Metatarsus adductovarus (MTA): efficacy of treatment with UNFO braces

Magnani M, Maredi E., Racano C., Merli ML., Stilli S.
SC Orthopaedics and Paediatric Traumatology Inst. Orthopaedics, Rizzoli Bologna

ABSTRACT

Introduction

Metatarsus adductovarus (MTA) is a congenital malformation that affects about 7% of newborns. To date, the gold standard for treatment is the application of a gypsum or another orthoses for correction. If untreated, MTA is associated with an increased risk of residual deformity in adulthood, stiffness of deformity, pain, arthritis and hallux valgus. The aim of the study was to verify the efficacy and safety of UNFO braces in the treatment of mild, moderate and severe MTA within the first year of life.

Materials and Methods

40 consecutive (80 feet) patients, with mild, moderate or severe MTA were treated with UNFO braces for 12 weeks. The mean age at first treatment was 2.8 months (min 1 - max 9.5). The severity of the disorder was classified in 11 patients as mild, in 24 as moderate, in 5 severe on the right and in 11 mild, in 26 moderate, and in 3 severe on the left, using the Bleck classification (using the calcaneum bisector).

Results

Patients were evaluated at the end of treatment with the UNFO at the 12th week. The average age at the last visit was 8.3 (min 4 - max 12.5).
Resolution of the MTA was achieved in all cases.
The correction was maintained at a follow-up of 20 weeks in all patients apart from 3 cases

Discussion

MTA is a relatively frequent and underestimated deformity (up to 7% of the population), in some cases it reaches and exceeds the incidence of valgus calcaneum.
Given the high incidence and the large percentage of underestimated cases (about 85%) the risk of progression and residual deformity and rigidity is high.
About 14% of cases do not resolve spontaneously, but most cases respond very well to conservative treatment. Complete correction of the forefoot occurred in all cases; in the face of excellent results in clinical terms, no major complication was found during treatment, only minor skin complications that were completely resolved on removing the braces.

Conclusions

UNFO braces area a valid and safe alternative to gypsum or other types of orthosis in all cases where a specialist deems a brace necessary. In the face of excellent clinical results, if used during the first 9 months of life, they are linked to a low number of complications, usually minor and of low significance. The ergonomics and easy use of UNFO braces make them suitable for even very young infants (neonates) and for a simple home management by parents.

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Introduction

Metatarsus adductovarus (MTA) is a congenital malformation that affects about 7% of births, even if the incidence rises to 16-17% when the first child is affected and in the case of premature or twins babies. MTA has in some cases a higher incidence of valgus calcaneus (1, 2, 3). In other cases there is the same incidence in premature and full term births, but it persists longer in premature babies (4) compared to those born at term.

The family risk is relatively high: 1 in 20.27 (5) if a family member is affected. The most plausible cause today is positional during intrauterine life. It is a pathology that occurs after the eighth week of intrauterine life and therefore falls into malposition, immediately after deformations such as the congenital clubfoot or the reflective foot; the malformations include those that occur before the eighth week of foetal life. (6)

If untreated, MTA is associated with an increased risk of residual deformity in adulthood, stiffness of deformity, pain, arthritis and hallux valgus. (7)

MTA responds very well to conservative treatment.

To date, the gold standard in treatment is the application of a gypsum or other corrective orthoses (8); the complications of the application of plaster casts are, as expected, decubitus, intolerance, difficult management with weekly changes, hygiene, technical difficulty; the other orthoses have the characteristic of being operator-dependent, they must be strictly controlled by the doctor, they are rigid.

UNFO braces are available on the market in two sizes and are adaptable to children of all ages ranging from birth to crawling. They have 3 pressure points, leaving the ankle free to move, and have the advantage of being light and easy to use in a way that can easily be managed by parents without specialist support, and are therefore removed for daily hygiene.

Material and Method

Product features**:** UNFO is a pre-moulded corrective shoe for the treatment of MTA in new born babies up to the time they begin crawling. The orthosis consists of a rigid part to support the foot and an adjustable tear-off system that acts through 6 fixing points divided into two levels (from top to bottom and from the outside to the inside) leaving free the joint of the ankle.

MTA patients, aged 1-9.5 months, were included in the study; excluded from the study were patients who had already been treated for MTA, with congenital or neuro muscular disorders, and those suitable for the study according to the researcher.
40 consecutive patients with mild or moderate MTA were treated with UNFO braces for 12 weeks - a total of 80 feet, 25 males, and 15 females were treated.
The mean age at first treatment was 2.8 months (min 1 - max 9.5).
The severity of the disease was classified as mild in 11 patients, moderate in 24, in 5 severe on the right and in 11 mild, moderate in 26, and 3 severe on the left according to the Bleck classification (using the calcaneal bisector) (9); while the flexibility of the feet at the initial visit was well correctable in 11, partially correctable in 27, hardly correctable on the right in 2 and slight in 11, and moderate on the left in 29.
All patients followed the protocol treatment scheme:
The protocol provided for 6 weeks of treatment 24 hours a day, then another 6 weeks only for the night. The visits were made every 2 weeks until the twelfth. At the twelfth week the guardians were removed and follow-up visits were performed at 16 and 20 weeks. Each patient was visited and classified at the initial visit by the principal researcher or by a doctor of the same team, assessed according to the inclusion and exclusion criteria.

Results

Every patient was evaluated clinically every 2 weeks until the twelfth week of treatment, then at the sixteenth and twentieth weeks. at each visit, the foot was evaluated from the clinical point of view using the classification of Bleck to assess the calcite bisector and residual flexibility. In the presence of the parents, the status of the skin, the parents' compliance in management (putting and removing the braces) and the compliance of the small patients were assessed.
Patients were assessed at the end of treatment with UNFO at the 12th week. The average age at the last visit was 8.3 (min 4 - max 12.5).
Resolution of the MTA was achieved in all cases.
The correction was maintained at a follow-up of 20 weeks in all patients except for 3 cases, where the MTA was still mild, and the brace was applied for a further 4 weeks with resolution of the problem. The aforementioned cases were all initially classified as severe and with low flexibility.
No major complications occurred, 2 superficial sores, 1 additional visit to 2 patients for intolerance of the brace and adjustments to it.

Discussion

MTA is a relatively frequent and underestimated deformity (up to 7% of the population), in some cases it reaches and exceeds the incidence of valgus calcaneum.
Given the high incidence and the large percentage of underestimated cases (about 85%) the risk of progression and residual deformity and rigidity is high.
About 14% of cases do not resolve spontaneously, but most cases respond very well to conservative treatment.

Currently the Gold Standard for treatment is the use of set gypsum, with many associated complications. The best age to start conservative treatment for good results is before nine months of life.

In the bibliography, the percentage of good outcomes from conservative treatment is high, but the percentage of complications related to it is equally high. (8)
UNFO braces are present on the market with excellent results linked to them and few complications.

UNFO braces have the characteristics of being easy to use, flexible, leaving the ankle free, and being available in two sizes which is good for smaller children (from birth to toddlers).

We therefore present our experiences with 40 subjects treated with UNFO for MTA. The braces are based on the application of pressure at 3-points, and the degree of correction is maintained by the Velcro strap in the central parts.

In contrast to plaster casts, UNFO braces have better home management of the deformity and the patient, are easy to use and give excellent results. Compared to Bebax braces, they have a lower need for specialist assessments, since the correction is standard and not adjustable.

All patients followed the protocol treatment scheme:
The protocol provided for 6 weeks of treatment 24 hours a day, then another 6 weeks only for the night. The visits were made every 2 weeks until the twelfth. At the twelfth week the braces were removed and follow-up visits were performed at 16 and 20 weeks. Each patient was visited and classified at the initial visit by the principal researcher or by a doctor of the same team, assessed according to the inclusion and exclusion criteria.

Complete correction of the forefoot was achieved in all cases, on considering a maximum time of 12 weeks; in cases in which there was a relapse (2 cases) this was still a residual live and well correctable deformity, which was treated and resolved by another 4 weeks of UNFO. Treatment was started as early as possible (mean age at

the start of treatment 2.8 months), in agreement with the literature that specifies a successful outcome of conservative treatment if initiated early. (9)

In the face of excellent results in clinical terms, no major complications were found during treatment, only small skin complications that were completely resolved on removal of the braces (2 cases) with a maximum percentage of 5%.

Conclusions

Metatarsus adductovarus (MTA) is a frequent and underestimated disorder in the infant population; if left untreated, it leads to rigid, painful and difficult-to-treat residual deformities during growth. In most cases, it does not resolve spontaneously, but still responds well to conservative treatment if started early.

UNFO braces are a valid and safe alternative to gypsum or other types of orthosis in all cases that a specialist deems one necessary. In the face of excellent clinical results, if used during the first 9 months of life, they are linked to a low number of complications, usually minor and insignificant. The ergonomics and easy use of UNFO braces even makes them suitable for very young infants (new borns) and for simple domiciliary management by their parents.

Further randomised trials are needed to improve the accuracy of the results.