

Pathofysiology of talar OCD's

Dr. Mikel Reilingh
Orthopedisch chirurg i.o.



Mikel Reilingh

Residency cluster AMC

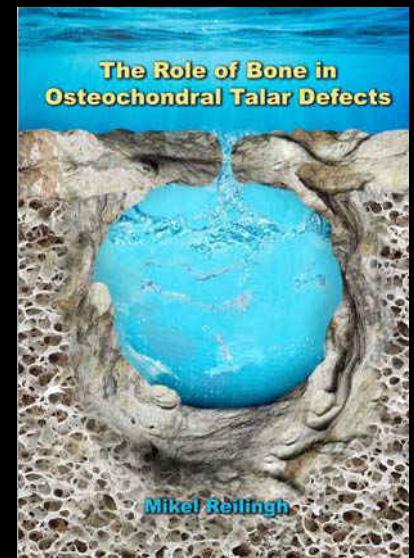
MC Slotervaart



PhD 14-9-2016

Tutors:

- Prof. dr. C.N. van Dijk
- Prof. dr. G.M.M.J. Kerkhoffs
- Dr. ir. L. Blankevoort



LOURINHO EN EL DESCANSO: "¿QUÉ ESTÁIS HACIENDO? NO NOS PUEDEN DOMINAR ASÍ"

CANALES ESTARÁ DE BAJA TRES SEMANAS CON UN ESGUINCE DE TOBILLO

LENGUA
30 de SEPTIEMBRE
a las 10h
Temas

FORNOS
MARTÍN GARCÍA

9.05

HOY

MARCA

MESSI TOMA EL CALDERÓN CON UN GOLAZO PERO SALE EN CAMILLA TRAS UN ENTRADÓN DE UJFALUSI

Se temió que tuviera roto el tobillo aunque todo apunta a que sólo sufre un esguince que le tendrá 15 días de baja
• De Gea evita una goleada del Barça con seis paradas antológicas



1-2

DE GEA, MESSI Y VEINTE MÁS



FOTO M

CLASIFICACIÓN

1. Valencia	9
2. Sevilla	7
3. Real Madrid	7
4. Atlético	6
5. Villarreal	6
6. Barcelona	6

ESCALOFRIANTE

Tendon pathology

(Stress) fractures

Anterior/posterior
impingement



Acute ligament
injury

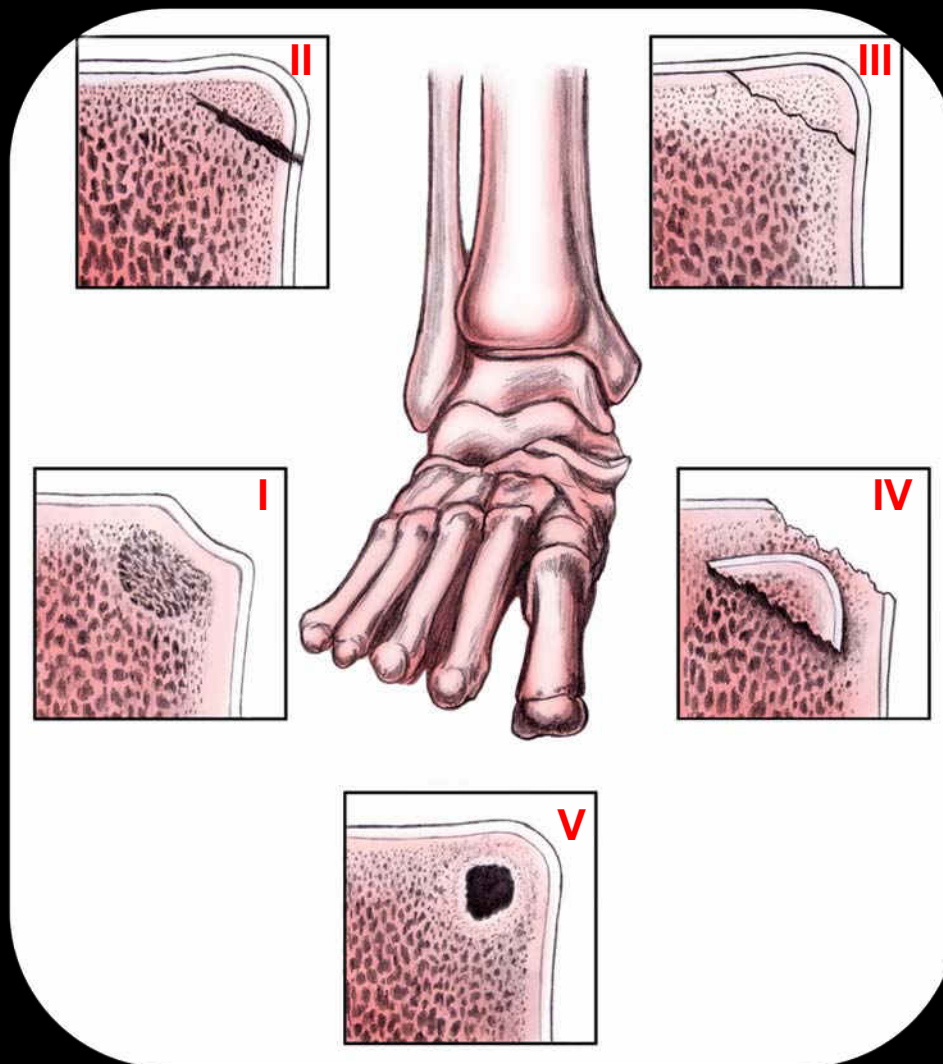
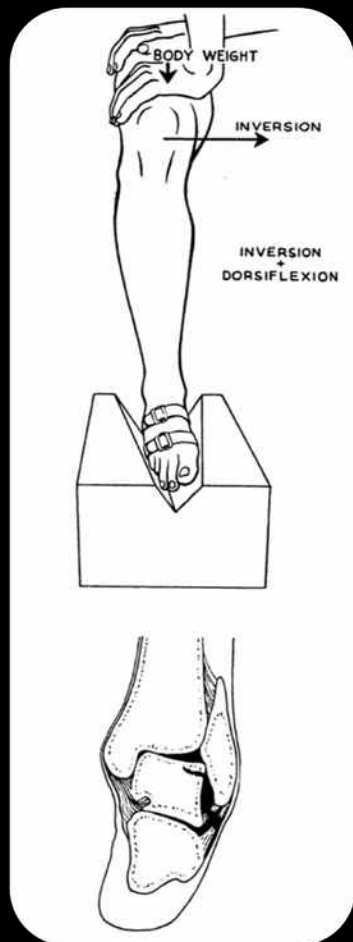
Chronic
syndesmotic pain

Chronic ligament
instability

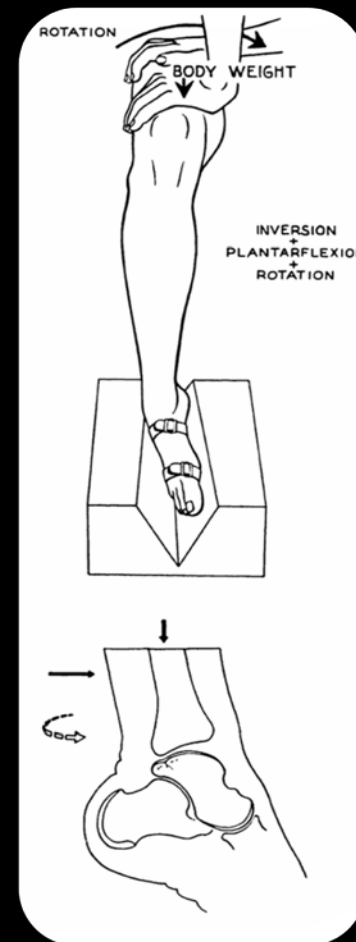
**Osteochondral
defects (OCD)**

Defect types

Lateral



Medial



Defect types

Unclair etiology

Chronic lesions

Slow development

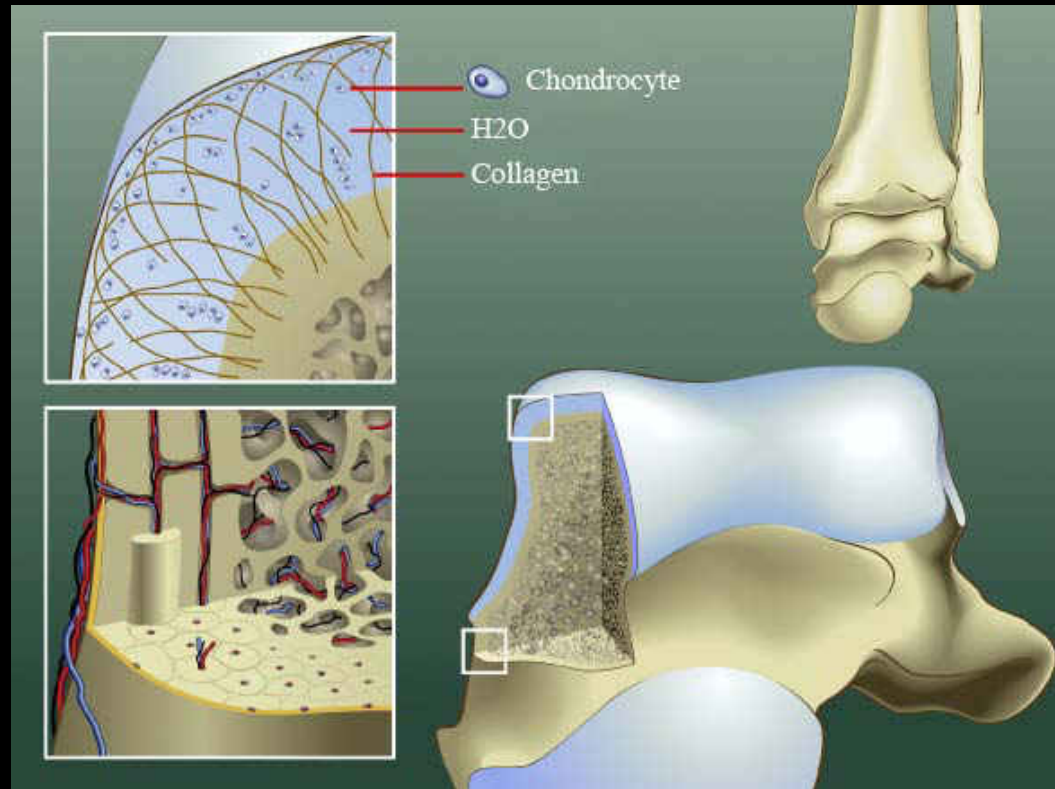
Painful



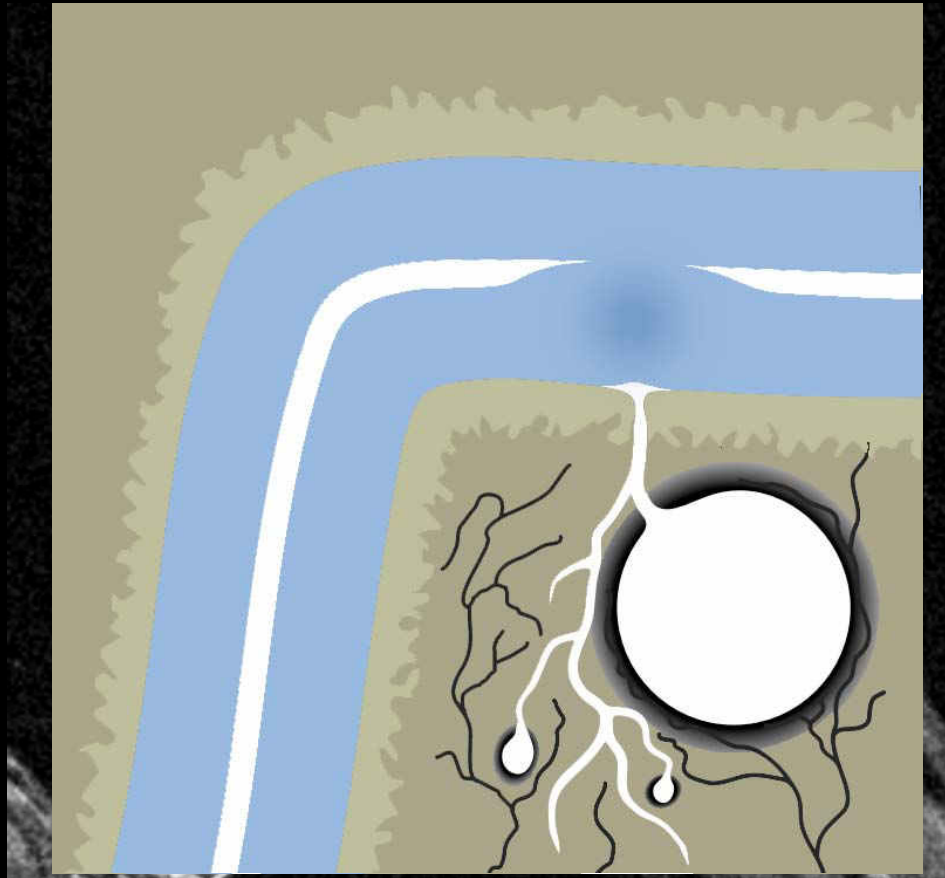
$\pm 50\%$

Progressive

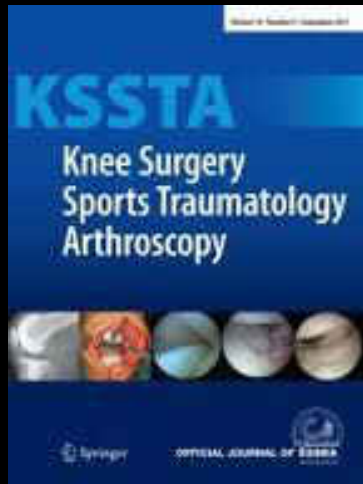
Cartilage



Natural history



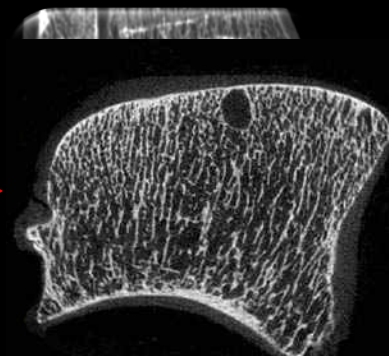
Subchondral bone



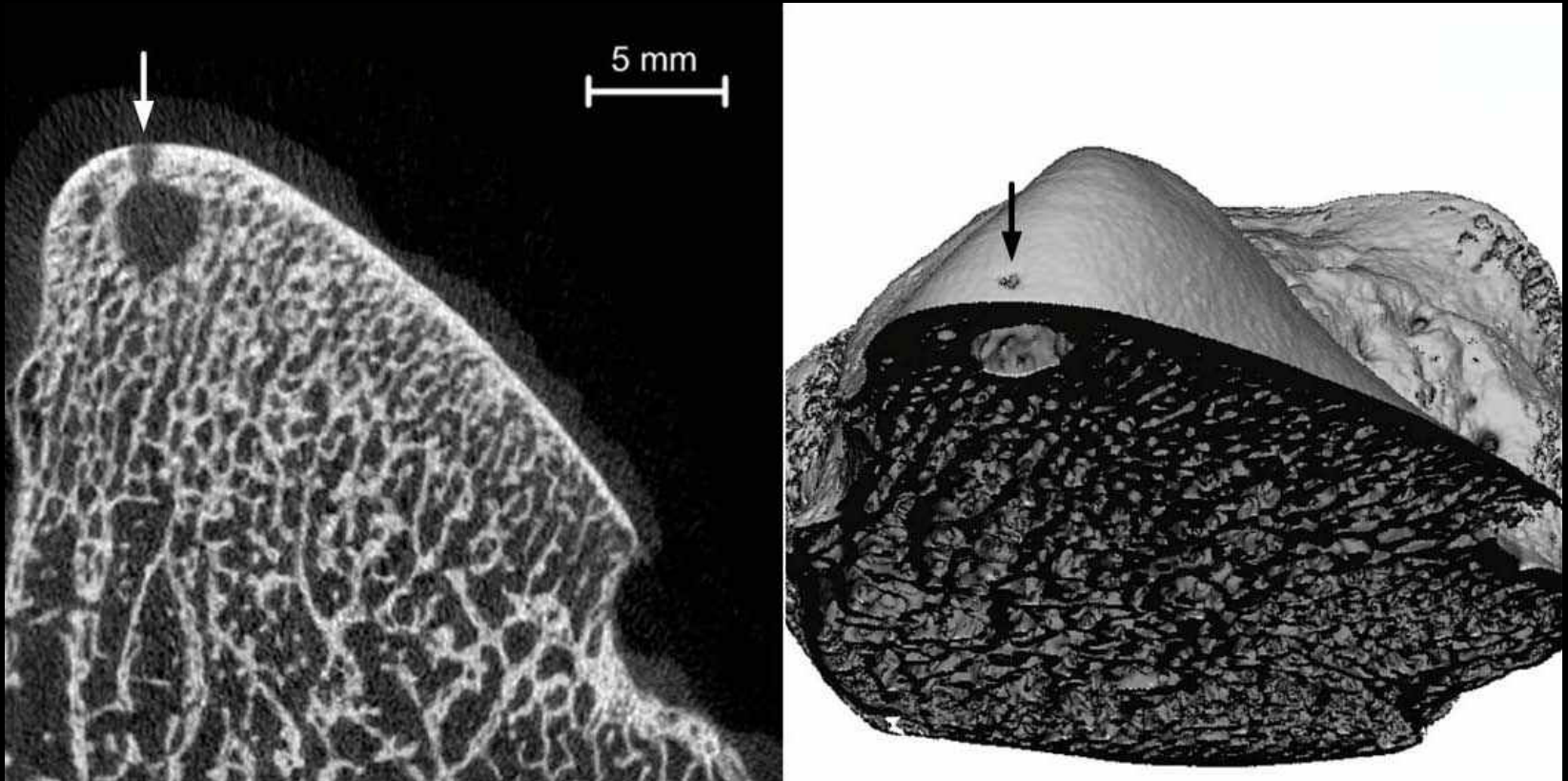
Morphological analysis of subchondral talar cysts on microCT

M. L. Reilingh • L. Blankevoort • I. C. M. van Eekeren •
C. N. van Dijk

66 ankles with analysis

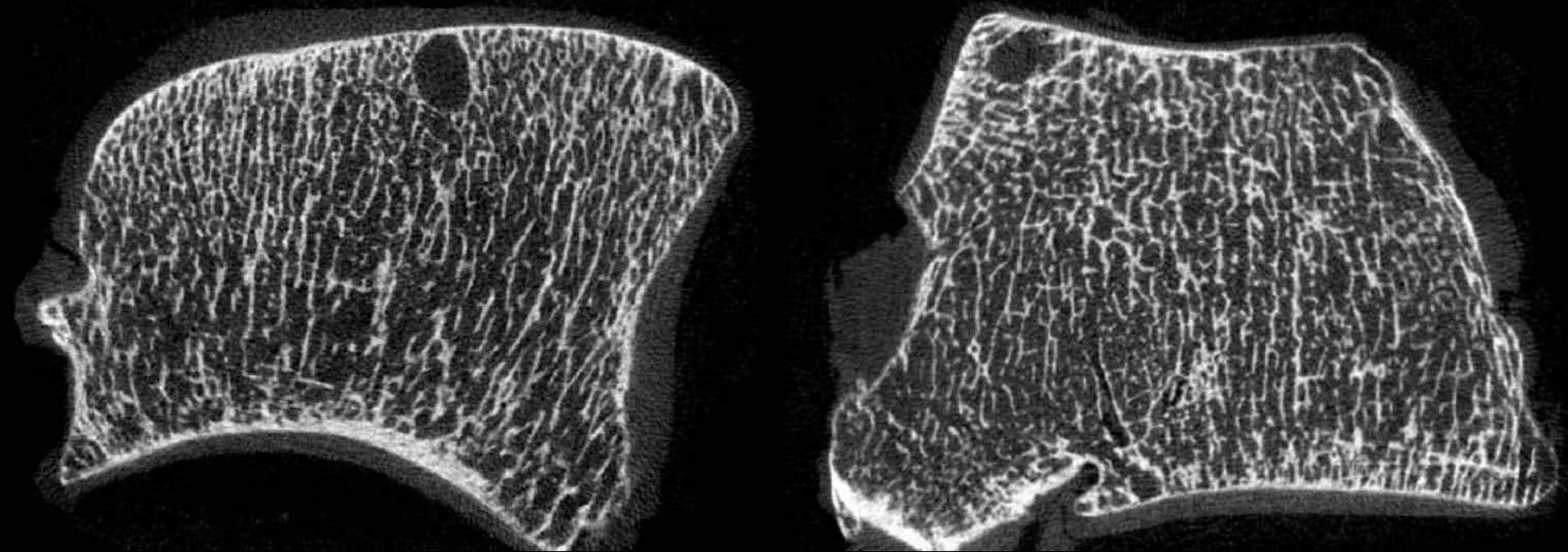


Subchondral bone



4 of the 6 cysts had a clear opening on microCT

Subchondral bone



2 cysts were rounded, and 4 cysts had an irregular shape

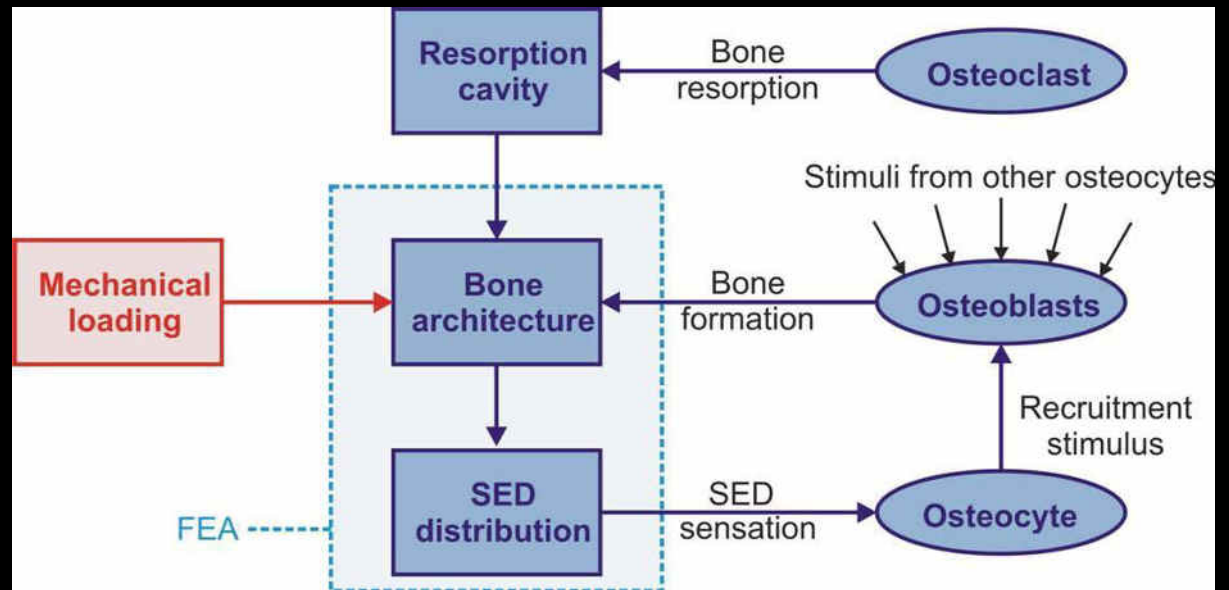
Pressurized fluid



The role of pressurized fluid in subchondral bone cyst growth

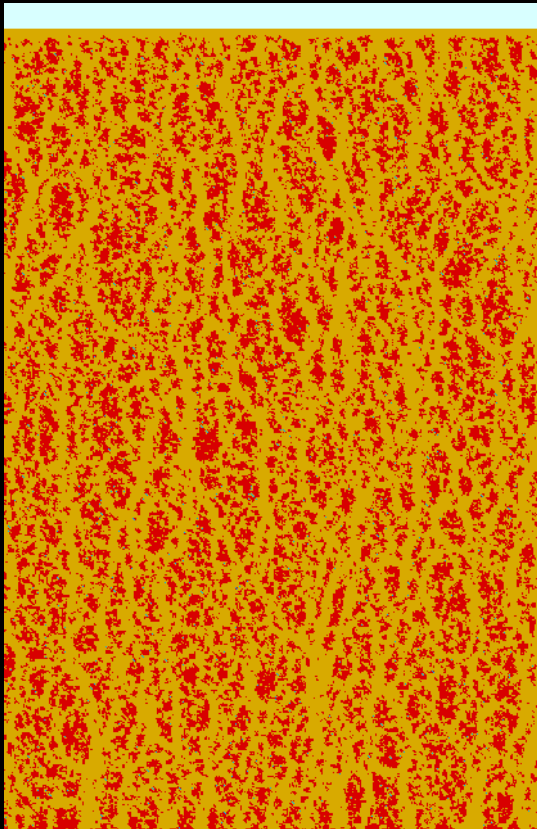
L.G.E. Cox^a, M.W. Lagemaat^a, C.C. van Donkelaar^{a,*}, B. van Rietbergen^a, M.L. Reilingh^b, L. Blankevoort^b, C.N. van Dijk^b, K. Ito^a

Mechanoregulated bone adaptation model

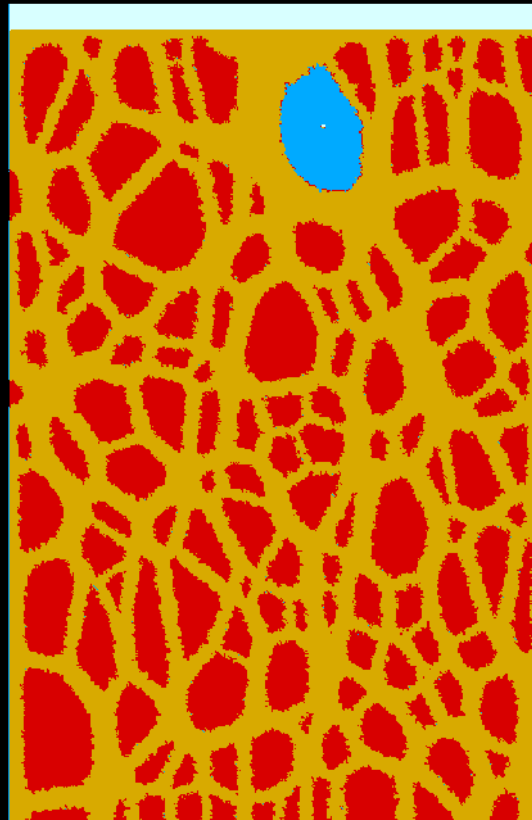


Pressurized fluid

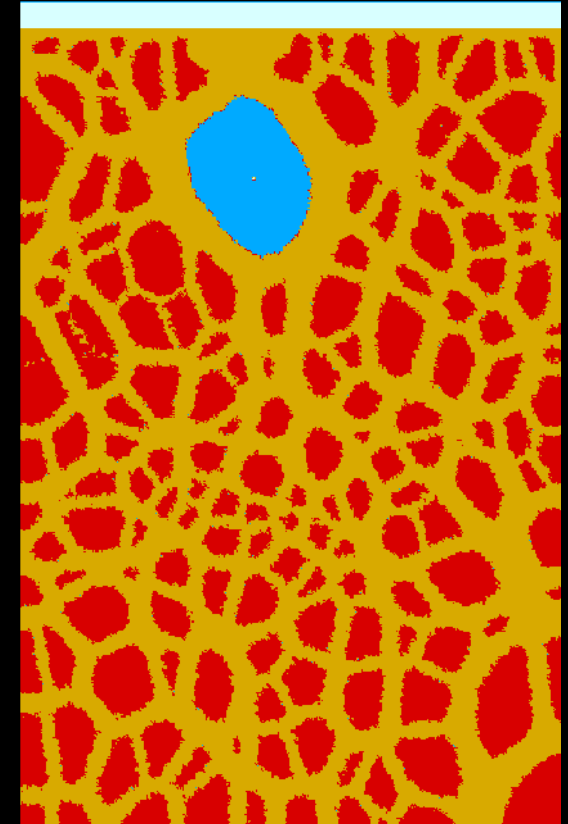
■ cartilage
■ bone
■ marrow



No changes



$P_{\text{fluid}} = 1.8 \text{ Mpa}$ (80 days)



Pressure release (80 days)

Natural history



Is Antegrade Transmalleolar Drilling Method for Osteochondral Lesion of Talus Necessary? Iatrogenic Cystic Formation at the Tibia: A Report of Five Cases

Jae Young Kim, MD, Francis Joseph V. Reyes, MD*, Young Yi, MD, Woo-Chun Lee, MD



Preop

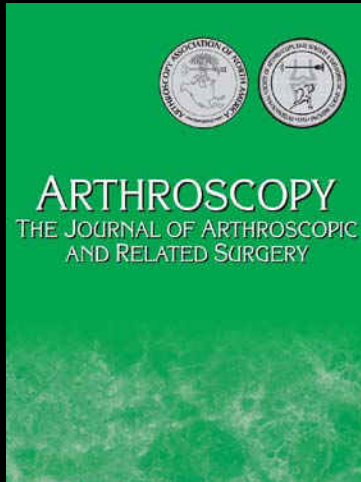


8 months postop



3 years postop

Natural history



Magnetic Resonance Imaging Evidence of Postoperative Cyst Formation Does Not Appear to Affect Clinical Outcomes After Autologous Osteochondral Transplantation of the Talus

Ian Savage-Elliott, B.A., Niall A. Smyth, M.D., Timothy W. Deyer, M.D., Christopher D. Murawski, B.S., Keir A. Ross, B.S., Charles P. Hannon, B.S., Huang T. Do, M.S., and John G. Kennedy, M.D., M.Ch., M.M.Sc., F.R.C.S.(Orth)



65% cysts
after OATS

Cysts & pain



Natural History of Nonoperatively Treated Osteochondral Lesions of the Talus

Georg Klammer, MD¹, Gerardo J. Maquieira, MD¹, Silke Spahn, MD¹,
Vanessa Vigfusson, MD¹, Marco Zanetti, MD¹, and Norman Espinosa, MD¹

Purpose: evaluate nonoperative treated minimal symptomatic talar OCDs

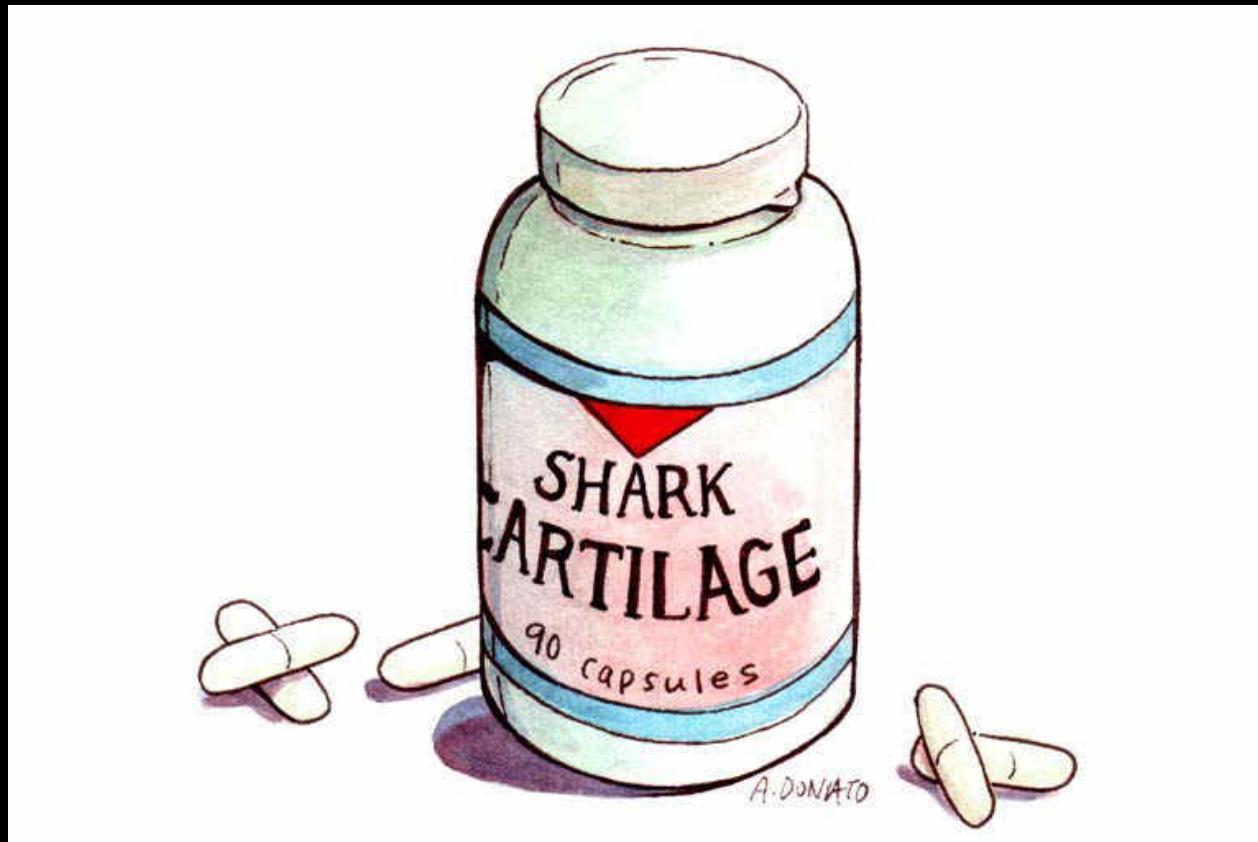
Study design: retrospective case series, n = 48

Follow-up: 4 years (mean)

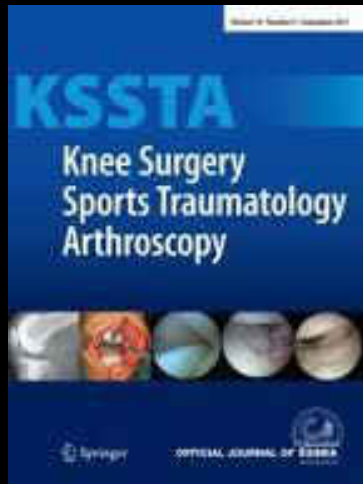
Outcome: MRI (preop and final FU), and VAS pain score (0-10)

Results: 41 of 48 minimal symptomatic, **cyst formation → ↑ pain scores**

Treatment



Treatment



No superior treatment for primary osteochondral defects of the talus

Jari Dahmen^{1,2,3} · Kaj T. A. Lambers^{1,2,3} · Mikel L. Reilingh^{1,2,3} · Christiaan J. A. van Bergen^{1,2,3,4} · Sjoerd A. S. Stufkens^{1,2,3} · Gino M. M. J. Kerkhoffs^{1,2,3}

52 studies, n = 1236

No superior surgical treatment for secondary osteochondral defects of the talus

Kaj T. A. Lambers^{1,2,3} · Jari Dahmen^{1,2,3} · Mikel L. Reilingh^{1,2,3} · Christiaan J. A. van Bergen^{1,2,3,4} · Sjoerd A. S. Stufkens^{1,2,3} · Gino M. M. J. Kerkhoffs^{1,2,3}

21 studies, n = 301

Treatment

Simple technique

Low complication rate

1-Stage technique

‘Short’ rehab

82% success



$\varnothing < 15 \text{ mm}$

Treatment



Comparison of Arthroscopic Microfracture for Osteochondral Lesions of the Talus With and Without Subchondral Cyst

Keun-bae Lee,^{*†} MD, PhD, Hyeong-won Park,[†] MD, Hyun-jong Cho,[†] MD, and Jong-keun Seon,[†] MD, PhD

Purpose: evaluate the outcome after microfracture for talar OCDs +/- cysts

Study design: cohort study, cyst group (n = 45) vs noncyst group (n = 57)

Follow-up: 4 years (mean)

Outcome: AOFAS (0-100), VAS pain score (0-10), Ankle Activity Score (0-10)

Treatment



Comparison of Arthroscopic Microfracture for Osteochondral Lesions of the Talus With and Without Subchondral Cyst

Keun-bae Lee,^{*†} MD, PhD, Hyeong-won Park,[†] MD, Hyun-jong Cho,[†] MD, and Jong-keun Seon,[†] MD, PhD

Outcome Measure	Cyst Group	Noncyst Group	<i>P</i> Value ^b
AOFAS			
Preoperative	64.8 (45-72)	66.2 (45-70)	.499
Final follow-up	91.8 (75-100)	91.3 (75-100)	.232
VAS			
Preoperative	7.5 (5-9)	7.3 (5-8)	.334
Final follow-up	2.3 (0-4)	2.2 (0-4)	.998
AAS			
Preoperative	2.7 (2-4)	2.6 (2-4)	.589
Final follow-up	6.7 (5-8)	6.5 (5-8)	.433
Lesion size, mm ²	100.9	99.3	.801

Conclusion: arthroscopic microfracture showed similar good clinical results

Pitfalls of D&M



Treatment



Computed tomography analysis of osteochondral defects of the talus after arthroscopic debridement and microfracture

M. L. Reilingh¹ · C. J. A. van Bergen¹ · L. Blankevoort¹ · R. M. Gerards¹ ·
I. C. M. van Eekeren¹ · G. M. M. J. Kerkhoffs¹ · C. N. van Dijk¹

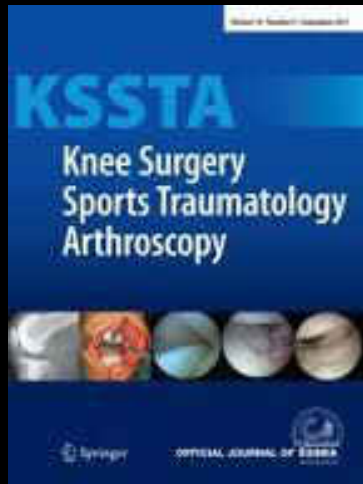
Purpose: evaluate the dimensional changes and bony healing after D&M

Study design: prospective case series, n = 58 (cystic, n = 27)

Follow-up: preop, 2 weeks postop, 1 year postop

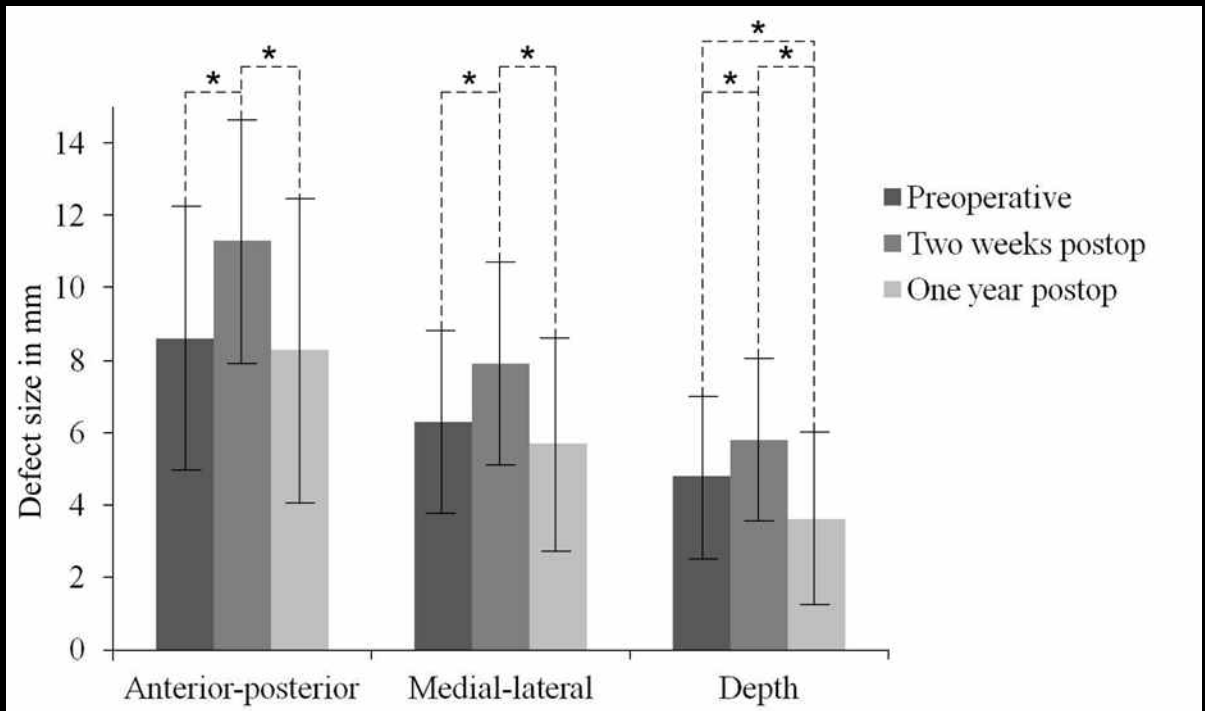
Outcome: CT-scans, AOFAS (0-100), VAS pain score (0-10)

Treatment

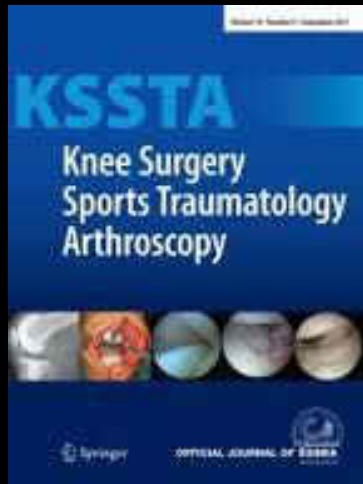


Computed tomography analysis of osteochondral defects of the talus after arthroscopic debridement and microfracture

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I. C. M. van Eekeren¹ · G. M. M. J. Kerkhoffs¹ · C. N. van Dijk¹

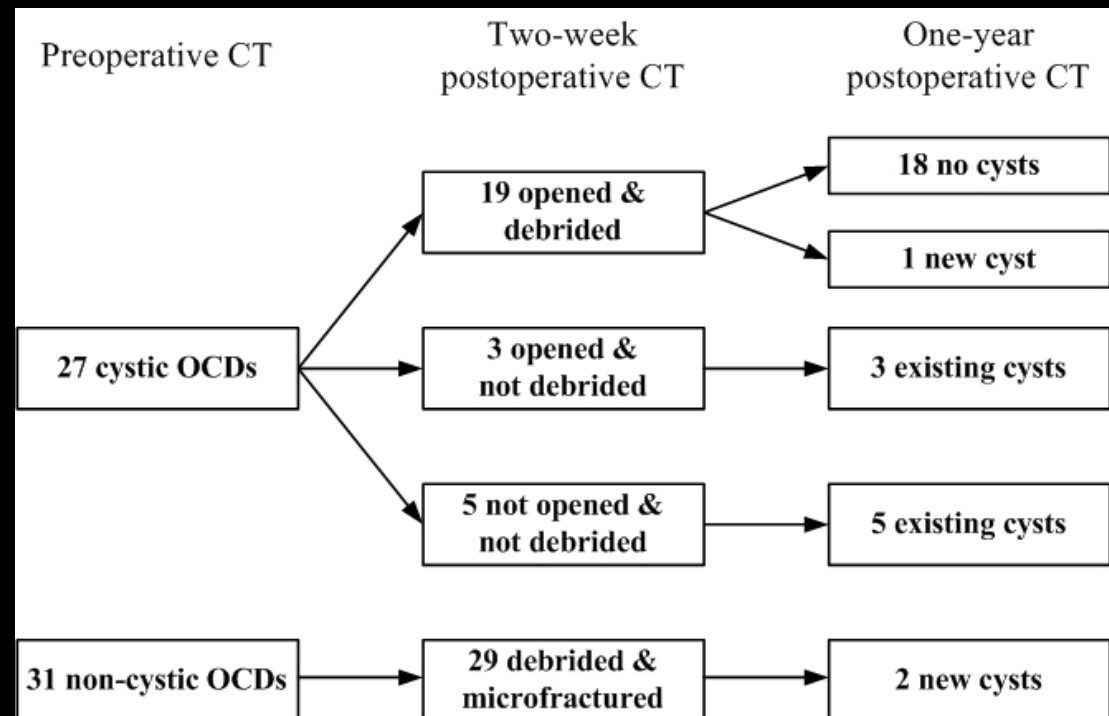


Treatment

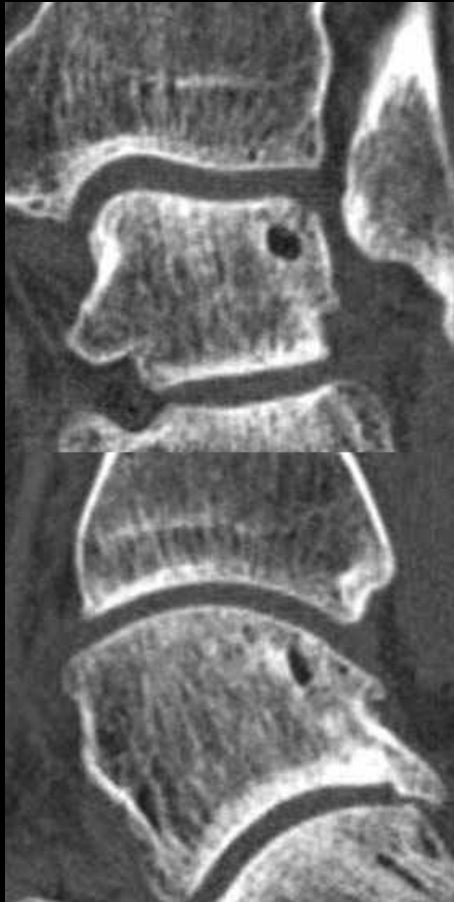


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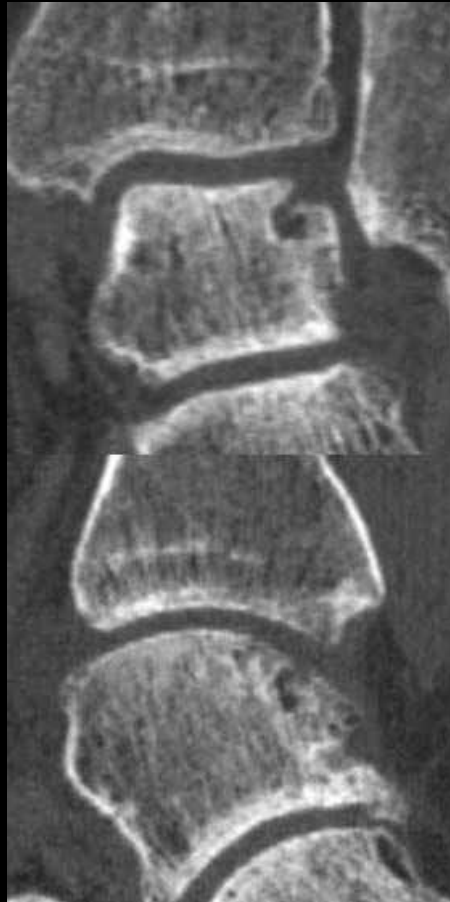
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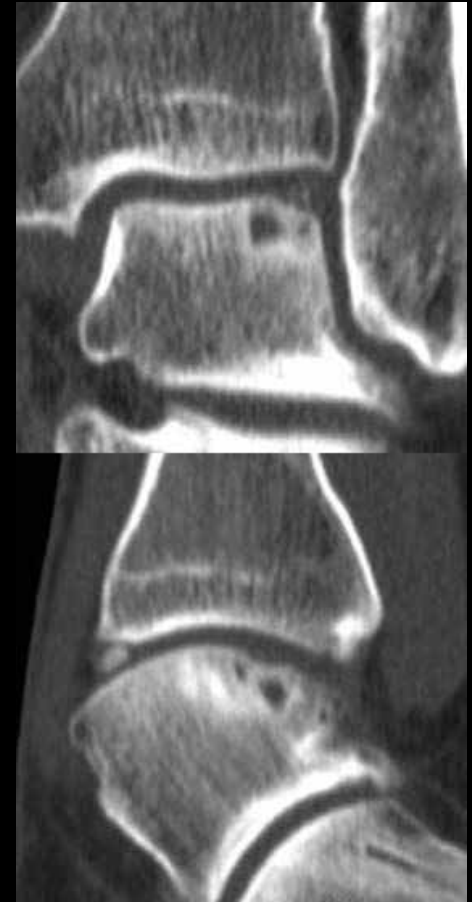
Treatment



Preop

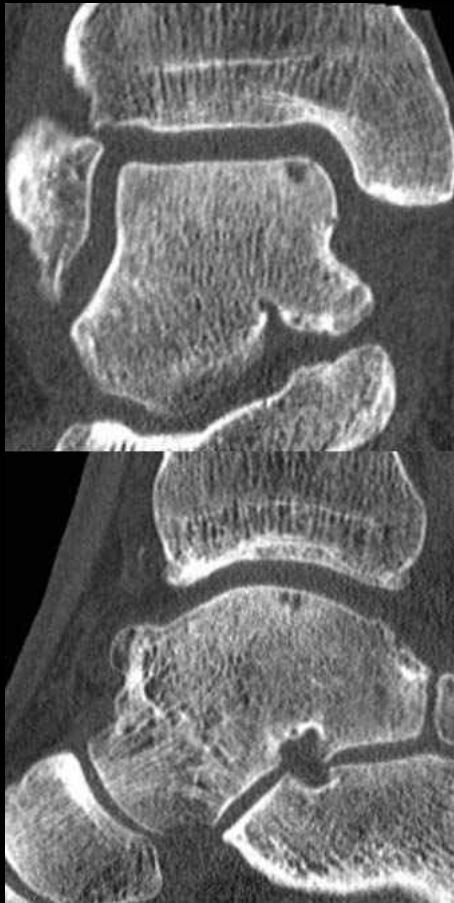


2 weeks postop

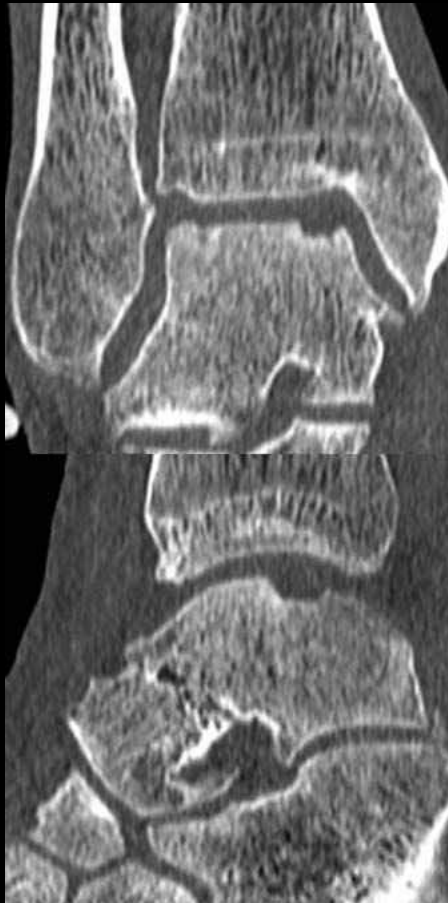


1 year postop

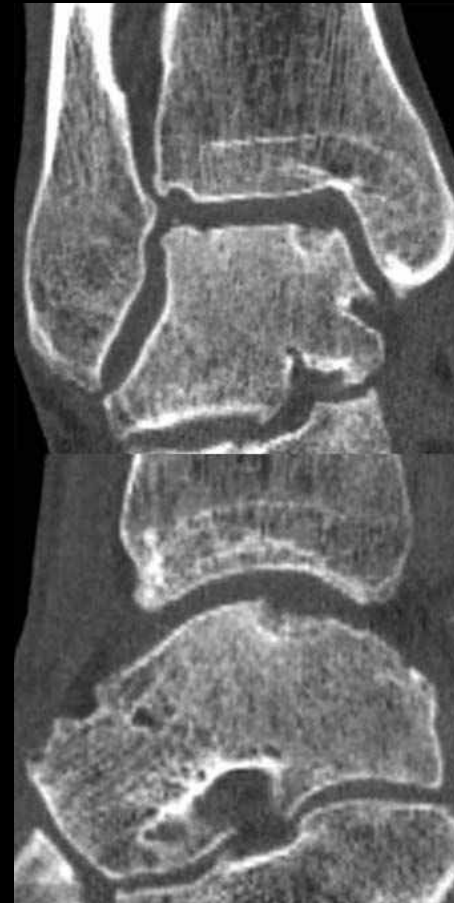
Treatment



Preop



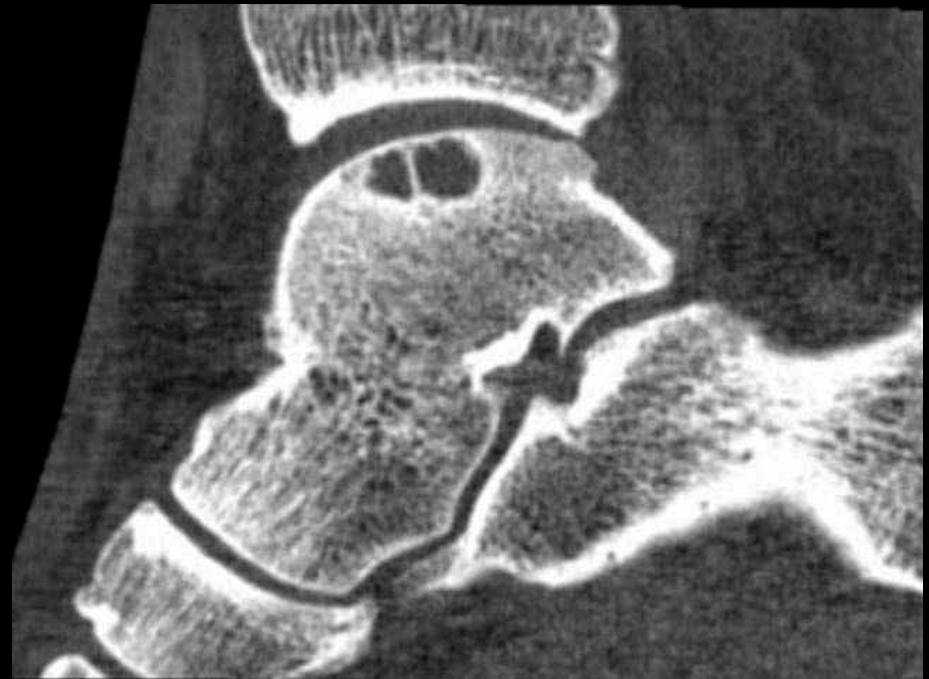
2 weeks postop



1 year postop

75% incomplete filling at one year follow-up

Treatment



Preoperative OCD (10 x 13 x 9 mm)

Treatment



2 weeks postoperative

Treatment



1 year postoperative

Treatment

Treatment of Large Cystic Medial Osteochondral Lesion of Talus With Autologous Osteoperiosteal Cylinder

YueLin Hu, M.D., QinWei Guo, M.D., Chen Jiao, M.D., Yu Mei
JiaNing Wang, M.D., and Zhuozhao 7¹

Osteochondral Autograft Transfer Combined With Cancellous Allograft for Large Cystic Osteochondral of the Talus

Yuan Zhu, MD¹, and Xian

Treatment
previo

van Bergen L.

Treatment of Large Cystic Medial Osteochondral Lesion of the Talus With Autologous Osteoperiosteal Cylinders

YueLin Hu, M.D., QinWei Guo, M.D., Chen Jiao, M.D., Yu Mei, M.D., JiaNing Wang, M.D., and Zhuozhao Zhang, M.D.

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MD¹, and Xian

No superior surgical treatment for secondary osteochondral defects of the talus

Lambers^{1,2,3}, Jari Dahmen^{1,2,3}, Mikel L. Reilingh^{1,2,3}, Christiaan J. A. van Bergen^{1,2,3,4}, J. J. van den Broek^{1,2,3}, Gino M. M. J. Kerkhoffs^{1,2,3}

talus with a metal resurfacing inlay implant

that Have Failed

Structure

Stephen A. B. Protzman, M.D., MHA, AACF, AACFAS

superior surgical effects of the talus

Kaj T. A. Lambers^{1,2,3} · Jari Dahmen^{1,2,3} · Mikel L. Ren
Sjoerd A. S. Stufkens^{1,2,3} · Gino M. M. J. Kerkhoffs^{1,2,3}

talus with a

levelt IN, van Dijk CN

on Osteochondral Allogra

En On Osteochondral Allografts for Large-Volume Cystic Osteochondral Defects of the Talus

By Steven M. Raikin, MD

Stephen A. Brigido, DPM, Nicole M. Protzman, MS, Melissa M. Galli, DPM, MHA, AACFAS, and Scott T. Bleazey, DPM, AACFAS

Defect types

Osteochondritis dissecans

Micro motion

Pre-existing

Non-union

Asymptomatic

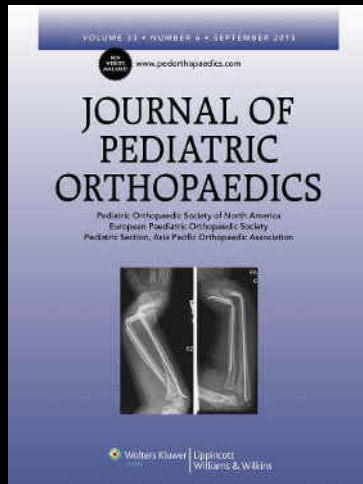


Ankle sprain

Healing potential



Juvenile OCDs



Juvenile Osteochondritis Dissecans of the Talus

Venkat Perumal, MD, Eric Wall, MD, and Nadir Babekir, MBBS

Purpose: evaluate the healing rate of OCDs in skeletally immature patients

Study design: retrospective study, n = 31 (type II and III lesions)

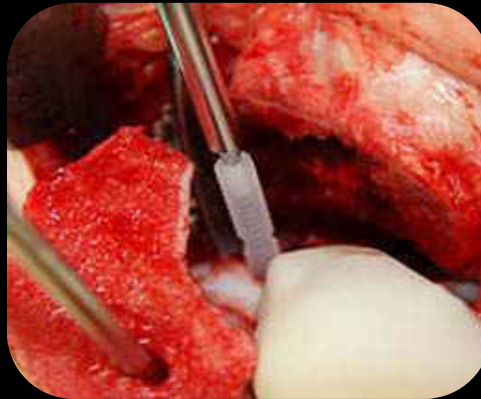
Follow-up: 6 months and 1 year (MRI or radiographs)

Results: 77% had no radiographic healing at 6 months, and 71% at 1 year

Treatment



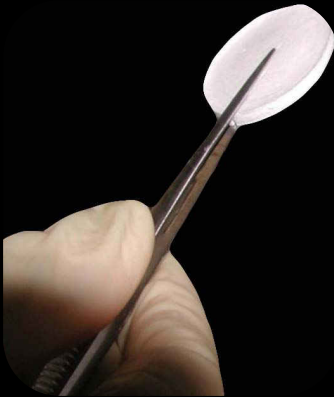
Debridement
& BMS



Fixation



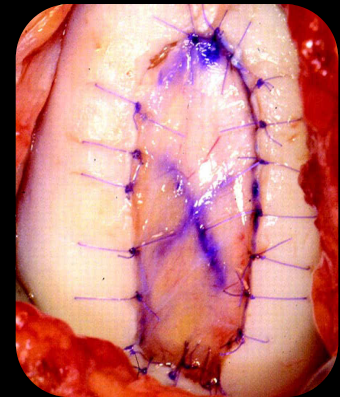
Retrograde drilling



Chondrogenesis inducing
techniques (CIT)



Osteochondral autograft
Transfer System (OATS)



Autologous chondrocyte
implantation (ACI)

Fixation

Preserve hyaline cartilage

Restore natural congruency

Treat larger defects

D&M is still possible after failed fixation

Indications

INTERNATIONAL CONSENSUS MEETING
ON CARTILAGE REPAIR OF THE ANKLE

November 17 and 18 Pittsburgh, PA



Primary OCDs

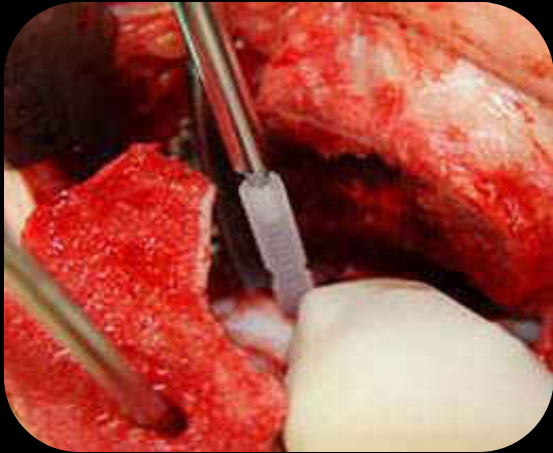
OCD > 10 mm in diameter

Fragment at least 3 mm thickness

Acute displaced fragment within 6 weeks

Non-displaced fragment after failed conservative treatment

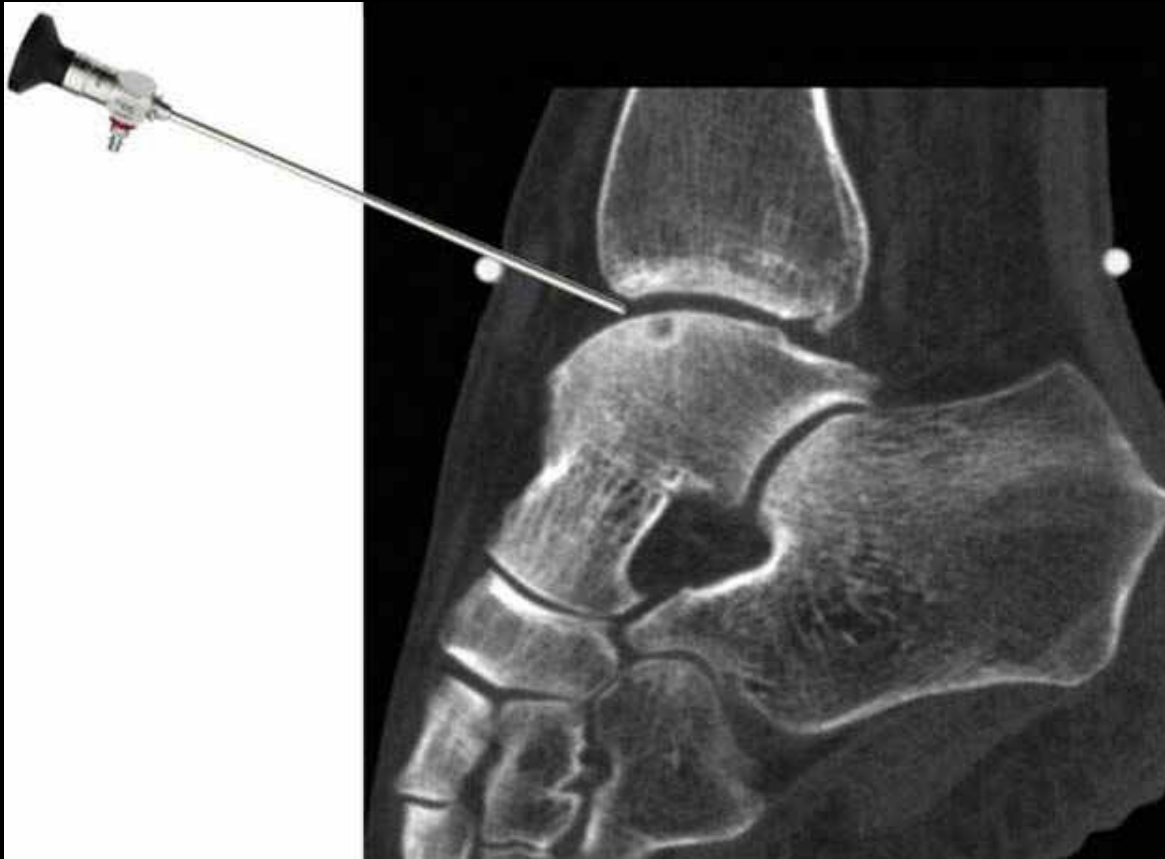
Open vs Scopic



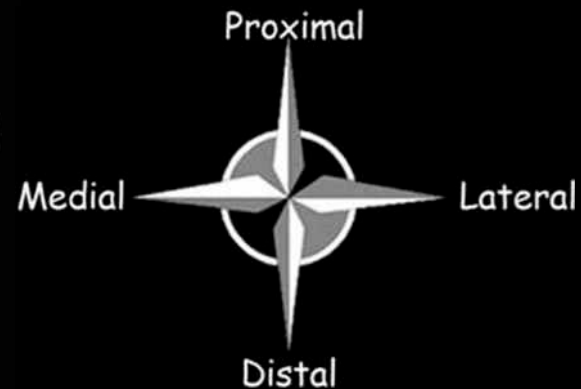
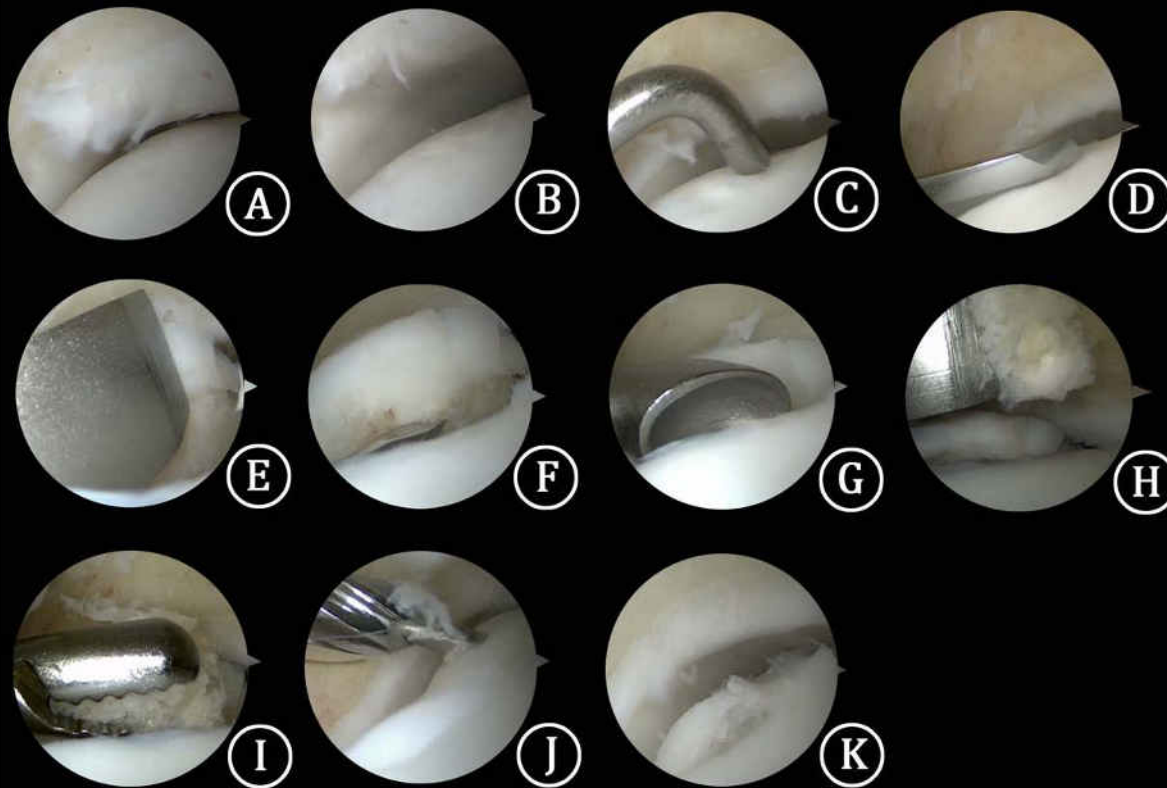
VS



Plantairflexion CT



Arthroscopic LDFF



Fixation vs D&M



The subchondral bone healing after fixation of an osteochondral talar defect is superior in comparison with microfracture

Mikel L. Reilingh^{1,2,3} · Kaj T. A. Lambers^{1,2,3} · Jari Dahmen^{1,2,3} ·
Kim T. M. Opdam^{1,2,3} · Gino M. M. J. Kerkhoffs^{1,2,3}

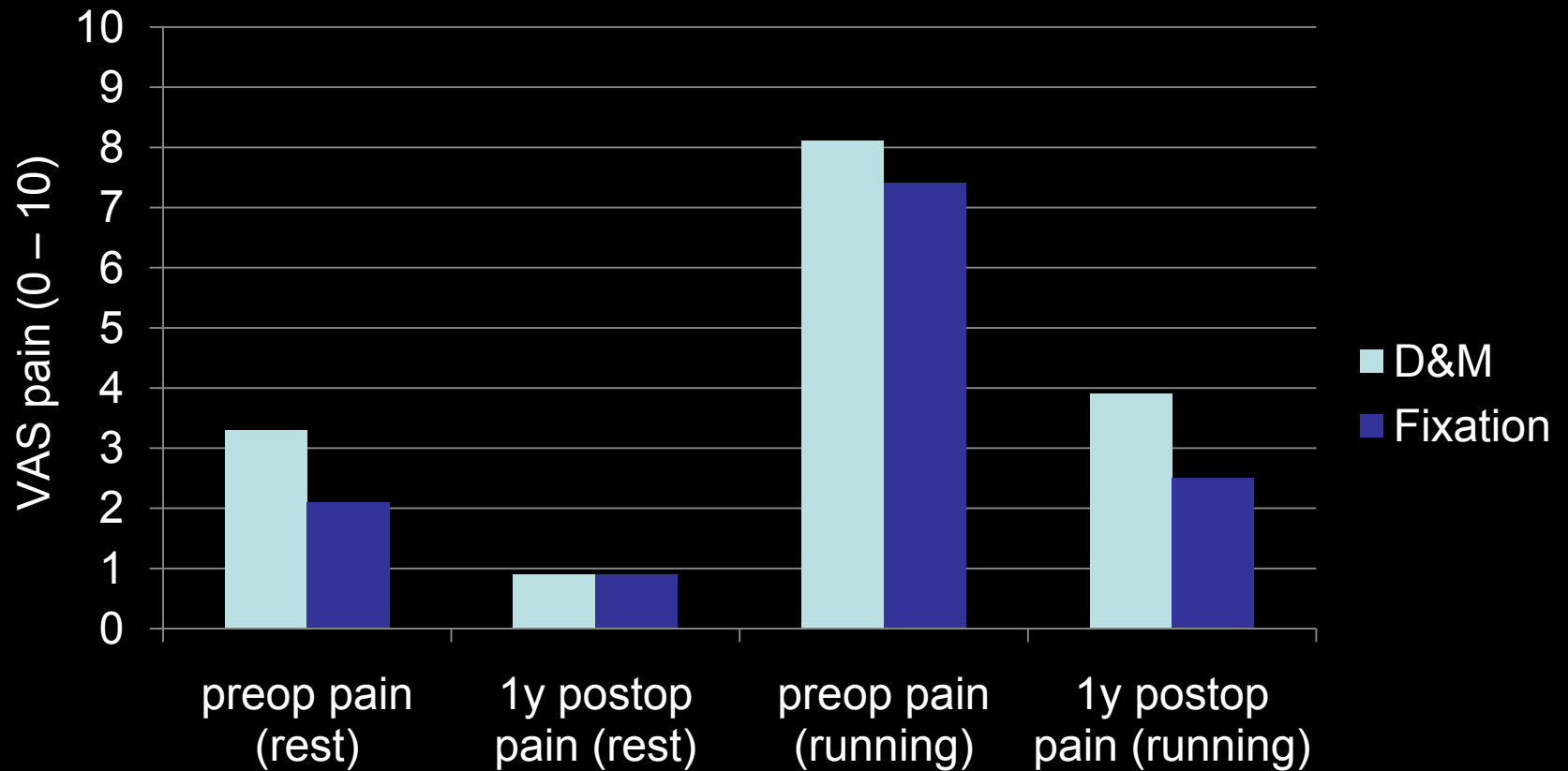
Purpose: compare arthroscopic fixation with D&M in primary fixable defects

Study design: case control study, n = 14 in both groups

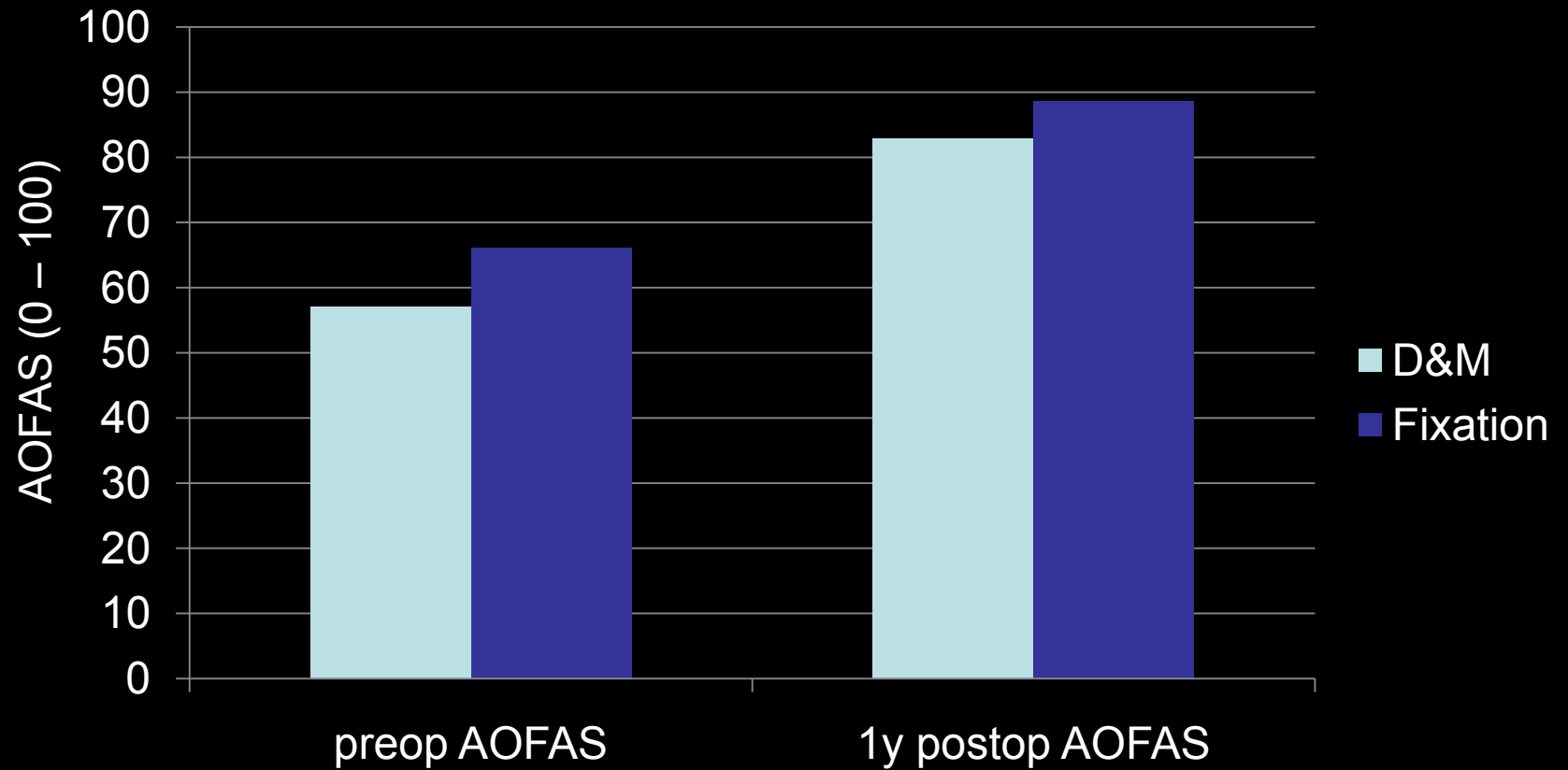
Follow-up: 1 year (mean)

Outcome: CT (preop and 1 year), AOFAS (0-100), VAS pain score (0-10)

Clinical results



Clinical results



Imaging results

	D&M n = 14	Fixation n = 14	
Level of bone plate, n (%)			$p = 0.02$
- Depressed	11 (79)	4 (29)	
- Flush	3 (21)	10 (71)	



pre and 1y postop
after D&M



pre and 1y postop
after fixation

Summary

Pressurized fluid plays an important role in cyst formation

Arthroscopic D&M has a good clinical outcome in
small cystic and non-cystic talar OCDs

The healing of the subchondral bone plate is
poor after arthroscopic D&M

The subchondral bone plate restores significantly
better after fixation in comparison with D&M

