Charcot Arthropathy (CN): Principles of Surgery
Questions to CN:

1. IS THIS CN?

2. WHAT ABOUT WALKER OR BOOT?

1.1. NOT EVERY BONE MARROW EDEMA REPRESENTS CN!

1.2. IS THERE A POLYNEUROPATHY?

2.1. IS CONSERVATIVE TREATMENT AN OPTION?

2.2 IF YES, IT IS THE TREATMENT OF CHOICE!!

Surgical Intervention in an active CN

QUESTIONS:
Indication for Surgery?
What about the incision?
Reconstruction of Soft Tissue and Foot

Gehling, D.J.; et.al.: Orthopedic complications in diabetes. Bone; VOL: 82; p. 79-92, 2016
Active Charcot caused by Surgery (missed Neuropathy)
McEwen, L.N.; et.al.: Foot Complications and Mortality Results from Translating Research Into Action for Diabetes (TRIAD). Journal of the American Podiatric Medical Association; VOL: 106 (1); p. 7-14, 2016
Osteomyelitis and Charcot

Aspects of Charcot Arthropathie CN

Stage (Eichenholtz)
0-3 BESSER 1A, 1B, 2, 3
(ACTIVE OR INACTIVE)

Localisation (Sanders)
1-5

Malum Perforans

Infection
(SOFT TISSUE, TENDONS, JOINTS, BONE)

Vascular Status
Bony Anatomy

Links aus Mc Minn: Anatomie des Fußes
Classification?

- BRODSKY Typ I, II, III, IV
- SANDERS Typ I, II, III, IV, V
- SCHON Mittelfuß Typ 1-4
- SOMMEREY, 2004
  (P1-3, F0-3, Do-2, So-4, L 1-10, Mo-4)
- Chantelau, 2014

Charcot Sanders II

Pat. male, 36a
PNP by M. Fabry
acute CN I/12
TCC for 5 month

MRT:
Osteomyelitis

Are there typical Destruction Patterns?
NON OF THE EXISTING CN CLASSIFICATIONS ARE SUFFICIENT

TREATMENT RECOMMENDATIONS ARE BASED ON PARTLY ASPECTS

WE DO KNOW:

INFECTION/ OSTEOMYELITIS
INSTABILITY
NON PLANTIGRADE FOOT/ ROCKER BOTTOM
Surgical Planning

- **unknownen:**
- classification?
- fixation
- cancellous bone, tricortical bone graft
- grafting itself
- stemm cells/bone marrow
- subtractive correction
- skin plastic for plantar defects
- recommendation for Implants
- recommendation of external fixation or Ilisarov type
Reposition or Resection

- Reposition of acute luxation
- Resection for reposition
Pat. H.B., Charcot II with Malum perforans

Pat. H.B., Charcot II with Malum

Inactive CN
CN II: unstabil, no fusion
Pat. R. E., * 1979, DM I, PNP

MRSA Infection
Fusion CN Sanders II

- Arthrodesis of both columns, when?
- Correction, subtractiv (always?)
- Amount of correction (3 dimensions)
- ATL (when and how)
- post OP protocol (off loading, duration, reloading)
• Eichenholtz III (inactive CN)
• stabil, plantigrad: custom made boots > conservativ

• unstabil, not plantigrad, Rocker bottom: mediale and lateral approach, Chopart arthrodesis, fixation intern

• unstabil, not plantigrad, Rocker bottom, Malum: plantare debridement, Chopart arthrodesis, Fixation: intern u/o extern
• subtalare Fusion needed?

• Fixation time: 3 month
• reloading of the foot: (2 x 15 min week 1, 2 x 30 min week 2,...)
• Custom made boots acc. to diabetic guide lines
• Check up every 4 weeks with x-ray
• MRI in doubt
Charcot Sanders III
Dislocation Typ bilateral

Stabile Internal Fixation:
2- Column Stabilisation

Sanders III > subtalare fusion
> Fusion laterale column
Sanders III

- **Not solved:**
- Subtalar Fusion needed
- recommended osteosynthesis
- internal +/o external
- ATL?
- Gastroc or AT
- surgically demanding: Talo-Naviculare-Fusion
Problems with Internal Fixation
Nonsurgically after failed Fusion
Analysis of failed Surgery

STAGING CORRECT?

TYPE OF FIXATION SUFFICIENT?

TIME OF FIXATION?

ORTHETIC STABIL ENOUGH

(COMPLIANCE OF THE PATIENT)
Pat. R. E., * 1979, DM I, PNP

MRSA Infection
Instability: CN Sanders IV
CN Sanders V

- Charcot disease of the heel
- CN V
- conservative therapy if possible
CN Sanders V

- conservative therapy (duration)
- custom made boots

VI- 15  
VIII- 15  
II- 16
Charcot: Problems

- Classification of several CN's of different location
- Different course of CN in correlation to different types of PNP?
- Differentiation: Charcot <> Osteomyelitis <> AVN
- Strategy infected CN: MRSA, ESBL, MRGN

- DRG (German Reimbursement System): Classification CN- Reconstruction vs. Amputation
- Stem cell therapy to modify bone biology?
DRG System

- wüsthoff
Conclusion

EXISTING CLASSIFICATIONS ARE INSUFFICIENT

DESTRUCTION PATTERNS WITH RELEVANCE TO TREATMENT PLANNINGS ARE NOT RULED OUT

TREATMENT OF CN IS BASED ON RECOMMENDATION OF SINGLE SURGEONS

LEVEL IV: GOOD MEDICAL PRACTICE