Naviculocuneiform joint: “non essential joint” that is essential to address

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Disclosure

OrthoHelix midfoot fusion plate on the video - primary designer
Goals:

• Why naviculocuneiform joint
• Review anatomy
• Discuss clinical evaluation
• Discuss indication and rationale for NC arthrodesis
• View video
• Discuss post-op care/complication
• Take home pearls
My Experience: Midfoot neglect
My Experience: Midfoot neglect
My Experience: Midfoot neglect again

Post op 10 day TAR
Post op 3+ years double fusion

Post op 12 wks TAR
Post op 3+ years double fusion
My Experience: Midfoot neglect again

Post op 6 months TAR
Post op 3+ years double fusion
Anatomy
Naviculocuneiform joints are “unnecessary, flat joints with no important motion.”
So how important or unimportant is naviculocuneiform joints.....

“Results demonstrated in intact specimens that the naviculocuneiform, first metatarsocuneiform, and talonavicular joints contributed an average of 50%, 41%, and 9% of total first ray sagittal plane range of motion, respectively.”

Biomechanics of the first ray. Part IV: The effect of selected medial column arthrodeses. A three-dimensional kinematic analysis in a cadaver model. Roling BA, Christensen JC, Johnson CH J FAS 2002
Clinical exam

- Careful/focal palpation on NC joint, TN joint, 1st MC joint, TA tendon, Spring Ligament
- Check hypermobility/instability of NC joint while hindfoot is in supinated, neutral, pronated setting
- Weight bearing exam – assess planal dominance
Clinical exam - “normal” NC joint
Clinical exam - unstable NC joint
Radiographic Exam

Meary’s angle
angle > 4 degrees - pes cavus
angle > 4 degrees - pes planus
Assess severity of the deformity
angle < 15 degrees - mild deformity
angle 15-30 degrees - moderate deformity
angle > 30 degrees - severe deformity

NC sag
Arthrosis
Treatment:

- Stable/supportive shoes
- OTC insert – Superfeet, Sole insert etc.
- Custom orthotic
- Injections - corticosteroid, Prolotherapy (dextrose)?
- Surgery - arthrodesis (primary or adjunctive)
My experience: Midfoot nonunion-poor fixation & not address the lateral NC jt?
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My experience: Midfoot nonunion-poor fixation?
My experience: Can I do better?
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So what happen?

1. Patient noncompliant?
2. Poor surgical execution?
3. Wrong place/wrong time?
4. Inadequate fixation?
Joint Curettage arthrodesis technique

Results show a residual layer of calcified cartilage overlying the subchondral plate interface on all osteochondral specimens after joint curettage. This suggests there is a natural histological barrier that may interfere with arthrodesis consolidation.

Johnson JT, Schuberth JM, Thorton SD, Christensen JC: JFAS 2009
Vitamin D deficiency and union rate

Vitamin D deficiency and nonunion in foot and ankle surgery

Published 18 November 2014

Vitamin D was deficient on 50% on nonunion and 21% on union on ankle, triple and 1st MTPJ arthrodesis

Conclusions: Our early results show a significant association of serum vitamin D levels with likelihood of nonunion, and we continue to collect data. There is a high

Methods: We sent serum vitamin D levels on consecutive post-operative patients seen in clinics between January and May 2014. They included those with an arthrodesis of
Vitamin D

UVB → Pre-Vit D₃

7-dehydro cholesterol → Pre-Vit D₃

Skin

Liver → 25-hydroxy Vitamin D₃

Kidney → 1,25-hydroxy Vitamin D₃
Wrong season/latitude – Vit D

✓ Check for Vit. D
✓ Check Ca++

Except during the summer months, the skin makes little if any vitamin D from the sun at latitudes above 37 degrees north (in the United States, the shaded region in the map) or below 37 degrees south of the equator. People who live in these areas are at relatively greater risk for vitamin D deficiency.
My experience: Can I do better?
Current approach - JC (22)
Current approach - JC (22)
Post-operative care:

- 6 weeks of non-weight bearing
- Transitional WB with cast boot for 1-2 wks with insert or orthotic
- 325 mg ASA for DVT prophylaxis
- Early mobilization of ankle/leg/knee
My experience:

- Performed 156 NC joint arthrodesis (05 -17)
- Use joint distractor
- Prepare all three joint surface
- Thorough preparation of subchondral plate
- Check Vit D/Ca level
- Consider orthobiologics (Osteocel)
- Protect TA tendon
My experience: post op 3 wks – pt fell
Summary

- Naviculocuneiform joint is ESSENTIAL when unstable
- Biology (Vit D/Ca++, nutrition, UVB exposure, PMH)
- Compression with neutralization fixation may be better
- Smoking history
- Compliance - NWB
- Neuropathy
- Cost ( $ or time)
- Post op risk factor (DVT)
CONCLUSION
Thank You
Vitamin D 25-Hydroxy

Deficiency: < 10 ng/ml
Insufficiency: 10-30 ng/ml
Sufficiency: 30-100 ng/ml
Toxicity: > 100 ng/ml

Recommended daily D3 age 50+:
600-800 IU, some experts - 1000-2000 IU
Max: 4000 IU
Daily Ca++ 1200mg

Replacement:
Loading Dose: Vit D3 – 1,000 IU qd/10ng/ml short for 6 weeks
Repeat Vit D 25 level after course
Recommended level is 40 -60ng/ml