

MIDFOOT ARTHRITIS:
WHAT TO DO WITH THE
N-C & 4-5 TMT ?

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DISCLOSURES



Ø 3B: BESP, INC. (CONSULTANT)

Ø EXTREMITY MEDICAL, INC.


NAVICULOCUNEIFORM
ARTHRITIS

NON-ESSENTIAL JOINTS

Ø 1-3 TMT


Ø NAVICULOCUNEIFORM

Ø KEY ROLE IN MEDIAL COLUMN STABILITY




LISFRANC VARIANT PATTERN

Ø LEWIS & ANDERSON, FAI 37, 2016



OFTEN APEX OF DEFORMITY IN MIDFOOT-DRIVEN FLATFOOT

Ø CHI, ET AL: CORR 365, 1999



N-C ARTHRODESIS

∅ ~ HIGHEST NONUNION RATE OF ARTHRODESES IN FOOT & ANKLE

∅ (ONGOING COLLECTION) 2005-2015

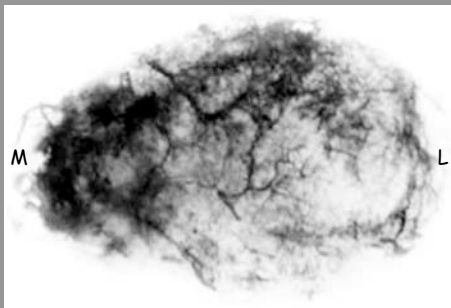
∅ 84 FUSIONS INCLUDED N-C JNT

∅ ~20% NONUNION RATE

∅ YOUNG, ET AL: UNPUBLISHED DATA

NAVICULAR

∅ LIMITED INHERENT VASCULARITY



METICULOUS JOINT PREP

∅ THOROUGH CARTILAGE REMOVAL

∅ PRESERVE SUBCHONDRAL PLATE



∅ DRILL HOLE PERFORATIONS / OSTEOTOME FEATHERING



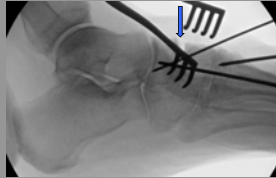
ROLE OF ORTHOBIOLOGICS

Ø PRP / BONE VOID FILLER

Ø GROWTH FACTORS

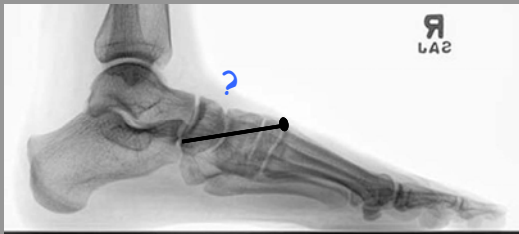
Ø STEM CELLS

Ø CANCELLOUS AUTOGRAFT



FIXATION

Ø LIMITED OPTIONS FOR QUADRICORTICAL SCREW FIXATION WITHOUT VIOLATION OF T-N JNT




FIXATION OPTIONS


Ø LAG SCREWS ALONE




FIXATION OPTIONS
Ø LAG SCREWS & NON-LOCKING PLATE



FIXATION OPTIONS
Ø LOCKING PLATE(S)

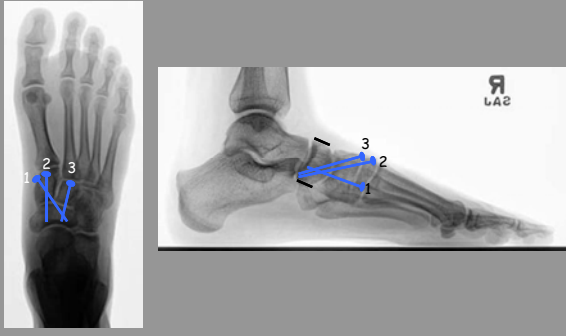


MY PREFERENCE
Ø LAG SCREWS & LOCKING PLATE(S)



LAG SCREWS & LOCKING PLATE

Ø LAG SCREWS BELOW "EQUATOR"



LAG SCREWS & LOCKING PLATE

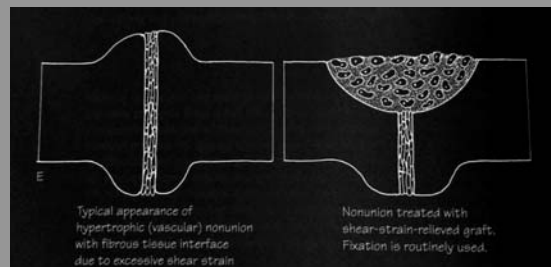
Ø LOCKING PLATE ACTS AS BUTTRESS

Ø PROTECTION OF LAG SCREWS



SHEAR-STRAIN RELIEF GRAFT

Ø INDUCE SPOT-WELD AT INTERFACE



Ø HANSEN, 2000

SUMMARY

- ∅ ~ HIGHEST NONUNION RATE
- ∅ LIMITED INHERENT VASCULARITY
- ∅ CANCELLOUS AUTOGRAFT
- ∅ LAG SCREWS BELOW EQUATOR
- ∅ LOCKING PLATE AS BUTTRESS

4-5 TMT ARTHRITIS

ESSENTIAL JOINTS

- ∅ ANKLE
- ∅ SUBTALAR
- ∅ TALONAVICULAR
- ∅ CALCANEOCUBOID
- ∅ 4 & 5 TMT



4-5 TMT

- ∅ PRIMARY FUNCTION OF SAGITTAL PLANE MOTION WITH ROTATION
- ∅ COMBINE WITH ST-TN-CC JNTS TO ACCOMMODATE UNEVEN GROUND
- ∅ ARTHRITIS RELATIVELY UNCOMMON

4-5 TMT ARTHRITIS

- ∅ PRIMARY OSTEOARTHRITIS
- ∅ ~ 40% OF CASES
- ∅ OFTEN DECEPTIVE ON XR



4-5 TMT ARTHRITIS

- ∅ POST-TRAUMATIC
- ∅ UNTREATED/UNDERTREATED LATERAL COLUMN INJURIES
- ∅ ~ 60% OF CASES
- ∅ OFTEN WITH LOSS OF COLUMN LENGTH



BEWARE OF CAVUS FOOT

∅ PREDISPOSITION TO LATERAL COLUMN OVERLOAD



4-5 TMT ARTHRODESIS

- ∅ GENERALLY NOT WELL TOLERATED
- ∅ ↓ ACCOMODATION TO UNEVEN GROUND
- ∅ C-C JNT: ↑ COMPENSATORY MOTION
- ∅ BEST TO AVOID

4-5 INTERPOSITION ARTHROPLASTY


- ∅ FIRST DESCRIBED IN 2002
- ∅ ALTERNATIVE TO ARTHRODESIS
- ∅ PRESERVES ESSENTIAL MOTION
- ∅ RESOLVES ARTHRITIC PAIN
- ∅ ~ DECEPTIVELY GOOD RESULTS

TENDON INTERPOSITION

Ø BERLET, ET AL: FAI 23, 2002

Ø P TERTIUS OR 4TH EDL

Ø 12 PTS / GOOD RESULTS




SPHERICAL CERAMIC BALL IMPLANTS

Ø SHAWEN, ET AL: FAI 28, 2007

Ø 11 PTS / GOOD RESULTS

Ø POSSIBILITY OF SUBSIDENCE (?)



MY PREFERENCE

Ø ALLOGRAFT TENDON INTERPOSITION

Ø ABLE TO PRESERVE / RESTORE LATERAL COLUMN ELASTICITY

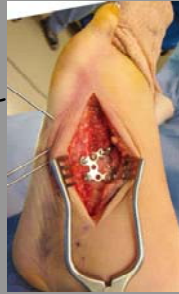


APPROACH

Ø STANDARD CUBOID FX APPROACH

Ø EDB / PERONEAL INTERVAL

Ø MUST PRESERVE 4-5 IML

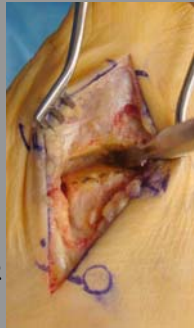


JOINT PREPARATION

Ø ENTIRE JOINT RESECTED

Ø ~ 4-5MM ON EACH SIDE

Ø MUST PRESERVE PLANTAR CAPSULAR RESTRAINTS



TENDON PREPARATION

Ø ALLOGRAFT SUTURED ON ITSELF

Ø OSTEOTOME OR MINI AO LAMINAR SPREADER

Ø DIAL IN COLUMN LENGTH



CASE EXAMPLE

Ø 26M / 6 MO S/P MCA / R FOOT INJURY

Ø TREATED ELSEWHERE FOR APPARENT COMPARTMENT SYNDROME OF FOOT

Ø ASSOCIATED FX TREATED IN CAST

Ø NOW PAIN WITH EVERY STEP

CHRONIC CUBOID MALUNION / 4-5 TMT SUBLX / PTOA



CHRONIC CUBOID MALUNION / 4-5 TMT SUBLX / PTOA



TREATMENT

- Ø 4-5 TMT ARTHROTOMY
- Ø ARTICULAR SURFACES ASSESSED:
ANKLYLOSED / NOT SALVAGEABLE
- Ø 4-5 TMT IPA





1.6MM K-WIRES



POSTOP PROTOCOL

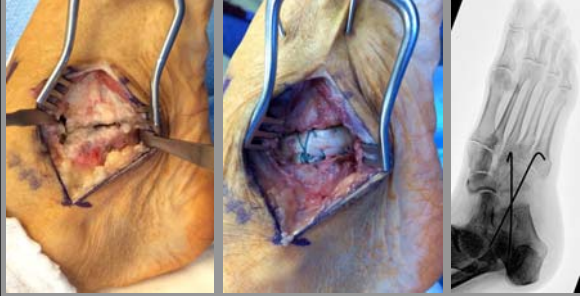
- Ø SPLINT / CAST IMMOBILIZATION
- Ø NONWEIGHTBEARING X 6 WEEKS
- Ø PINS REMOVED AT 6 WEEKS
- Ø BOOT / WEIGHTBEARING ADVANCED
- Ø PROGRESS TO REGULAR SHOE

FINAL XR



CAN ALSO BE USED FOR C-C

Ø 71F 1 YR S/P ATTEMPTED C-C FUSION



SUMMARY

Ø 4-5 TMT: ESSENTIAL JOINTS

Ø INTERPOSITION ARTHROPLASTY /
HAMSTRING ALLOGRAFT

Ø PRESERVE / RESTORE MOTION

Ø PRESERVE / RESTORE
LATERAL COLUMN LENGTH

REFERENCES

Ø LEWIS & ANDERSON, FAI 37, 2016

Ø CHI, ET AL: CORR 365, 1999

Ø YOUNG, ET AL: UNPUBLISHED DATA

Ø BERLET, ET AL: FAI 23, 2002

Ø SHAWEN, ET AL: FAI 28, 2007