Basic principles of joint preserving surgery of the ankle

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Introduction

Stage adapted treatment of OA

1. Arthroscopy (+Debridement)
2. Arthrotomy + Debridement
3. Distraction
4. Osteochondral Ankle Joint Resurfacing
5. Corrective osteotomies
6. Joint replacement
7. Arthrodesis
Debridement

Arthroscopy / Arthrotomy + Debridement

Satisfactory results in early stages

osteochondral lesions < 1-1.5cm

Chuckpaiwong B, Arthroscopy 2008
Amednola A et al, Arthroscopy 1996
**Distraction (Arthrodiastasis)**

*Introduction*  
Arthroscopy / Arthrotomy + Debridement

Distraction

3 mo external fixator

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Tellisi N, Foot Ankle Int. 2009
Acevedo JI, Foot Ankle Clin 4:409-30, 1999
Ploegmakers JJ et al, Osteoarthritis Cartilage 13:582-588, 2005
Distraction

Arthroscopy / Arthrotomy + Debridement

Distraction

3 mo external fixator

Own Data

2001-2006: 5 Patients, Fixator removal after 10 (7-12) weeks

Only one of the patients reported on a functional improvement after 1 year

Marijnissen AC et al
Osteochondral Resurfacing

Arthroscopy / Arthrotomy + Debridement

Distraction

Osteochondral Ankle Joint Resurfacing

Autograft

OATS, Mosaicplasty (mainly OCD)
Osteochondral Resurfacing

Arthroscopy / Arthrotomy + Debridement

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OATS, Mosaicplasty (mainly OCD)

Vascularized Autograft

M, 54, extended lesion medial talus
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2001-2007, n=12

2 failure (conversion to TAR)

10 complete incorporation

Pierer et al, submitted
Osteochondral Resurfacing

Arthroscopy / Arthrotomy+Debridement

Distraction

Osteochondral Ankle Joint Resurfacing

Autograft

OATS, Mosaicplasty

Vascularized Autograft

Allograft

Limited experience

Adams SB, JBJS Am 2011
Raikin SM, JBJS Am 2009
63% of the patients with arthritis of the ankle joint have a malalignment.

Valderrabano CORR 2009
What is the problem

1. Asymmetric joint load

Takakura et al, JBJS 95
What is the problem

1. Asymmetric joint load
2. Force vector of the triceps surae
Aim of OT

- Realignment of the hindfoot
- Normalization of the force vector of the triceps surae
Nature of the deformity

Localisation

CORA (Centre of rotation of angulation)

Paley
Nature of the deformity

Instability pattern

single plane ↔ ‘balance board instability’
Nature of the deformity

Instability pattern

single plane ↔ ‘balance board instability’
Nature of the deformity

Instability pattern

single plane ↔ ‘balance board instability’
Biomechanical background
Biomechanical background

Anatomy

Highly congruent joint

Close joint contact
Biomechanical background

isolated changes of the angle of the distal tibia

paradox shift of the load transfer

Varus: posterolateral shift

Valgus: anteromedial shift
Biomechanical background

SMOT only comparable to HTO as long as joint congruency / ligament balancing is maintained
Biomechanical background

Failed SMOT due to joint incongruency
Biomechanical background

Isolated change of the distal tibial articular surface angle failed to restore talar positioning
Biomechanical background

Changes of load distribution in coronal plane deformity

Shift of the load transfer occurs in two directions:

- medio-laterally
- antero-posteriorly
Biomechanical background

Usefulness of the SPECT-Ct scan to preoperatively assess the area to be unloaded
Technique SMOT

In valgus deformity: medial closing wedge

Regeneration!

Pre-OP  |  6 mo post OP  |  3 y post OP

Introduction  Arthroscopy  Distraction  Osteochondral Tx  Osteotomy  Conclusion
Technique

Varus Deformity

Medial opening wedge OT

Pre-OP

12 mo post OP
Technique

Varus Deformity

Lateral closing wedge
Technique

Varus Deformity

Medial opening wedge

Fibula OT
Technique

Anterior extrusion

Anterior opening wedge OT
Surgical technique

1. SMOT Tibia, Aim: overcorrection of 3-5 deg
Surgical technique

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Biplanar OT, if anterior extrusion
Surgical technique

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Biplanar OT, if anterior extrusion
Surgical technique

2. Fibular OT
Surgical technique

3. Calcaneus OT: if remaining deformity
Surgical technique

3. Ligament reconstruction
Surgical technique

4. Midfoot OT / AD in flatfoot deformity

Midfoot OT in (cavo-) varus feet
Conclusion

• Debridement / Microfracturing helpful in early stages
Conclusion

- Debridement / Microfracturing helpful in early stages
- Osteochondral resurfacing for extended lesions
  - Only preliminary reports available
Conclusion

- Debridement / Microfracturing helpful in early stages
- Osteochondral resurfacing for extended lesions
- Alignment surgery for asymmetric OA
  - May slow down the degenerative process
  - 2 Step approach: secondary TAR / Fusion
  - Corrected alignment: needed for TAR or fusion

Pre-OP  6 mo post OP  3 y post OP
Thank you!