Rare Case of a Right Hallux Varus:
About a Case and Review of the Literature

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Abstract:
Hallux varus deformity is generally defined by three components: medial deviation of the hallux at the first metatarsophalangeal (MTP) joint, supination of the phalanx, and interphalangeal (IP) flexion or claw toe deformity. The deformation can be congenital or acquired. Hallux varus is most commonly seen as an iatrogenic complication of bunion surgery, resulting from overcorrection of hallux valgus. The incidence is relatively rare, with reports ranging between 2% and 15.4% in the literature. Besides iatrogenic hallux varus, several other etiologies cause acquired hallux varus: trauma, severe burn injury with contracture, systemic inflammatory disorders such as rheumatoid or psoriatic arthritis, Charcot-Marie-Tooth disease, avascular necrosis of the first metatarsal head, and paralysis or poliomyelitis. The goal of treatment is to obtain a functional, pain-free, shoeable foot. It is desirable to achieve a stable, aligned hallux while maintaining or maximizing joint mobility when possible.

Keywords: hallux varus, bone, ligamentooplasty, failure, static transfers.

Introduction
Hallux varus is a deformity of the first toe (“big toe” or “hallux”) which moves away from the lateral toes by moving towards the inside of the foot (in “varus”) (Turner, 1986; Edelman, 1991; Granberry & Hickey, 1994). This deformation generates a gap between the hallux and the second toe at the origin of painful phenomena and discomfort when putting on shoes (Groulier at al., 1992). It's about a rare deformity of the forefoot, which may be of congenital origin (present at birth), or acquired after a trauma, during an inflammatory disease, neurological pathology or sometimes after foot surgery (Donley, 1997; Saraiya, 2000).

Materials and Methods
Our work concerns the case of a 23-year-old young patient, followed in the Orthopedic and Traumatological Surgery Department of the Ibn Sina Hospital in Rabat, who presents a congenital deformity of the big toe, making it difficult to put on shoes and having harmful repercussions on the walking with the onset of disabling lameness.
Figure 1. Clinical aspect of the hallux varus

Figure 2. X-Ray of the hallux varus

Results and Discussion

Anatomical Reminder

The bony skeleton of the big toe (“hallux”) consists of the first metatarsal (M1) extending by two phalanges (P1 and P2). The joint between the head of the first metatarsal and the base of the first phalanx (“metatarsophalangeal” joint) is normally straight or slightly inclined towards the outside (10° of valgus on average) (Rochwerger, Curvale & Groulier, 1999). When walking, the big toe can move easily and painless to adapt to the terrain and shoe.

This “metatarso-phalangeal” joint is therefore essential for walking:

- Slipping is easy and painless thanks to the cartilage covering the extremities
- A fibrous sleeve, «the capsule», reinforced by ligaments, ensures stability.
- Tendons, an extension of the leg muscles attaching to different bone segments, control mobility.
- Sensitivity is dependent on the sensory nerves, termination of the large trunks nervous of the leg.

Depending on the length of the big toe your foot is classified into different types:

- "Greek foot" with a second toe longer than the first ray;
- "Egyptian foot" where the big toe is the longest;
- Finally, "Square foot" where the first two toes have the same length.

Physiopathology

The Hallux Varus is a deformation of the big toe, which results in a progressive separation of the hallux of the second toe (Trnka et al., 1997). Frequently there are phenomena joint pain associated because the joint no longer works “in
the axis". This deformation is extremely inconvenient for footwear because it causes a significant enlargement of the forefoot (Hawkins, 1971).

This deformity can be congenital (present since birth), in particular in ligament pathologies (hyperlaxity, collagenosis, etc.).

Hallux Varus can also be acquired:

- In the aftermath of a trauma, during a joint fracture for example;
- During a joint pathology destroying the metatarsophalangeal joint (inflammatory rheumatism, osteochondritis of the head of the first metatarsal);
- in some neurological disorders;
- After hallux valgus surgery, due to joint imbalance in the immediate or late aftermath of the initial operation.

Diagnostic

The clinical deformity is characteristic with a big toe deviating gradually from the second, and then crossing the axis of the medial edge of the foot. It is created thus a significant gap between the first and the second toe leading to a widening of the forefoot.

Minimal, supple deformation is often tolerable in a wide fit; while a significant or stiff deformation makes it impossible to put on. The conflict with footwear may be responsible for ulceration on the medial edge (internal) of the hallux, at the edge of the nail or the phalanx.

The clinical diagnosis is obvious in front of a deviation in varus of the first toe, deviating of the second toe and crossing the axis of the medial edge of the foot.

The radiographic assessment allows to confirm the diagnosis, to measure its importance and to find the causes of this deformation (Vanore et al., 2003). Other complementary examinations (ultrasound, MRI, scanner and sometimes biological blood test) make it possible to specify joint damage (state of the joint) or biological causes (rheumatic disease...).

Therapeutics

Non-surgical treatment

The adaptation of the shoe, wide and flexible, remains effective for a long time for the forms beginning or remaining flexible hallux varus. This adaptation of the footwear can be supplemented by plantar orthoses made by a pedicure-podiatrist (orthopaedic insoles) or "orthoplasties" (silicone inter-toe wedges, a strapping) to reduce phalangeal varus. An analgesic medical treatment is useful to reduce painful phenomena, but it will not be able to stabilize or correct the deformation (Zahari & Girolamo, 1991).

Surgical treatment (consisting of re-aligning your first toe) is offered when the pain limits your activities, that footwear becomes difficult and/or that the orthoses become ineffective.

As time goes (with a different speed of evolution depending on the causes), the deformation is accentuated, significantly widening the forefoot. The flexible deformations are often well tolerated for a long time, whereas stiff quickly become awkward to wear closed footwear.

Ulcerations frequently occur on the medial border of the phalanx or the nail. We can thus see the appearance of ingrown nails of the medial furrow, bursitis, hyperkeratosis...

Surgical treatment

In the absence of improvement with medical and podiatric treatment, or before the appearance of complications, it is possible to envisage a surgical management (Jahss, 1983).

Hospitalisation

Your hospitalisation can be during one day or a few days following your associated pathologies.

Anesthesia

A preoperative consultation with an anesthetist-resuscitator is obligatory. This doctor will explain to you, during this consultation, the methods and the possible choices of anesthesia adapted to the surgery and your health problems.

During this consultation, your treatments will also be reviewed. New treatments may also be
implemented, either before or after the intervention. The most frequently used are anticoagulation, antibiotics, analgesics and anti-inflammatory.

The anesthesia may be loco regional (anesthesia of a segment of the limb, of the leg to the toes), spinal (anesthesia of the pelvis and limbs by pricking between two vertebras) or general.

The duration of the intervention varies from 45 minutes to 1h30. The time depends on the chosen technique, the difficulties encountered and any gestures made during the intervention.

A tourniquet can be used to temporarily cut off the blood supply to the level of the operating area. This can be placed on the thigh, leg or even ankle.

The incisions can be located on the top of the foot, or on the inside of the first metatarsal and first phalanx. Their size depends on the technique used, but are generally less than 10 cm.

The purpose of the operation is to correct the deformation of your toe: the operation allows you to realign your first toe by working on the bones and/or tendons and ligaments. (Goldman, Siegel & Barton, 1993). The choice of technique used depends on the importance of your deformity, the existence of articular osteoarthritis, your age and the habits of your surgeon.

Several surgical techniques can be used, blocking the joint or maintaining joint mobility:

**Arthrodesis**

When the deformity is significant, recurrent and/or associated with osteoarthritis, it may be necessary to block the joint between the metatarsal and the phalanx (“metatarsophalangeal arthrodesis”) to effectively and efficiently correct lasting deformation. This articular blockage necessarily leads to a reduced mobility of the column of the first toe. This blocking takes place in a position that is specific to you, depending on the morphology of your foot or your mode of footwear in particular.

**Ligaments Reconstruction**

In the context of a treatment preserving joint mobility, the realignment of the hallux will be ensured by a release of adhesions and retractions producing the deformation. The transfer of certain ensures the maintenance of the position tendons (tendon deviation), fighting against the initial deformation (Leemrijse et al., 2008).

**Realignment Osteotomies**

These interventions concern the bones: either the metatarsal or the first phalanx. We cut the bone to change its orientation. Osteotomies and ligament reconstructions are sometimes associated.

**Fixing**

Whether or not the intervention maintains the metatarsophalangeal joint mobility, the correction of the deformity often requires the use of a fixing means (screws, plates, pins, staples, wires, etc.).

Post-operatively, the support is generally permitted immediately following the operation, often without unfolding of the step. This can be done through a postoperative medicine shoe. Walking sticks can be useful in the first days.

In the most important cases of deformation, or bone fragility, a period without support for a few weeks may be required of you.

**Figure 4. Osteosynthesis of the bone after correction of the deformation**

The resumption of walking will be gradual, with weaning from medical footwear then resumption of a wide shoe before resuming your usual footwear. Delays are a function of the initial deformation, the intervention carried out, the habits of your surgeon and factors specific to
you (weight, bone strength, importance of the initial deformation, medical history...).

Conclusion

Hallux varus is a rare deformity of the big toe resulting in a distance between the first and the second toe. Particularly troublesome for closed footwear, this deformation can be supported operation after failure of non-surgical treatments. The realignment toe surgery can be done while maintaining joint mobility (at means of ligamentoplasties or osteotomies) or in a non-conservative by metatarsophalangeal arthrodesis.

References


