Total Ankle Arthroplasty and Medial Malleolar Lengthening for Reconstruction of the Arthritic Ankle with Varus Deformity

H. Cornelis (Kees) Doets, MD, PhD  
kees.doets@hccnet.nl  
Amsterdam, Netherlands

Distal Tibial Osteotomies in the Varus Ankle

Beat Hintermann, MD  
beat.hintermann@ksli.ch  
Liestal, Switzerland

Malalignment can result in the development of osteoarthritis in the ankle joint whether the deformity is of primary or secondary origin. In either case, there is an altered load distribution across the joint that compromises joint functionality and interferes with the normal cartilage metabolism. In a varus deformity of the ankle with medial degenerative changes, a supramalleolar osteotomy restores the alignment of the hindfoot. It can also be used to realign the ankle/hindfoot in end-stage osteoarthritis of the ankle before, during or after total ankle replacement or fusion.

When do I use them and how?

I do it for realignment surgery including:

- corrections of malaligned ankles with medial OA
- corrections of malunions after distal tibia fractures
- realignment before or at total ankle replacement or fusion
- realignment before or at fusion
- correction of malaligned total ankle replacements
- corrections after malpositioned ankle fusions
- osteochondral lesions on the medial aspect of the tibiotalar joint

I do not use it for:

- end-stage OA as an isolated procedure
- severe hindfoot instability that cannot be stabilized ("floppy" hindfoot)
- severe vascular or neurological deficiency in the affected extremity
- neuropathic disorders (Charcot foot)

I am careful:
- altered bone quality (due to medication, large cysts, and osteopenia or osteoporosis)
- age (>70 years)
- insulin-dependent diabetes
- tobacco abuse
- rheumatic disease

**Should I use opening or closing osteotomies; how do I choose?**

My decision between wedge removal laterally and wedge insertion medially is based on the following considerations:

- when the amount of correction necessitates a wedge removal greater than 7 mm, a loss of triceps surae force can be expected
- when the amount of correction necessitates a wedge insertion of greater than 7 mm, a soft tissue overstretch (including flexor tendons) can be expected
- in an extensive medial opening-wedge osteotomy, the fibula may restrict the amount of correction possible
- soft tissue condition and previous scars may obligate either a medial or a lateral approach
- in posttraumatic cases, there could be a malunion of the fibula that requires simultaneous correction
- closing-wedge osteotomy is easier to perform
- delayed union or nonunion may occur less frequently in closing-wedge osteotomy

As a principle, I differentiate between

- congruent varus deformity of distal tibia (e.g. the tibiotalar space is parallel)
- non-congruent varus deformity (e.g. the tibiotalar space is not parallel)

Usually I select

- lateral closing wedge osteotomy for correction of congruent varus deformity
- medial opening wedge osteotomy for correction of incongruent varus deformity

**Should I do them before, during or after other procedures, e.g. ligament reconstructions, total ankle arthroplasty?**

I differentiate between:

- realignment surgery with preserving the ankle joint
- realignment surgery with replacing or fusing the ankle joint
- correction of (at distal tibia level) malaligned hindfoot after total ankle replacement or ankle fusion

I start overall procedure for realignment surgery always with distal tibial osteotomy

**Should I use bone grafting on opening or closing wedge osteotomies; autograft, allograft, metal triangular composite?**

Usually I use:

- for opening wedge osteomy: allograft (Tutoplast®, Novomedics/Germany)
- for closing wedge osteotomy: no substitute

I consider use of bone matrix with BMP (Isotis®, Integra, Plainsboro/USA) for closing wedge osteotomies in bad bone condition.