

CORRECTION OF SPASTIC EQUINOVARUS DEFORMITY IN ELDERLY HEMIPLEGICS BY TENOTOMIES

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With the increasing average age of men more and more people are suffering from damage of the locomotor apparatus caused by the failure of the vascular supply to important neurologic centers. Cerebral hemorrhage is one of the most dreaded incidents in the aged, leaving the patient if not killing him with more or less severe motor damage, mainly of spastic type. Other conditions, like central neurologic diseases or surgical interventions at the brain, may have similar results.

Many of these patients are spastic hemiparetics. If they recover, rehabilitation tries to restore their walking ability by exercises, mostly using a stick in the healthy hand. (1, 4, 5). Very often a spastic equinovarus deformity of the foot makes walking difficult. This deformity increases with the recovery of muscle tonus during the first 6 to 12 months after the onset, being more pronounced the moment the foot swings forward to meet the ground during walking, but often almost disappearing during standing. Callouses develop on the lateral border of the foot, a faulty step mechanism is instituted, where the foot steps first on the outer toes, later bends into dorsal flexion and finally reaches the ground with the heel. In severe cases the heel never reaches the ground.

To correct this deformity various splints are used, connected to the shoe and activated by springs which pull the foot into dorsal flexion. (2). These splints may correct the deformity satisfactorily if there is very little spasticity. Most of these patients, however, prefer to walk with some deformity rather than to wear the additional weight of the splint. If the deformity is strong, the splint may have the effect of pulling the lower leg forward resulting in a flexed knee during weight bearing.

The best solution for this trouble is surgical correction. It eliminates the necessity of a cumbersome splint and removes the spasticity of the foot. Ankle fusions have been used as sound procedures to correct such a deformity but they are major interventions considering the frail health of these patients. It is much easier to correct the deformity by tenotomy of the spastic and deforming muscles.

Tenotomies have been performed as early as in 1838 as blind tenotomies by *Stromeyer* (7) to correct congenital and similar conditions. There was much enthusiasm about this simple operation at the time but as recurrences happened very often and early, the method was later abandoned. Tenotomies as treatment of choice are still used to correct contractures in special cases, (3, 6) mostly in spastic conditions where surgery of a more reconstructive kind does not seem to give better results.

Tenotomy to correct the deformity in question is a simple procedure as it may be done with a single incision and accomplished in about 15 minutes in local infiltration anaesthesia and is therefore not distressing for the patient.

THE OPERATION

The patient is placed in prone position or on the side with the paralysed leg near the table. Local anaesthesia is given to the region of the medial malleolus and the Achilles tendon. A curved incision is made, freeing the medial posterior plane of the lower tibia. (Figs. 1 and 2). The fascial sheath is opened about two inches above the malleolus. The tendons of the posterior tibialis and the flexor digitorum longus muscles are identified and a piece of these tendons of one inch in length is resected. The neurovascular bundle is avoided, the tendon of the flexor hallucis longus is freed laterally to it and divided likewise. If there is still spasticity holding the foot in equinus the Achilles tendon is freed for about 6 inches through the same incision. Two transverse cuts are made in it, each dividing half of the tendon fibers. The heel cord is now lengthened by sliding between the cut fibers according to the technique of *White* (8) by dorsal flexion of the foot. The skin only is closed and a light below-knee walking cast is applied for three weeks, holding the foot in correct alignment. No heel is applied to this cast and the patient is encouraged to walk the day after the operation straight on the sole part of the plaster. He is discharged two to four days later. After the removal of the plaster elastic bandages are used as long as swelling persists around the ankle.

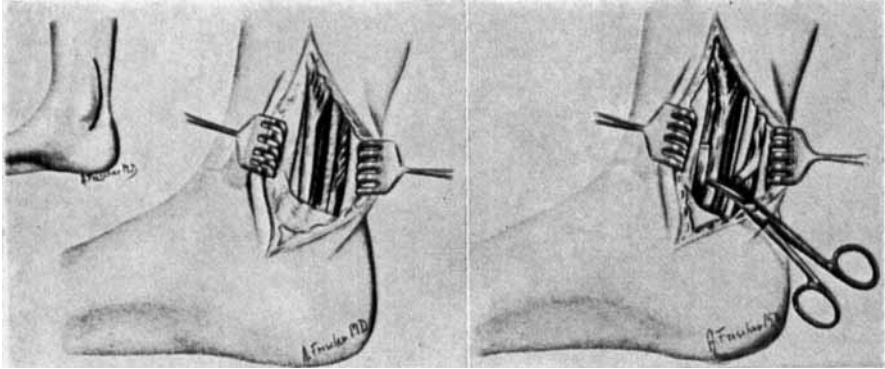
*Fig. 1.**Fig. 2.*

Fig. 1. Inset: Skin incision. After opening of the fascia the tendons of the Tibialis posterior and the Flexor digitorum longus are identified.

Fig. 2. After division of the tendons of tibialis posterior and Flexor hallucis longus, resection of a tendon piece of one inch in length and dissection of the flexor hallucis longus tendon. The latter tendon is divided, care being taken not to injure the neuro-vascular bundle.

DISCUSSION

During the last three years 8 patients have been operated according to this procedure. (Figs. 3 and 4). There were no adverse effects in any of these cases. In one case slight calcaneus deformity resulted by over-correction of the heel cord, but it did not impair the walking ability of the patient. One of the patients, suffering from Parkinson's disease and being a spastic paraplegic after brain surgery has asked now for the same operation on the unoperated better leg. There were no recurrences in this short follow-up period, but not many of these patients will achieve a long follow-up period because of the nature of the underlying disease. Even if this operation had a lasting effect for only a few years it still would be worth while to use it. On the other hand it seems impossible to get recurrence of the varus component of the deformity, as its cause, namely the invertor muscles, has been radically eliminated. The only recurrence theoretically possible should be a recurrence of the equinus deformity by additional shortening of the Achilles tendon, which did not occur in these cases.

The simplicity of the procedure, the immediate correction of the deformity and the improvement of the gait in a very short time are advantages, which make the surgical correction of the deformity re-

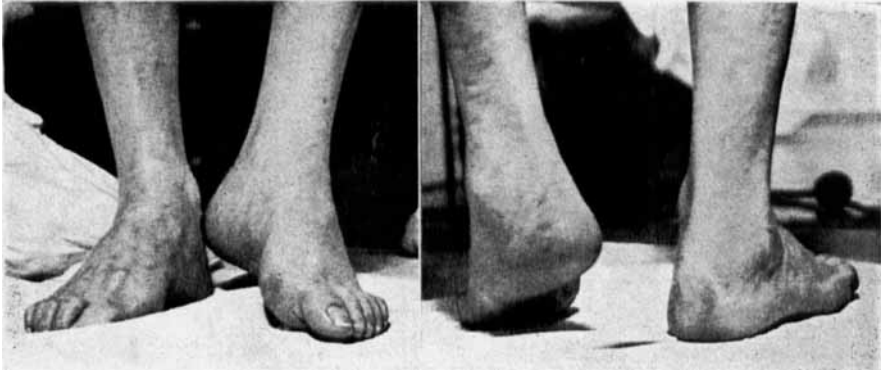


Fig. 3.
Left spastic equinovarus in standing.



Fig. 4.
Same case 6 months after correction by flexor-invertor tenotomy and
Achilles lengthening.

commendable even in this group of patients with a rather unhappy outlook for their far future.

S U M M A R Y

With the increasing age of the human being more people suffer from spastic paralysis, caused by cerebral hemorrhage. Spastic equinovarus deformity in these patients makes walking more difficult and orthopaedic appliances used for correction of the deformity are not very successful.

A simple operation is advised for these patients, which eliminates spasticity and the need for corrective apparatus. In local anaesthesia the

tendons of the toe flexors and the tibialis posterior are cut and the Achilles tendon—if necessary—is lengthened through the same incision.

The effect is immediate. The patients are allowed to resume weight bearing the day after operation with a protective walking plaster, which is discarded after 3 weeks. In 8 cases operated there were no adverse results or complications, making this operative procedure a simple solution for this problem of elderly and weak patients with a precarious state of health.

RESUME

Avec l'élévation de l'âge chez les êtres humains, le nombre des cas de paralysie spastique causée par hémorragie cérébrale s'accroît aussi. La déformité spastique équino-varus chez ces malades rend la marche difficile et les moyens orthopédiques utilisés pour corriger la déformité n'ont guère de succès.

Une simple opération est recommandée pour ces malades. Elle élimine la spasticité et la nécessité d'appareils de redressement. Sous anesthésie locale, les tendons des fléchisseurs de l'orteil et du ligament tibial postérieur sont coupés et le tendon d'Achille – si cela est nécessaire – est allongé à travers la même incision.

L'effet est immédiat. Il est permis au malade de faire supporter au pied le poids du corps le jour qui suit l'opération avec un bandage en plâtre de protection qui est retiré au bout de trois semaines. Dans 8 cas opérés jusqu'ici, il n'y a pas eu de mauvais résultats ou de complications, ce qui fait que ce procédé opératoire apporte une solution simple à ce problème chez les malades âgés et faibles dans un état de santé précaire.

ZUSAMMENFASSUNG

Als eine Folge des höheren Alters, das von den Menschen erreicht wird, leiden eine zunehmende Zahl von ihnen an durch Gehirnblutung hervorgerufener spastischer Parese. Spastische equino-varus Deformität macht das Gehen für diese Patienten schwieriger und orthopädische Apparate zur Korrektur der Deformität sind nicht sehr erfolgreich.

Eine einfache Operation, die die Spastizität ausschaltet und die Notwendigkeit für korrigierende Apparate überflüssig macht, wird bei diesen Patienten angeraten. In örtlicher Betäubung werden die Sehnen der Zehenbeuger und des m. tibialis posterior durchgeschnitten und die Achillessehne wird – wenn notwendig – von derselben Inzision aus verlängert.

Die Wirkung ist eine sofortige. Die Patienten dürfen am Tage nach der Operation mit einem beschützenden Gehgips belasten. Der Gips wird nach 3 Wochen entfernt. In 8 operierten Fällen traten keinerlei unerwartete, schlechte Ergebnisse oder Komplikationen auf, so dass man dieses operative Verfahren als eine einfache Lösung für das Problem älterer schwacher Patienten mit schlechtem Gesundheitszustand ansehen kann.

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