

SURGICAL TREATMENT OF GASTROCNEMIUS EQUINUS

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Many patients present themselves at the podiatrist's office with chronic pedal symptomatology which seems to be a resistant to orthotic control therapy. These patients may have a congenitally short tendo achilles causing limitation of dorsiflexion at the ankle and in many instances making orthotic control of the foot difficult if not impossible.

A seven-year-old male caucasian was admitted to Northlake Community Hospital for bilateral tendo achilles lengthening. He has been under the care of a podiatrist since 1966. At that time his parents were concerned about the "funny way" he walked. He walked knocked kneed and toed in, and pronated excessively. Heel stabilizers were prescribed at that time. In 1968 therapy was changed to acrylic plates in an attempt to control the foot. In 1969 the patient was re-evaluated and a diagnosis of forefoot varus and gastrocnemius-equinus bilaterally was made. Therapy was now changed to acrylic controls, which were posted anteriorly for forefoot varus, and exercises to attempt to lengthen the heel chords.

The patient's progress was evaluated one year later by the podiatrist. It was noted that the patient still had a gastrocnemius equinus of 6 or 7 degrees bilaterally and that several controls had either been broken or flattened out with normal use. The podiatrist felt that surgical correction of the gastrocnemius equinus was necessary.

A review of the patient's past medical and surgical history revealed that he did have chicken pox, measles and mumps, but had no history of rheumatic fever, asthma, heart disease, liver disease or any allergies. The patient had never been operated on previously.

The patient's appetite was good. He didn't suffer from chest pain, palpitations, orthopnea, frequent headaches or colds, unusual incidents of diarrhea, constipation, nausea, or vomiting. He had not noticed any changes in skin color or texture nor the appearance of any unusual eruption. He had not experienced any form of fainting, unconsciousness, spasms, convulsions, paralysis or joint pain.

The patient's parents are both healthy and

there is no familial history of diabetes mellitus, gout, rheumatoid arthritis or cerebral palsy.

Upon examination it was noticed that the patient was well nourished and mentally alert. A routine urine analysis, blood count and blood chemistry were within normal limits.

Bilateral lateral and dorso plantar roentgenographs revealed a slightly plantar flexed and adducted talus bilaterally. The navicular was wider on its medial side.

Palpation of the posterior, tibial and dorsalis pedis arteries revealed normal and bounding pulses bilaterally. Capillary return and temperature gradient were normal, skin color, turgor and texture were also normal. The patellar, achilles and plantar reflexes were equal and active bilaterally.

An orthopedic examination revealed a normal range of motion of the subtalar, mid-tarsal, and metatarsal phalangeal joints. The ankle joint showed a limitation of dorsiflexion with the knee extended seven degrees bilaterally. A normal range of motion with the knee flexed was obtained bilaterally. A seven degree gastrocnemius equinus was thus measured. There was rearfoot varus of four degrees bilaterally and a forefoot varus of six degrees in the left foot and eight degrees in the right foot.

A gait analysis revealed a coxavara genu valgum and genu recurvatum bilaterally. A close look at the stance phase of gait showed that the patient contacted in inversion, but pronated severely through the midstance and propulsive phases of gait. A premature heel lift-off was also noted.

Under general anesthesia with the patient in the prone position and a pneumatic cuff around the thigh inflated to 450 mm. Hg., the following procedure was performed on the right foot.

A transverse incision, 8 cm. in length, was made at the posterior aspect of the right heel, approximately at the level just superior to the calcaneus. The incision was deepened exposing the posterior aspect of the tendo-achilles. The skin was dissected free from attachments at its distal aspect and the most distal aspect of the tendo-achilles was isolated. With the tendon sheath preserved, the medial half of the tendo-achilles was severed at this point. The incision was then retracted proximally, approximately 2.5 cm. proximal to the original incision in the tendo-achilles. The tendon sheath was isolated and retracted.

The lateral half of the tendo-achilles was tenotomized. The foot was then manipulated into a dorsiflexion direction creating a tendon slide. Tendon lengthening of approximately 1.5 cm. in the tendo-achilles was attained. Deep structures were placed in apposition, skin edges were placed in apposition and maintained utilizing a continuous subcuticular suture of 3-0 stainless steel wire. A short leg walking cast was applied with the foot in a neutral position and in 90 degrees at the ankle.

A similar procedure was performed on the opposite foot. The casts were left on for a period of three weeks.

Discussion

A review of the orthopedic evaluation shows that there are many factors producing pronatory forces in this patient. More specifically they are coxavara genu valgum, rearfoot varus, forefoot varus and gastrocnemius equinus.

All these factors appeared to be controlled by a correctly fabricated and posted acrylic orthotic except for the pronation produced by the gastrocnemius equinus. The patient did not slide off or pronate off the controls but either flattened them or broke them. This was due to the tremendous pronatory force which is produced in a foot with limitation of ankle dorsiflexion.

This limitation of ankle dorsiflexion causes the sagittal plane forces of flexion and extension to be dissipated in the foot. These sagittal plane forces which are normally dissipated at the ankle are now transmitted to the subtalar and midtarsal joints in the foot. Since these joints were not primarily designed as joints of flexion and extension, a great deal of destruction takes place

in order that these forces may be dissipated in the foot. Excessive pronation of the subtalar joint and subluxation of the midtarsal joint usually occurs.

When the limitation of motion is due to a short gastrocnemius, a genu recurvatum will also occur. The body, in an attempt to increase the range of motion at the ankle joint, will hyperextend and sublux the knee joint. This will tend to shorten the distance between the origin and insertion of the gastrocnemius and thus relieve the tension of the tendon.

The sagittal plane forces which enter the foot when there is a limitation of dorsiflexion at the ankle are of highly destructive nature and difficult, if not impossible, to control. Thus restoration of normal range of dorsiflexion at the ankle is essential to therapy directed at controlling excessive pronation in the foot.

BIBLIOGRAPHY

1. ROOT, MERTON, D.S.C., "FOOT TYPES IN CHILDREN", PAPER PRESENTED AT CALIFORNIA COLLEGE OF PODIATRY.
2. WRIGHT, D. G., M.D., DESAI, S.M., M.E., AND HENDERSON, W. H., B.S., "ACTION OF THE SUBTALAR AND ANKLE-JOINT COMPLEX DURING STANCE PHASE OF WALKING", FROM THE BIOMECHANICS LABORATORY, UNIVERSITY OF CALIFORNIA, SAN FRANCISCO AND BERKELEY.
3. SGARLATO, T. J., D.P.M., "SURGICAL MANAGEMENT OF GASTROCNEMIUS EQUINUS".
4. SMITH, STEPHEN D., D.P.M., WEIL, LOWELL SCOTT, D.P.M., "POST GRADUATE SEMINAR SERIES ON BIOMECHANICS AND SURGERY OF THE LOWER EXTREMITIES"

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