The SCARF osteotomy is a midshaft osteotomy of the first metatarsal (MT) bone. It is named after the English translation of “le trauf de Jupiter des charpentiers,” which is a carpentry technique for increasing the size of an entrance by longitudinally joining beams of timber. The technique was first described by Meyer in 1926 and later rediscovered by Burutaran in 1976. American podiatrists in the Chicago area popularized this technique locally, but Barouk made it public worldwide.

**1. INDICATION**

- IM angle up to 20° (Wanivenhaus) 8, 23° (Weil) 9.
- Wide metatarsal
- Good bone stock
- Increased DMAA

**2. CONTRAINDICATION**

- Narrow thin metatarsal
- Exceeding 23° IM angle
- Mild hallux valgus

**3. TECHNIQUE**

**A. Skin incision**

The incision depends on the technique of the lateral soft tissue release.

- a) Strictly medially (in case of transarticular or a lateral soft tissue release via a second incision)
- b) Dorsomedial skin incision over MTP joint and 1st metatarsal

**B. Capsular incision**

- a) Longitudinal (Rippstein)
- b) Proximal inverted L-shaped (Myerson)
- c) Vertical ellipse (Weil)
- d) Distal middle flap (Austin/Leventen)
C. Lateral soft tissue release

a) Transarticular (not all lateral structure accesable)

b) coming from the medial incision over the dorsum of the metatarsal

c) 2nd incision in the first web space (allows more exposure)

According to Schneider et al transecting the lateral metatarsosesamoid suspensory ligament is the key to a sufficient lateral release. Thererfore the transarticular release exposes all necessary structures.

D. Preparation of the osteotomy

"""Removal of the medial exostosis always after the metatarsal correction!""

1) Exposure of the medial surface of the first metatarsal

2) Insertion of 2 guide wires parallel to the plantar surface of the shaft
   a. 1 distal is located just proximal the center of the metatarsal head
   b. 1 proximal is located in the metaphysis of the metatarsal

E. Osteotomy

1) Longitudinal cut
   a. Parallel to the medial border
   b. 2-3 mm above the medial border
   c. 20 degrees declination from medial to lateral = parallel to the planar surface of the metatarsal
   d. Saw guide advocated (DePuy, Darco)

2) Transverse cut
   a. The proximal cut
      i. In an angle of 45° with the longitudinal cut
      ii. Should be directed slightly posteriorty to allow lateral displacement
   b. The distal cut
      i. In an angle of 45° with the longitudinal cut (like a Chevron)
      ii. Should be directed slightly posteriorty to allow lateral displacement
F. Displacement

The SCARF technique allows displacement in the transverse plane as well as medial rotation. Medial rotation results from a larger displacement of the proximal part than the distal. This is useful in the presence of an increased DMAA for example in congenital hallux valgus deformity or recurrence of hallux valgus.

Furthermore shortening and lengthening is possible. Shortening is advocated in hallux valgus and rigidus to decompress the MTP-joint and increase range of motion

G. Fixation

1) 2 cortical screws (“classical” technique)
2) 1 cortical screw

G. Postoperative regimen

1) Stable situation:
   i. Postoperative surgical shoe for 4-6 weeks
   ii. Postoperative surgical shoe for 3 weeks, running shoe for 3 weeks
2) Unstable situation (very uncommon)
   i. Cast for 6 weeks
1. Results

1. 54 feet
2. F/U: 14 to 43 months
3. Average age: 46 years (13 to 66)
4. Average preop and postop HV: 22°(15-30°) respectively 15° (-13 to 30°)
   Average preop and postop IM: 10.5°(5-15°) respectively 4° (40 to 10°)

Wagner A.; Foot and Ankle Surgery, 6: 105-112, 2000 13
   o 53 feet
   o F/U: 1,2 years
   o Average age: 53 years (19 to 74)
   o Average preop and postop HV: 43°(10-65°) respectively 23° (10 to 33°)
   Average preop and postop IM: 16°(10-22°) respectively 8° (4 to 16°)
   o Complications:
     - Metatarsal fractures: 4

   o 889 feet
   o F/U: 3,5 to 7,5 years
   o Average preop and postop IM: 15° respectively 9,8°
   o Complications: stress fractures, prominent hardware, AVN, overcorrection (8%), hallux varus (3%)

Kristen KH. Foot Ankle Int. 23: 221-229, 2002 15
   o 111 feet
   o F/U: 36 months
   o Average age: 46 years (18 to 73)
   o Average HV correction: 19°
   Average IM correction: 6,6°
   o AOFAS score: 50,1 to 91
   o Complications: 5,4%
   Superficial wound infections, traumatic fracture, Hallux limitus
Coetzee Ch. Foot Ankle Int.. Vol. 24: 29-33, 2003

- 20 feet
- F/U: 6 and 12 months
- Average age: 41 years (18 to 60)
- Complications:
  - Troughing: 7
  - Rotational malunion: 6
  - Proximal fracture: 2
  - Early recurrence: 5


- 35 feet
- F/U: 20 months
- Average age: 46 years (18 to 73)
- Average preop and postop HV: 33°(24-46°) respectively 14° (2 to 32°)
- Average preop and postop IM: 15°(10-19°) respectively 9° (2-15°)
- Complications:
  - Fractures: 1
  - Prominent screw irritating the sesamoid: 1
  - Superficial wound infections: 2

Choi J.H.. et al, Foot & Ankle Int. 2013

- 53 feet
- F/U: 24 months
- Average age: 59 years
- Average preop and postop HV: 29° respectively 10.6°
- Average preop and postop IM: 13.6° respectively 7.8°
- Complications: 15%.
  - Symptomatic hardware: 4
  - Hallux varus: 2
  - Progressive arthritis: 2

- 93 feet
- F/U: 124 months
- Average age: 50 years (21 to 78)
- Average preop and postop HV: 31° (18-60°) respectively 15° (-10 to 39°)
- Average preop and postop IM: 13.9° (10-20°) respectively 7° (1-17°)
- Complications:
  - Prominent hardware: 13
  - Hallux varus: 2

The rate of recurrence (an HVA of ‡20_) at the time of final follow-up was 30%. We were unable to determine if recurrence resulted in functional impairment or consequences for quality of life. The minimal invasive soft tissue release might have contributed.
SUGGESTED READING:

Reference List

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10. **Rippstein, P. and Zänd, T.:** The "Scarf" Osteotomy for the Correction of Hallux Valgus. Oper Orthop Traumatol, **13:**107-120, 2016.

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