Case Report: Metatarsalgia (by first ray insufficiency)

Personal data intake and anamnesis

A 32 years old patient goes to the clinic with a noticeable pain in the first and second metatarsal heads of the left foot, and in the first metatarsal head of the right foot.

Since the patient works as a hairdresser, she stands up about 8 hours a day in static position and walking.

The pain she feels when walking is Sharp, and more accentuated in propulsion phase. Since the morning sharp pain gets even more intense at the end of the day, it is a mechanical pain.

Footwear analysis

The footwear normally used by the patient is 4-5 cm heeled or wedged shoes.

The outsole of his usual footwear is worn in the medial edge of the forefoot and lateral edge of rearfoot, both in the right shoe and the left one. On the other hand, the upper is also worn in the medial zone of the forefoot.

Another remarkable point is the posterior view of the shoe, with a lateral deviation of the shoe caused by an excess of pronation.
Non-weight bearing exploration

In the non-weight bearing exploration, the most remarkable data are the following:

- When the patient is in decubito supine position with the knee in extension, it is observed that the hip flexion-extension movement is decreased both in the right and left sides.
- The movements of flexion and extension of the right knee are decreased when the hip is kept flexed.
- The pronation and supination movements in the Chopart’s joint are decreased in both feet.
- The plantar flexion movement of the metatarsophalangeal joint is decreased in both feet.
- The plantar flexion of the fifth ray is also decreased bilaterally.
- In the plantar view, it can be remarked the occurrence of hiperqueratosis on the surface of the first toe soft tissue, in the first metatarsal head and in the peritalar zone, that all bilaterally.
- The foot axis is pronated both in the left and the right foot.
Weight bearing exploration

When the patient is standing up, it is observed that the Fick’s angle is decreased, there is an incipient hallux abductus valgus, the fifth toe is in varus position and the second, third and fourth toes are claw, that all bilaterally.

When the maximum pronation test is carried out, from a posterior view it is observed that both feet are at 10º valgus position.

Regarding the lateral view, there is a certain hyperextension of the knees in the sagittal plane.

It is worth highlighting that the patient presents a hiperqueratosis along with a hip anteroverision.

Footprint analysis

The type of footprint detected in this study is a cavus-valgus footprint in both feet. The hyperpressure areas are on the heel and the first metatarsal heads. In the support of the toes’ soft tissue, it can be remarked that he supports a lot the fist one whereas the fifth one hardly is visible.

Gait analysis

In this study, it is worth highlighting that, in the swinging phase, the dorsiflexion of the tibiofibular joint is decreased. In the support phase of the heel, the inversion of the subtalar joint is lower than the required 20º. To conclude, it is observed the lateral rotation of the tibia in the digital takeoff phase is decreased.
Diagnosis

Pes cavus-valgus by hyperpronation of the subtalar joint, causing a metatarsalgia due to first ray insufficiency, and with possibility to develop an Hallux Abductus Valgus, and Hallux Rigidus or both of them.

Treatment

The treatment prescribed to the patient consist of a pair of “easy-flex” composite insoles, of maximum flexibility, for the sustentation of the longitudinal arch, for controlling the excessive pronation of the rear foot as well as of the forefoot.

Mould

The weight-bearing cast is obtained by stepping on the phenolic foam boxes, where an exact footprint of the patient is obtained. These foams are filled in with plaster, from which the positive mould of the patient’s foot is obtained.

[Image 6. Positive plaster cast]

Orthoses production

The orthosis is made moulding the composite material on the plaster mould, paying special attention on the corrections that must be performed with the insole.

[Image 7. Forming of the plantar insole]
Initial Validation

When the plantar orthoses were delivered, the patient mentioned pain both in static and in dynamic in the metatarsal heads area, especially in the first one. The problem was related to the retrocapital support, because it was a little high whereas the patient preferred it lower. Furthermore, she also referred to pain in the medial zone of the heel during the support.

On the other hand, when she tried the orthoses on standing up, overpressures on the medial longitudinal arch were found. To conclude, in the dynamic exploration phase, a decrease of the rearfoot pronation was detected, what shows that the prescribed orthoses favors the good progress of metatarsalgia.

The orthoses were modified to solve the problems indicated by the patient and, after the delivery of them, she considered them quite comfortable.

Validation in the checkup

The patient went to the clinic after using the orthosis for 15 days to undergo the corresponding checkup. In this visit, it was observed that the pain she felt initially in the metatarsal head had progressed favourably. In the dynamic analysis, it was also observed that there was a better support on the foot's medial zone, bilaterally.