Double Bone Block Medial Column Arthrodesis for Correction of a Dorsal Bunion Deformity

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Presentation:

“Double Bone Block Medial Column Arthrodesis for Correction of a Dorsal Bunion Deformity”

My disclosure is in the Final AOFAS Program Book. I have no potential conflicts with this presentation.
Background:

- Dorsal bunion deformity (DBD) is a complex, multi-planar deformity with dorsal angulation of the medial column and plantar flexion of the great toe MTP joint, first described by Lapidus in 1940.

- DBD historically has been observed as a result of poliomyelitis or in selected cases of cerebral palsy with tibialis anterior spasticity.

- DBD now typically occurs as a congenital anomaly or as an acquired deformity following surgical correction of clubfoot deformity.
Dorsal Bunion Pathomechanics

- Paralysis or weakness of the peroneus longus muscle with unopposed pull of the tibialis anterior causes dorsal angulation through the naviculocuneiform and the 1,2 intercuneiform joints.

- Imbalance between the flexors and extensors of the great toe can also result in plantar flexion of the great toe and secondary dorsiflexion of the first metatarsal.
Double Bone Block Medial Column Arthrodesis for Correction of a Dorsal Bunion Deformity

Study Purpose: To present this new technique for double bone block arthrodesis (DBBA) of the medial column for correction of fixed DBD

Study Methods: Retrospective chart review and pre/post radiographic measurements were performed on 7 pts. (9 feet) that underwent the DBBA procedure for a dorsal bunion deformity that was not passively correctable
Double Bone Block Medial Column Arthrodesis Technique:

**Rationale:**

- Typically, the apex of the dorsiflexion deformity of the first ray occurs at the naviculocuneiform joint.
- Correction of the deformity is best performed at the apex of the deformity.

Double Bone Block Medial Column Arthrodesis Technique:

Rationale:

- However, as the first MT and Cun-1 is plantarflexed, it also pronates and adducts due to the shape of the 1,2 intercuneiform joint and creates a gap requiring a bone block graft to stabilize and fuse these two joints in the corrected alignment.

Double Bone Block Medial Column Arthrodesis Technique:

Technique:

- Dorsal midfoot incision between Ant Tibialis and EHL tendons.
- Denude cartilage and release plantar capsule from 1 & 2 Navic-cun jt. and 1,2 intercun. jt.
- Place distractor between Navic and Cun-1 and and wedge joint open dorsally until first MT is plantar flexed to desired level, even with other metatarsal heads.
- Shape allograft tricortical bone wedges to fit into spaces created at BOTH the naviculo-1st cun. and the 1,2 intercuneiform joints.
Double Bone Block Medial Column Arthrodesis Technique:

Technique:

- Augment fusion sites with morselized allograft bone graft
- Use interfragmentary screw fixation with or w/o a dorsal reconstruction plate to secure bone graft and hold the corrected alignment
- Perform adjunctive procedures as needed:
  - anterior tib transfer to 2\textsuperscript{nd} cun.
  - plantar capsular/FHB release 1\textsuperscript{st} MTP joint
  - FHL transfer to 1\textsuperscript{st} MT neck
  - Calcaneal, tibial osteotomies for deformity correction
Illustrative Case: 9 y/o female with Bil. Dorsal Bunion Deformity following clubfoot surgeries at 6 mo. of age

The Problem:
- Elevation of medial column
- Overpull of FHL w/flexion of MTP-1
- Overpull of Ant Tib secondary to weak Peroneus Longus
- Valgus hindfoot
9 y/o Female s/p Bil. PMLR @ 6mo

Solution:

- Double bone-block fusion of navic-cun-1 and intercun1-2 joints
- Ant Tib Tendon Transfer to 2nd cun.
- FHB intramuscular lengthening, MTP joint plantar release and pinning
- FHL transfer to MT-1 neck
- Medial Displ. Calc. Osteotomy
Results:

- N=7 patients (9 feet): avg. age 19 (9-49)
  - prior clubfoot surgery: 6 feet
  - Congenital deformity: 3 feet

- Avg. F/U 12 months (3-31)

- Avg correction in the first MT head height (HH) = 16 mm

- Lateral first metatarsal axis (α) improved an average of 14 degrees (7 degrees preop to 21 degrees postop)

- Additional procedures at time of surgery:
  - Ant tib tendon transfer (3)
  - Reverse Jones FHL transfer (2)
  - FHB lengthening w/pinning of MTP jt (3)
  - Medial displacement calc osteotomy (2)
  - Triple arthrodesis (1)
  - 1st MTP fusion (1)
  - 5th MT bunionette correction (1)

- No nonunions, 2 reoperations for hardware removal
Double Bone Block Medial Column Arthrodesis Technique for Correction of Dorsal Bunion

Conclusions:

- This new technique for correction of dorsal bunion deformity provided excellent radiographic improvements without nonunion.

- Although these results are comparable to other published techniques⁹, this study population was older and had greater degree of deformity indicating its usefulness particularly in this group of patients.
References


2. Docquier PL, Leemrijse T, and Rombouts JJ: Clinical and radiographic features of operatively treated stiff clubfeet after skeletal maturity: etiology of the deformities and how to prevent them.


