARCOT FEET?**

**IS IT WORTH TO SAFE INFECTED  
CHARCOT FEET?**



# DOES IT WORK?

## Mid-term walking ability after Charcot foot reconstruction using the Ilizarov ring fixator<sup>1</sup>

- limb salvage in 93%
- 96.3% limb salvage was ambulatory
  - independent from radiologic fusion,
  - presence of osteomyelitis<sup>2</sup> at the time of reconstruction
- 95.7% ambulatory patients after 1 year<sup>3</sup>

<sup>1</sup>Wirth SH et al. Arch acta orthop, 2020

<sup>2</sup>Hartmann R et al. J orthop Res, 2021

<sup>3</sup>Pinzur MS et al. FAI, 2012

# GOALS

A foot with ...

- no open ulcers or any tendency to develop open ulcers during gait



# GOALS

A foot that ...  
fits into at least orthopedic foot gear



# GOALS

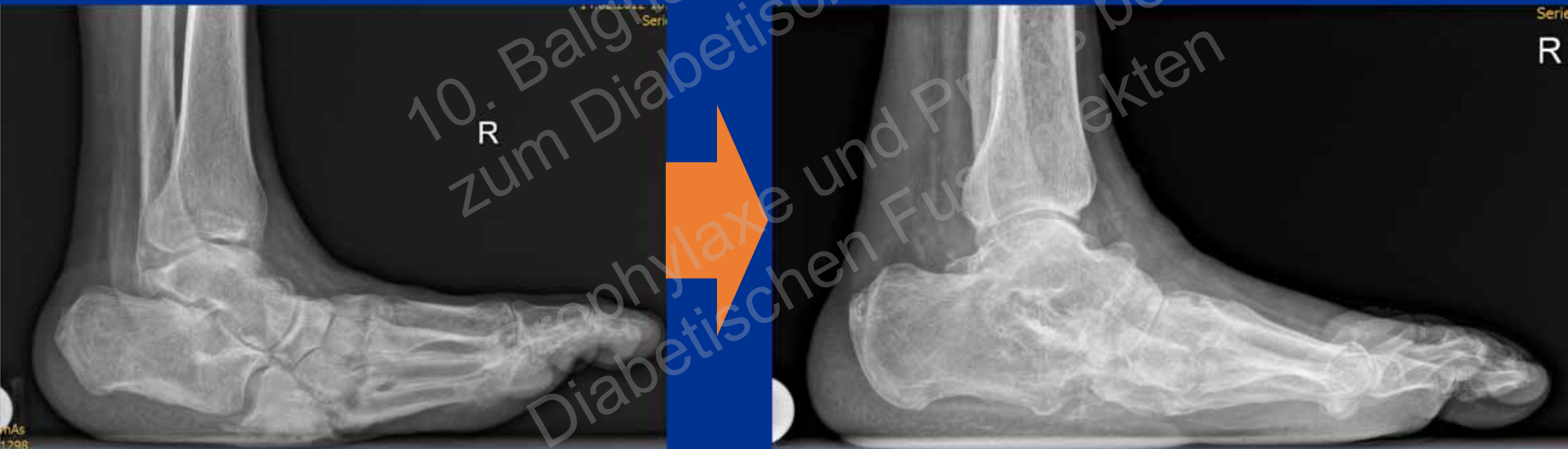
A foot that ...permits the patient to be ambulatory





# GOALS

A foot that ...is not prone to COLLAPSE or recurrent instability



# GOALS

A foot that ...

is least PLANTIGRADE and optimally has a medial longitudinal arch, and no bulging cuboid or medial cuneiform



# WHAT IT MAKES DIFFICULT

- Circulation
- Sensibility
- Bone quality
- Malalignment/Missload



Increased punctual load

- > Local overload
- > Ulceration (chronic)
- > Osteomyelitis



# WHAT MAKES CORRECTION DIFFICULT

## COMPROMISED STATE OF PATIENTS:

- significantly immunocompromised with
- advanced neuropathy
- arterial insufficiency
- some degree of renal insufficiency

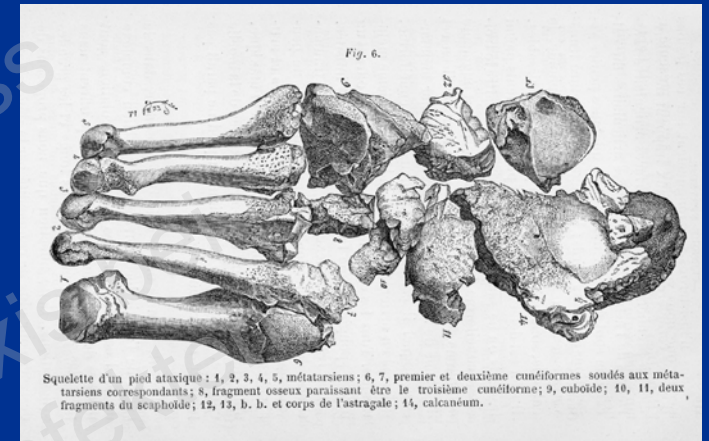


**LIMITED RESERVES FOR HEALING**

# WHAT MAKES CORRECTION DIFFICULT

## ADDRESSING COMORBIDITIES:

- Diabetes (HbgA1c)
- PAVK (preoperativ optimization, stenting, bypass)
- Poor bone quality



Charcot, *Archives Neurologie*. 1883; 6

**OPTIMIZATION OF BLOOD GLUCOSE, VITAMIN D, CALCIUM, PHOSPHATE, CONTROL OF HYPERTENSION AND, IN MANY INSTANCES, CARDIAC WORKUP, ARE NECESSARY.<sup>1</sup>**

<sup>1</sup>Frykberg RG, FAI, 2006, 45(5)

# HOW TO AVOID FAILS



DO NOT MISS A CHARCOT FOOT



# HOW TO AVOID FAILS

## MINIMIZE RISK OF WOUND COMPLICATIONS

- PRE-OPERATIVE VASCULAR ASSESSMENT
- INTRAOPERATIVE BACTERIOLOGIC SAMPLING (if osteomyelitis/ulcera are present)
- SPEZIFIC ANTIBIOTIC THERAPIE
- EARLY REVISION SURGERY
- CLOSLY PATIENT GUIDANCE/CONTROLL



# CHOOSE THE RIGHT IMPLANT



10. Balgrist Symposium  
zum Diabetischen Fuss  
Prophylaxe  
Diabetischer Fussinfekten



# INTERNAL FIXATION ?

## “Active“ Osteomyelitis Infected ulcers

- Impaired bone quality
- Soft-tissue damage
- Bad compliance



Internal Fixation

# ILIZAROV RINGFIXATEUR

## Advantages:

- High mechanically stability<sup>1</sup>
- Fixation on multiple planes  
-> multiplanar Compression
- high rigidity  
-> early weigthbearing<sup>1</sup>
- Access to soft tissue remains
- Postoperative adjustable<sup>2</sup>
- Possibility of correction step by step<sup>2</sup>

<sup>1</sup>Mullins MM, Injury 34(2):155–157

<sup>2</sup>Kirienko A, 2003, Taylor & Francis



# ILIZAROV RINGFIXATEUR

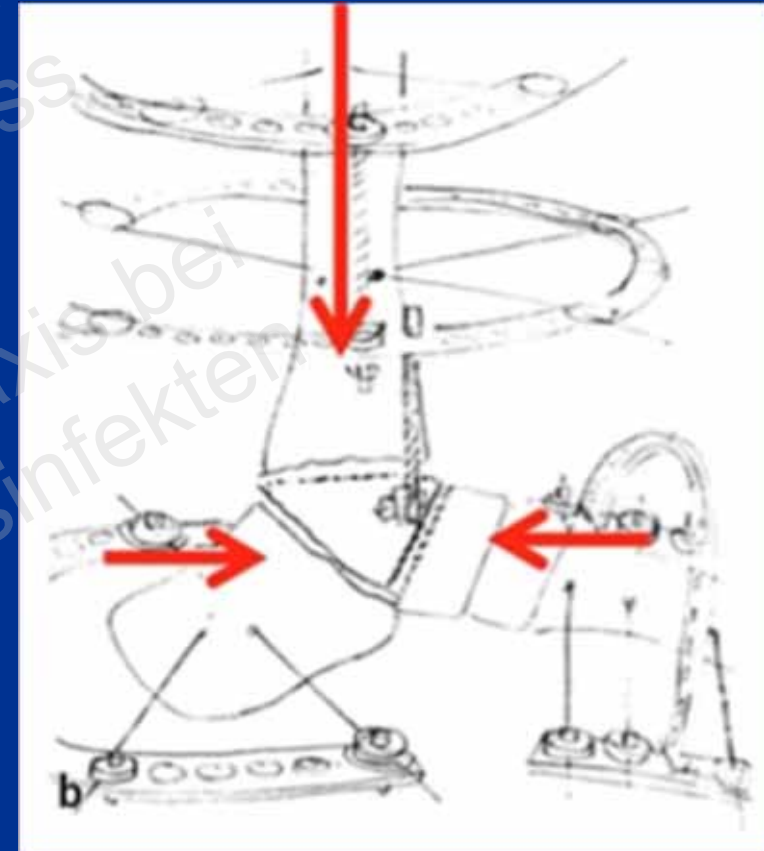
## Advantages:

- Resection of bone and soft tissue structures is given by high stability<sup>1</sup>
- Minimal invasive, percutaneous fixation<sup>1,2</sup>
- Long durability of stability (fine wire fixateur)
- Wire change is easy<sup>3</sup>

<sup>1</sup>Conway JD, Foot Ankle Clin 13(1):157–173.

<sup>2</sup>Cooper PS, Foot Ankle Clin 7(1):207–254

<sup>3</sup>Wirth SH, Orthopaede. 2015;44(1):50-57



Wirth SH, Orthopaede. 2015

# INDICATIONS FOR ILIZAROV RINGFIXATEUR

- Severe deformity, not treatable by conservative therapy
- Deep infections/osteomyelitis
- Recurrent deformity with ulzerations despite optimal conservativ treatment
- Bad skin status
- Bad circulation

# CASE 1



# CASE 1

- 52 y, male
- Diabetes Type 1
- Severe peripheral neuropathy
- History of ulcers forefoot



# CASE 1



# CASE 1



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Zum Diabetischen Fuss  
Prophylaxe und Praxis bei  
Diabetischen Fussinfekten



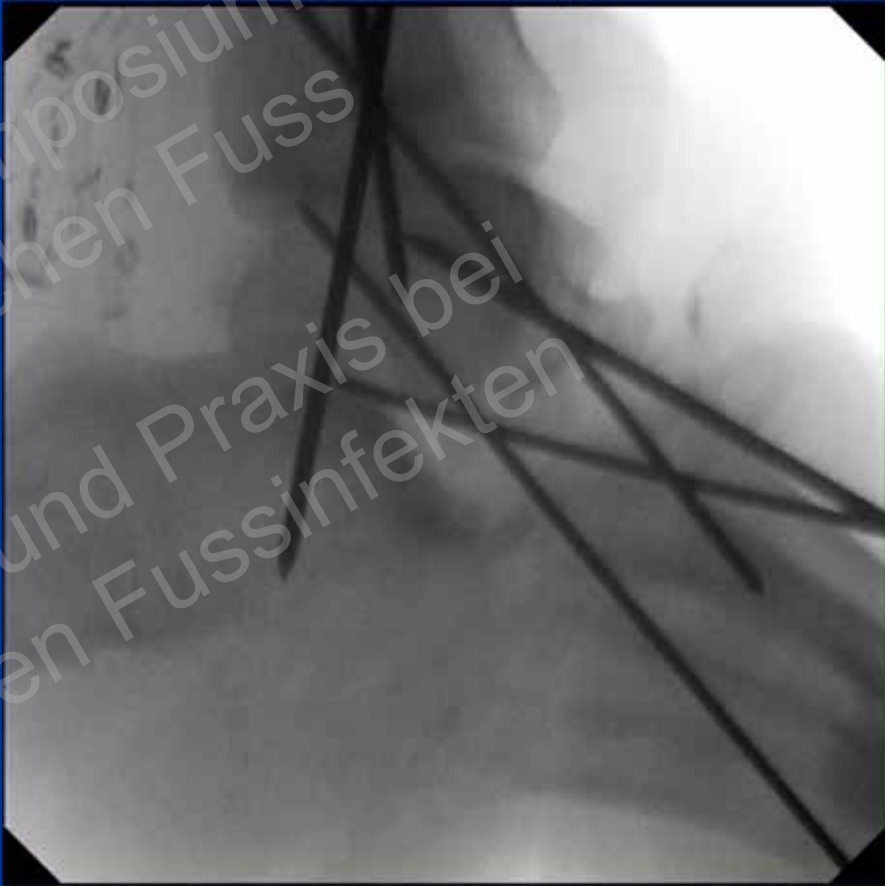
# CASE 1



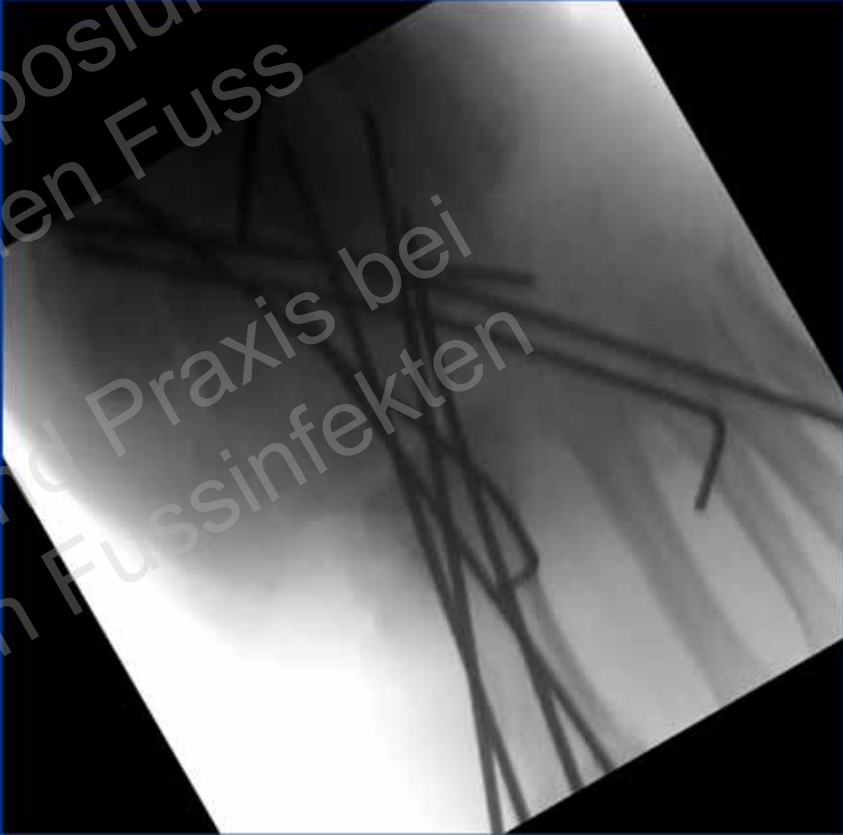
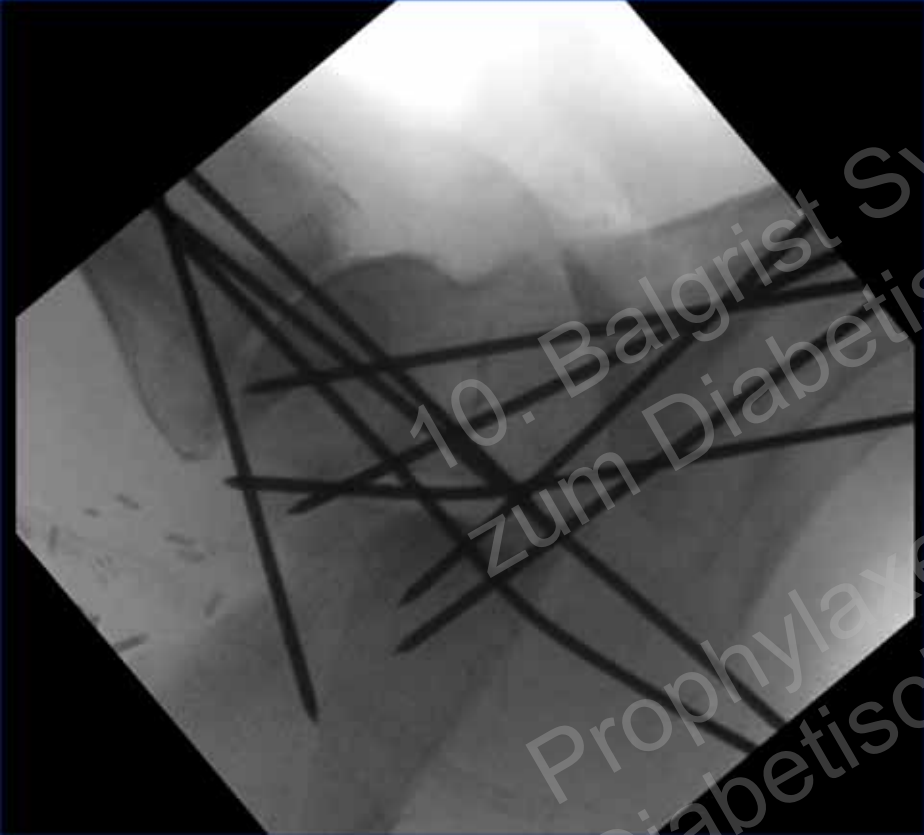
# CASE 1



# CASE 1

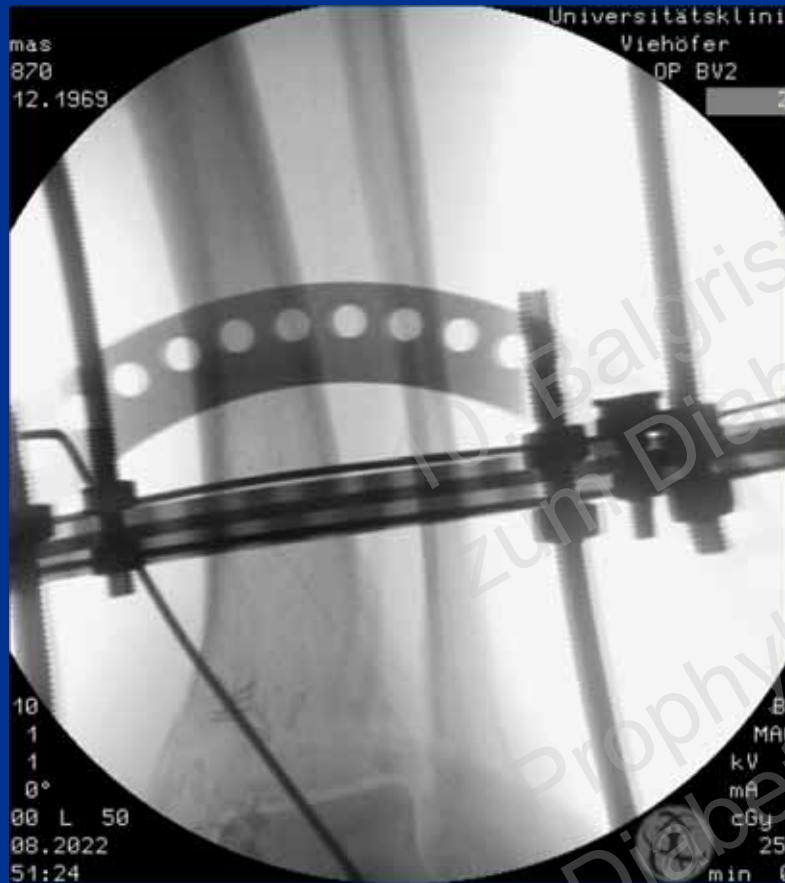


# CASE 1

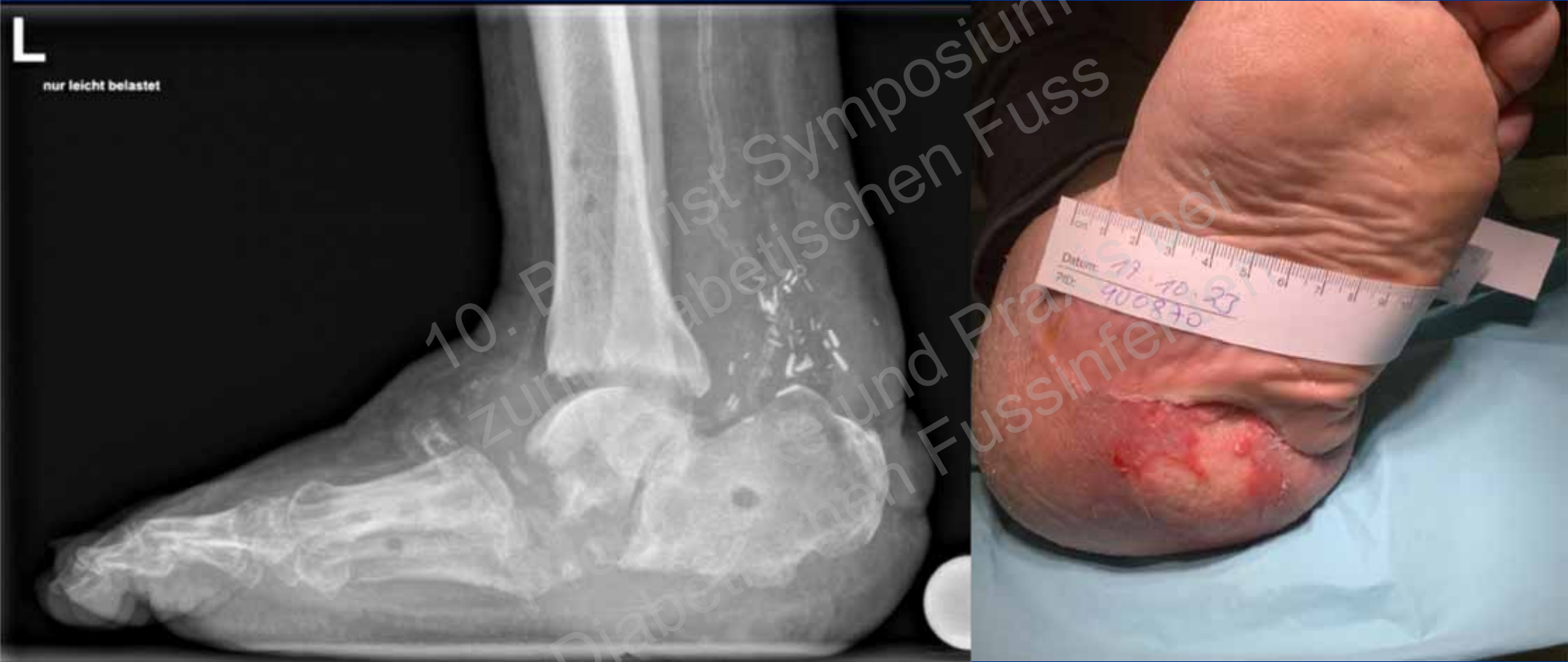


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zum Diabetischen Fuss  
Prophylaxe und Praxis bei  
Diabetischen Fussinfekten

# CASE 1



# CASE 1



nur leicht belastet

## CASE 2



# CASE 2

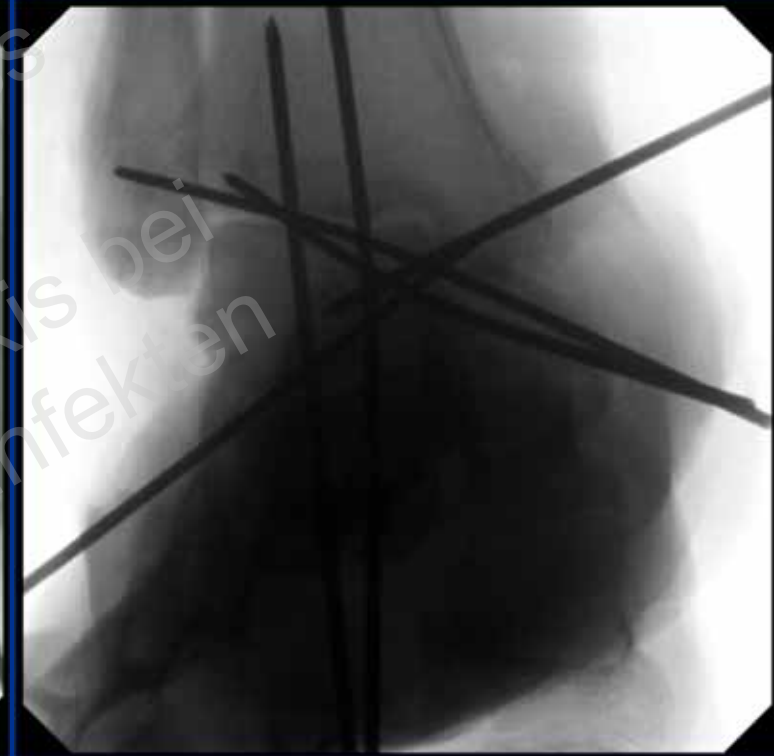
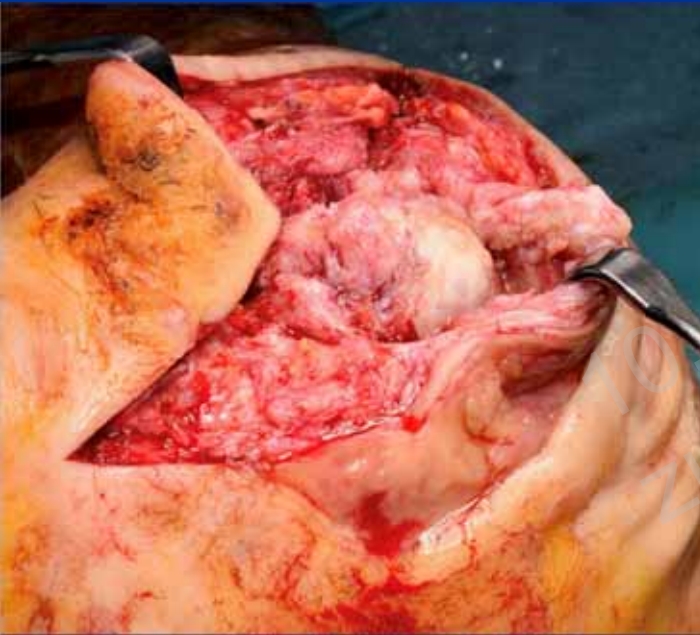




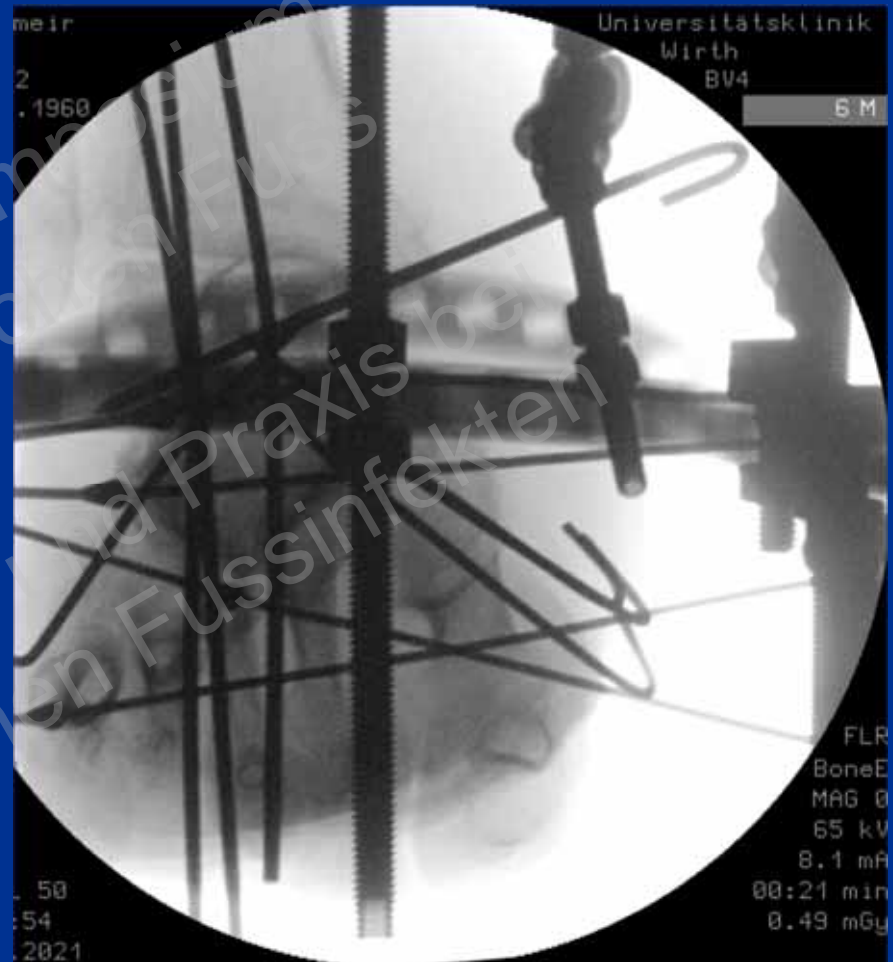
# CASE 2



# CASE 2



# CASE 2



# CASE 2



# CASE 2



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zum Diabetischen Fuss  
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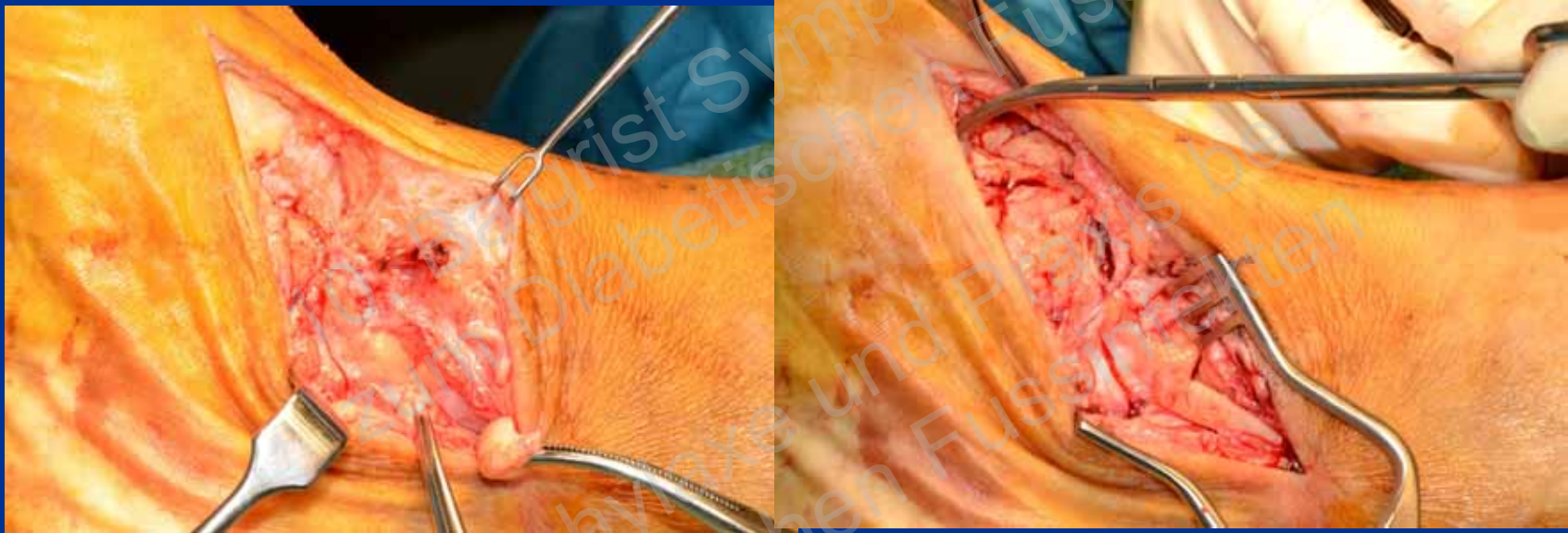
# CASE 3



# CASE 3

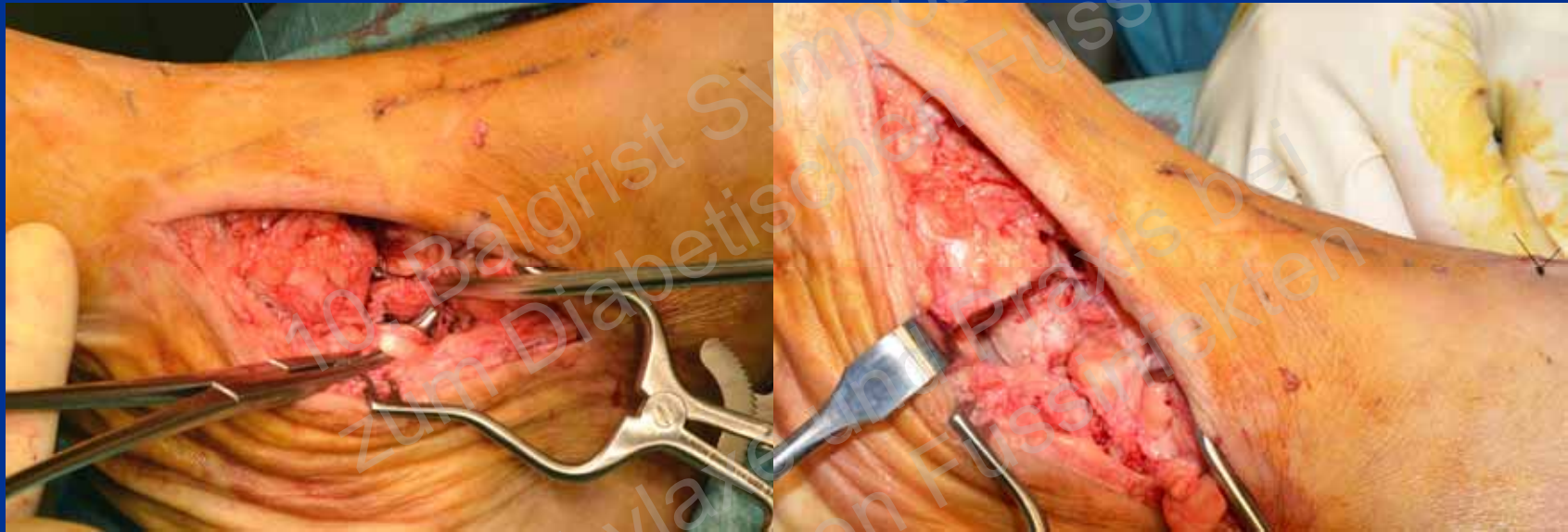


# CASE 3

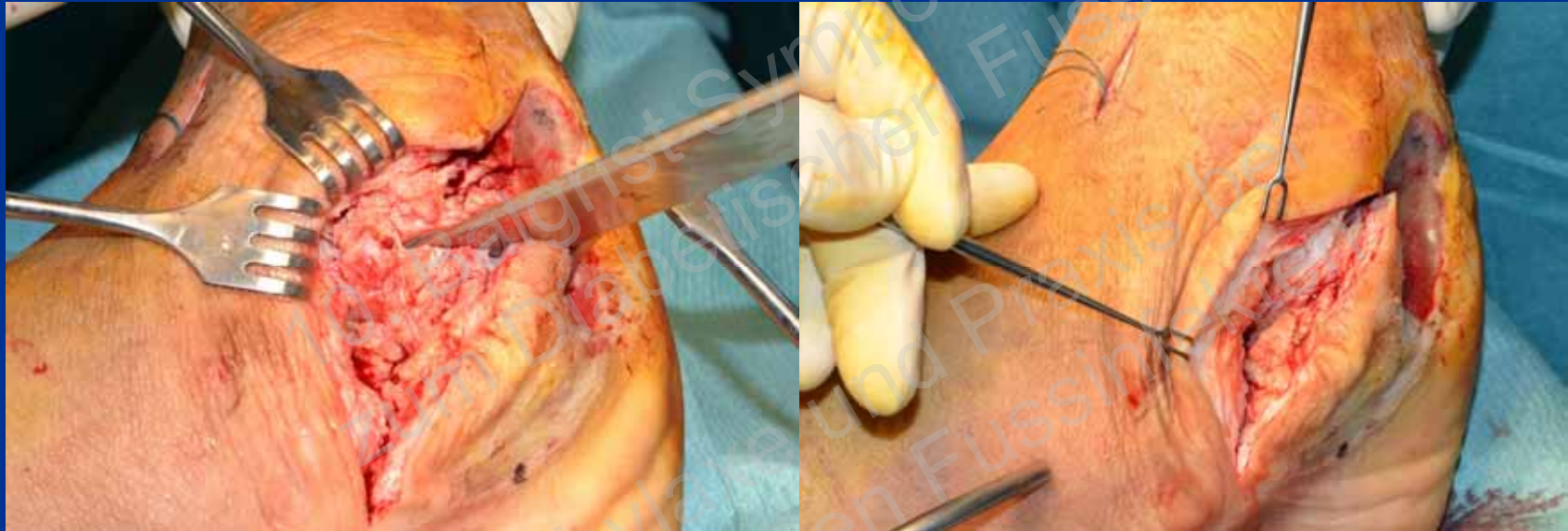




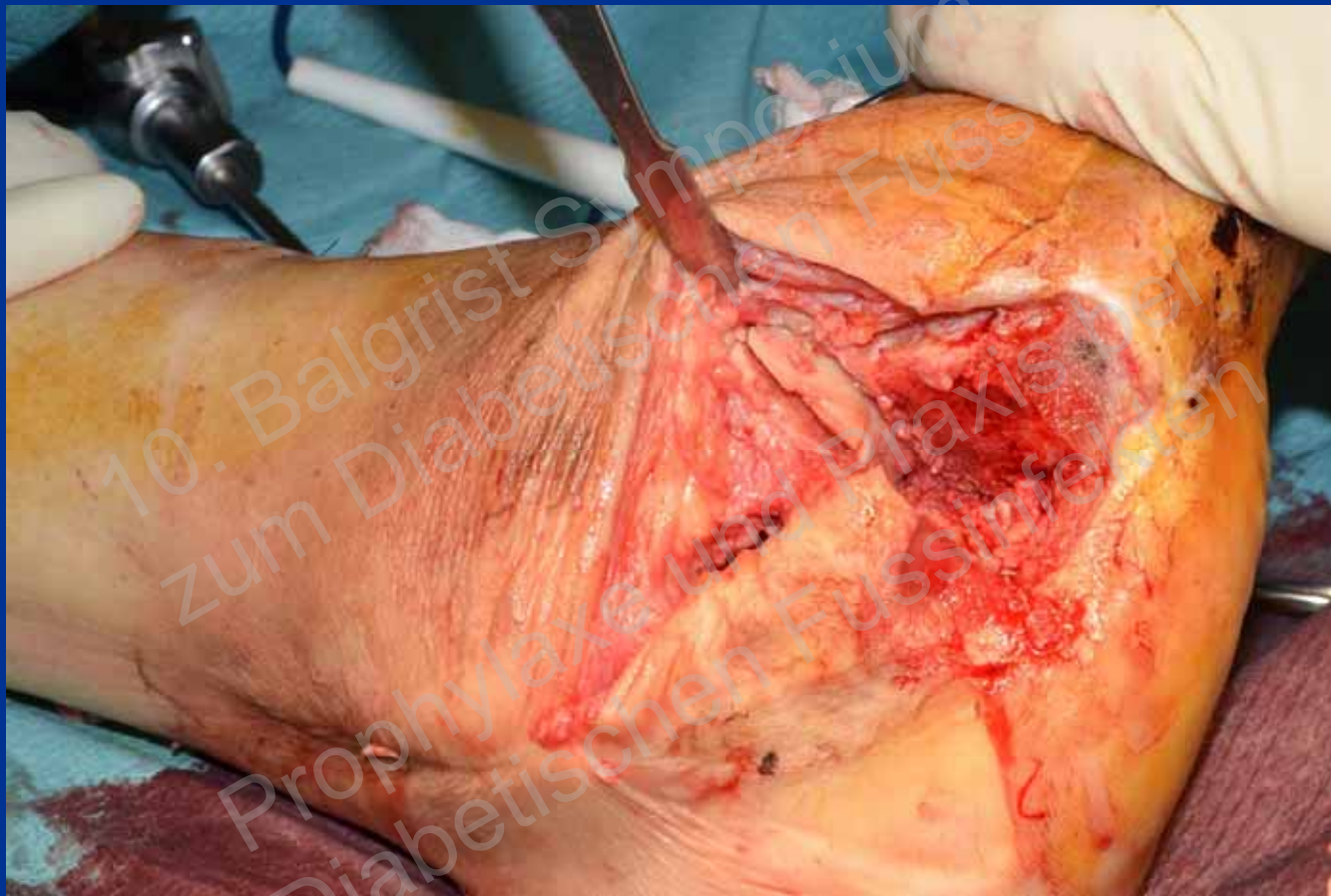
# CASE 3



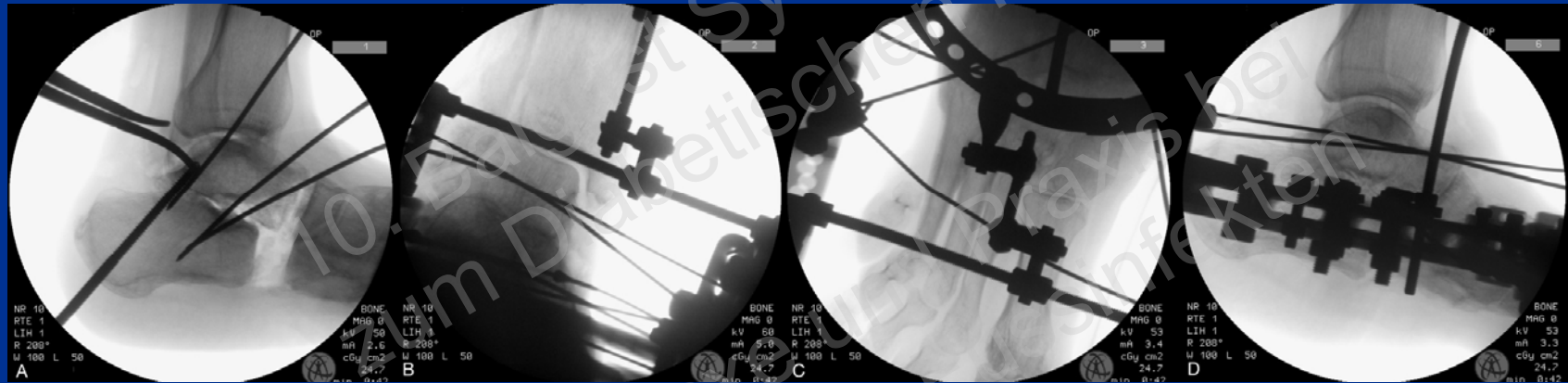
# CASE 3



# CASE 3



# CASE 3



# CASE 3



# CASE 3



# CASE 3



# CASE 3





# CASE 4

34 j., w  
DM Typ I  
Montrauma  
Direkte ORIF



# CASE 4



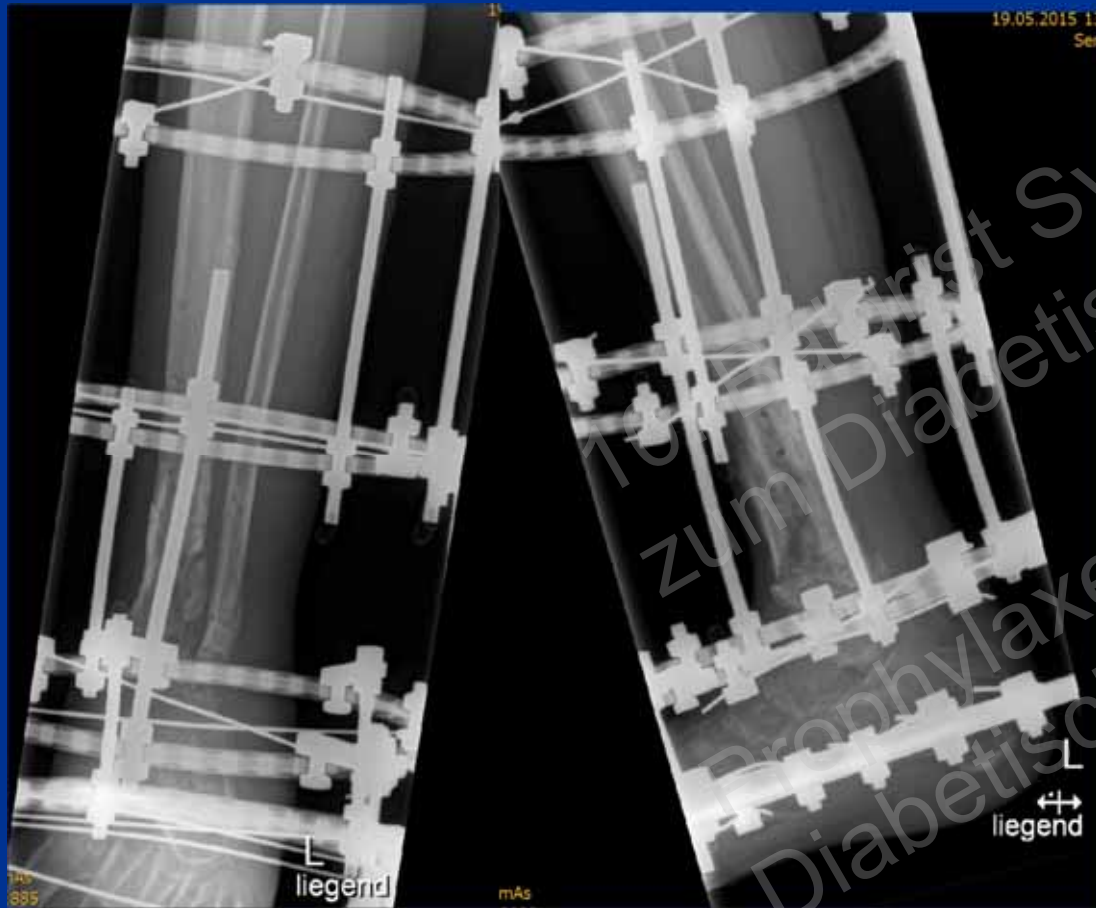
# CASE 4



# CASE 4



# CASE 4



# CASE 4



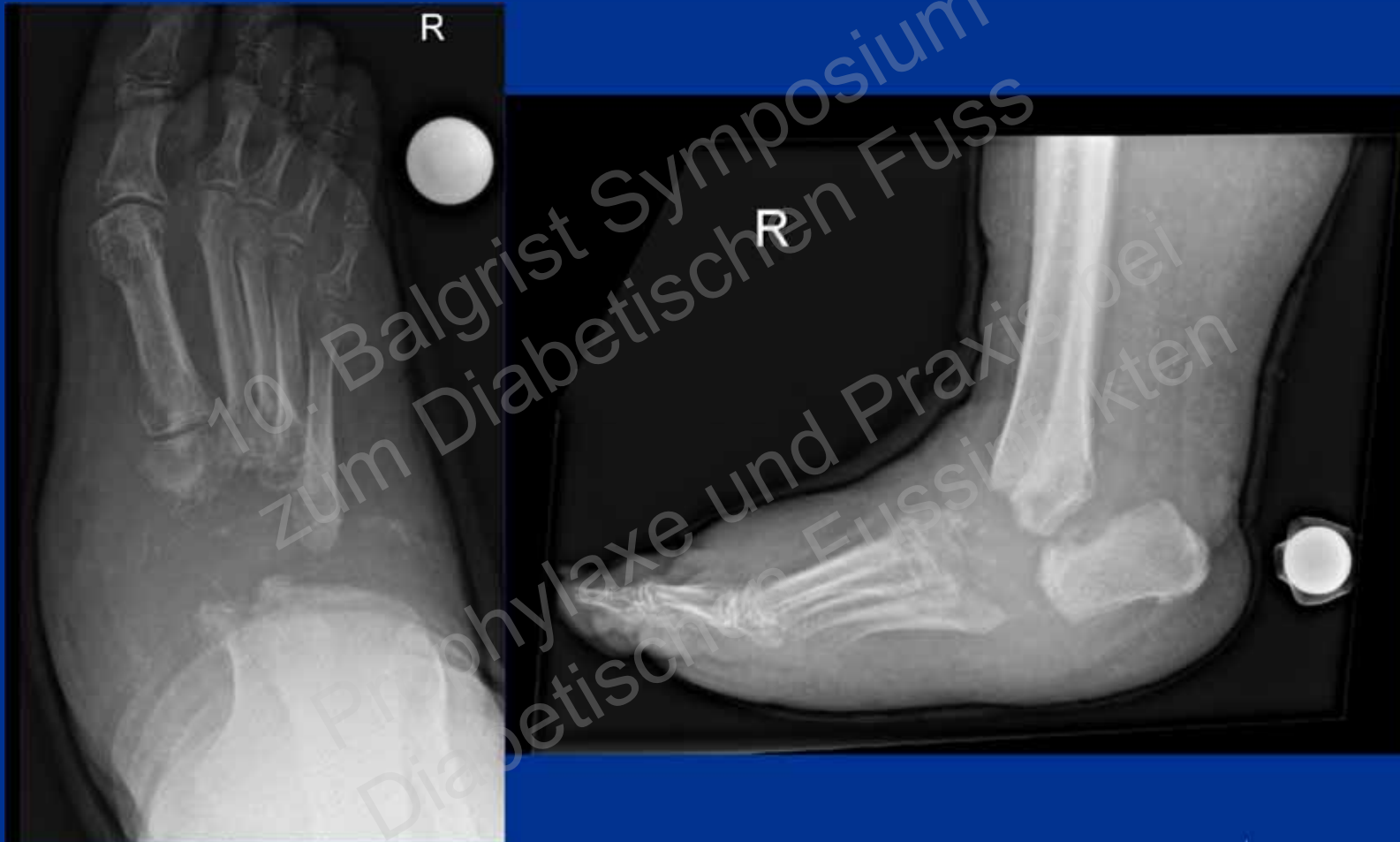
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# GRENZEN

- 57 j., w
- Diabetes Mellitus Typ I
- Multiple Ulcera
- Konservativer Therapieversuch
- Operativer Therapieversuch
  - Mittelfussresektion
- -> Zweitmeinung

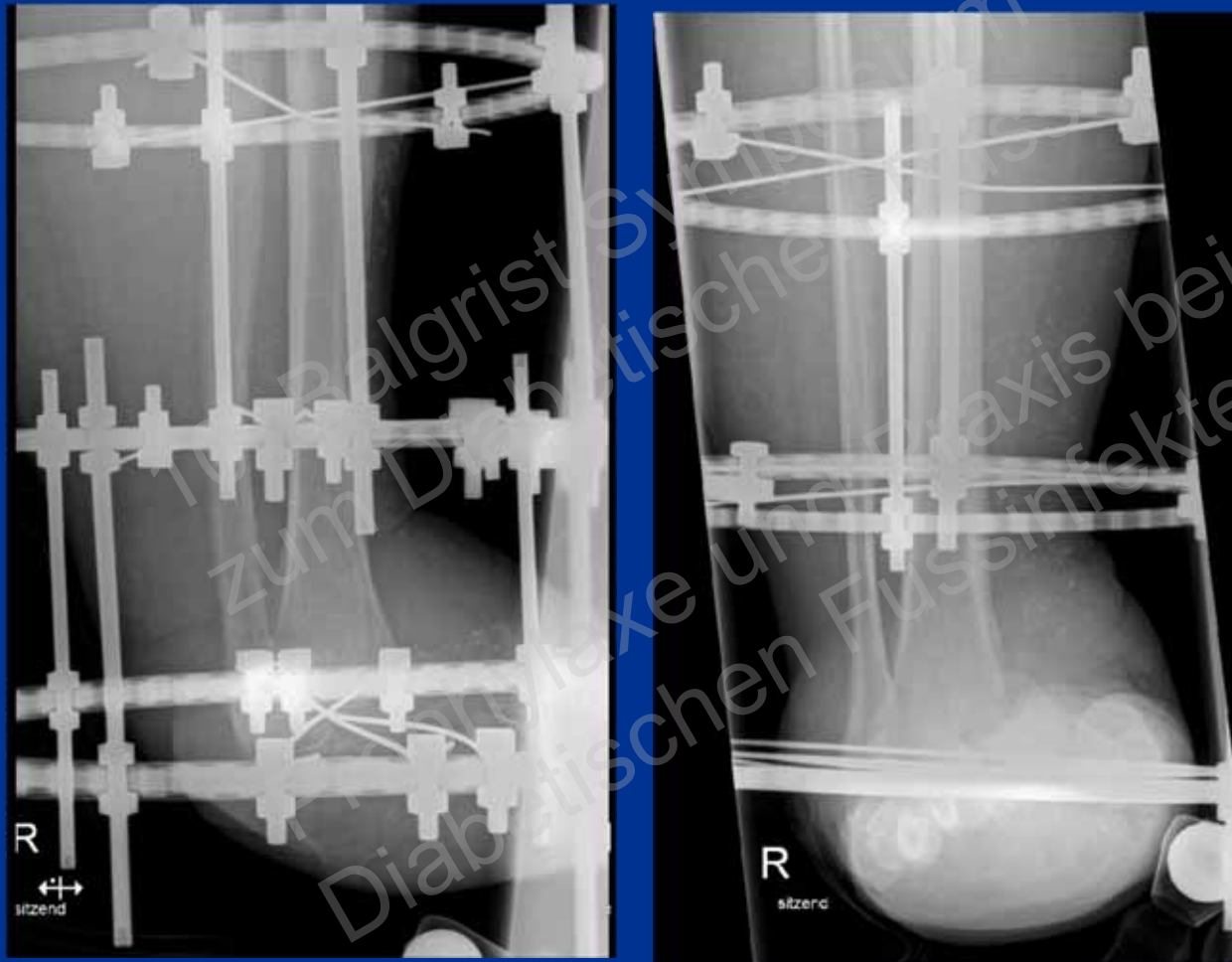


# GRENZEN





# GRENZEN





# SUMMARY

## SAFING THE LOWER EXTREMITIY

- Is teamwork
- Is demanding
- Needs experience
- Is a long treatment

## ILIZAROV RING FIXATOR

- Flexible usable, exspecially in complex cases
  - Secret weapon
  - Complex and time consuming surgery
  - Realignment surgery is the main part
    - ....not putting the frame on
  - Flat learning curve
- 
- Biology is the limiting factor

# HERZLICHEN DANK



