

Accessory slip of tibialis anterior muscle- A cadaveric case report

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ABSTRACT

During routine dissection classes in 2014 in the Department of Anatomy, an anomalous insertion of the tibialis anterior tendon was observed on the left side of a formalin-fixed cadaver of a middle aged man without any trace of scars, adhesions or signs of trauma or operation. The tibialis anterior is an important muscle because of its function and its use in tendon transfer as a treatment of recurrent congenital clubfoot and paralytic equinovarus foot deformities in cerebral palsy and arthroscopy. The present case report describes the accessory slip of tibialis anterior muscle in a middle aged male cadaver during routine dissection of left leg and dorsum of foot. The slip was 12.7cm and originated deep to inferior retinaculum and inserted on to the head of first metatarsal.

KEYWORDS: Tibialis anterior, Tendon, Inferior retinaculum.

INTRODUCTION

Several muscles pass through the ankle via tendons, the ones carrying the largest forces one of them being the muscle tibialis anterior.¹ The tibialis anterior runs parallel to the tibia and is the primary muscle used for dorsiflexion of foot. It arises from the lateral condyle and proximal half to two-thirds of the lateral surface of the tibial shaft, from the adjoining anterior surface of the interosseous membrane, from the deep surface of the fascia cruris and from the intermuscular septum between it and extensor digitorum longus. The muscle descends vertically to end in a tendon in the lower third of the leg; the tendon passes through the medial compartments of the superior and inferior extensor retinaculum, inclines medially, and inserts into the medial and inferior surfaces of the medial cuneiform and the adjoining part of the base of the first metatarsal bone. The fascial extensions forwards to the phalanges of the great toe and backward to navicular, talus and calcaneus may reproduce phylogenetic history.²

This muscle is of interest to the foot surgeons because knowledge of the variations will assist them in performing anterior tibial tendon transposition for recurrent congenital club foot. Abnormality of tibialis anterior may be related with flat foot or hallux valgus deformity.^{3,4} This muscle is often affected in poliomyelitis than any other muscle of the body.⁵ The tibialis anterior tendon transfer has been used in the treatment of recurrent congenital clubfoot and paralytic equinovarus deformities in cerebral palsy. It is important to determine the optimal site of tibialis anterior tendon insertion for ankle and foot motion and to compare the split and whole tendon transfer.⁶

CASE REPORT

During routine cadaveric dissection of a middle aged male cadaver at JLN Medical College, Ajmer, Rajasthan, India, a variation was observed in the tendon of tibialis anterior muscle unilaterally on the left side. The muscle was dissected carefully to expose it from its origin, course and insertion. The usual insertion of tibialis anterior is on to the medial and inferior surface of medial cuneiform and adjoining part of base of the first metatarsal. Variations in attachments of tibialis anterior have been recorded by previous authors as attachment to talus, first metatarsal head or base of the proximal phalanx of hallux.⁷ But in the present study, the tendon gave off an accessory slip which was arising deep to inferior extensor retinaculum and got inserted onto the head of first metatarsal bone. Length of the slip was 12.7cms.

DISCUSSION

As the tendon of tibialis anterior is important for surgeons and orthopaedicians there is a need for awareness of variations in this area. Tibialis anterior is the primary dorsi flexor of the ankle and an adequate knowledge of its normal anatomy and variations in attachments and course is required for clinicians. Ebraheim et al. (2003) found the muscle to be a relatively easy flap to use for covering anterior tibial open wounds.⁸ It is also used in tendon transfer as a treatment of recurrent congenital clubfoot and paralytic equinovarus foot deformities in cerebral palsy and arthroscopy.⁹

Thompson et al. (2009) stated that recurrent dynamic and Structural deformities following clubfoot

surgery are commonly due to residual muscle imbalance from a strong tibialis anterior muscle and weak antagonists. They used the tibialis anterior tendon transfer to restore muscle balance in recurrent clubfoot.¹⁰ Tibialis anterior tendon can also be used as a distal landmark for extra medullary alignment in total knee arthroplasty. Using this tendon as distal landmark eliminates any interobserver variability by providing an easily palpable fixed anatomical structure.¹¹ Transfer of tibialis anterior into the talus has been utilized for correction of vertical talus, as well as for paralytic valgus foot deformities.¹²



TA- Tibialis Anterior
EHL-Extensor Hallucis Longus
AS- Accessory Slip

Tibialis anterior insertion has been reported to display variations with regards to its extension on the neighboring bones. Research studies have described multiple variations of some similarities. These types of

variations are only incidental findings and we do admit that regarding these anomalies, a series of observations over a sufficient number of years in multiple cadavers are sure to add more vigor to the existing knowledge.

Anson observed accessory slips to cuneiforms, metatarsals and phalanges.¹³ The slip of the tendon may go to other bones such as talus, head of first metatarsal or base of proximal phalanx of hallux.¹⁴ According to Christopher Bibbo (2004) the accessory tendon was present in 26 of 32 feet (81.25%) with accessory tendon originating from Extensor Hallucis longus in 92.3% and from Tibialis Anterior in 7.7%. 100% of accessory tendon inserted onto the dorsal / dorsomedial aspect of the first metatarsophalangeal joint capsule.¹⁵ In the present study, accessory slip of tibialis anterior was found arising deep to inferior retinaculum and got inserted onto the head of first metatarsal.

REFERENCES

1. Kendall FP. Muscles: Testing and Function. On: Williams & Wilkins Company, 1993. www.case.edu/artsci/sportsmed/ankle%20notes.htm.
2. Hallisy JE. The muscular variations in the human foot: A quantitative Study. *Am J Anat* 1930; 45:411-42
3. Arthornthurasook, Gaew. Anterior tibial tendon insertion: An Anatomical study. *J Med Assoc Thai* 1990; 73:693-96.
4. Brenner E. Insertion of the tendon of the tibialis anterior muscle in feet with and without hallux valgus. *Clin Anat* 2002; 15: 217-23.
5. Romanes GJ. Muscles of leg and foot. In, Romanes GJ (ed). *Cunningham's Text Book of Anatomy*, 10th edition. New York, Oxford university press, 1964: 360.
6. Hui JHP, Goh JCH, Lee EH. Biomechanical study of tibialis anterior tendon transfer. *Clin Orthop Relat Res*. 1998; 349: 249-55.
7. Standring S, Healy JC, Johnson D, Collins P, Borley NR, Crossman AR et al. *Leg*. In: *Gray's Anatomy- The Anatomical Basis of Clinical Practice*, Churchill Livingstone, UK, 2008; 40; 1417-1429.
8. Ebraheim NA, Madsen TD and Humpherys B. The tibialis anterior used as local muscle flap over the tibia after soft tissue loss. *Journal of Trauma*;2003; 55(5) 959-961.
9. Ikiz AAZ and Üçerler H. A previously unreported variation related to the insertion of the tibialis anterior muscle and the superficial fibular (peroneal) nerve. *Anatomical Science International*; 2005; 80(3) 172-175.
10. Thompson GH, Hoyer HA and Barthel T. Tibialis anterior tendon transfer after clubfoot surgery. *Clinical Orthopaedics and Related Research*; 2009; 467(5) 1306-1313.
11. Rajadhyaksha AD, Mehta H and Zelicof SB. Use of tibialis anterior tendon as distal landmark for extramedullary tibial alignment in total knee arthroplasty: an anatomical study. *American Journal of*

Orthopaedics; 2009; 38(3) E68-70.

12. Kissel CG and Blackledge DK. Transfer of tibialis anterior into talus for control of the severe planus pediatric foot: a preliminary report. *Journal of Foot and Ankle Surgery*;1995; 34(2) 195-199.

13. Anson BJ. The musculature. In, Anson BJ (ed). *Morris Human Anatomy*, 12th ed. New York, McGraw Hill Book Company, 1966; 587.

14. Tesch NP, Grechenig W, Heidari N, Pichler W, Grechenig S, Weinberg AM. Morphology of the tibialis anterior muscle and its implications in minimally invasive plate osteosynthesis of tibial fractures. *Knee orthoped*; 2010; 33:157.

15. Bibbo C, Arangio G. The Accessory extensor tendon

of the first metatarsophalangeal joint. *Foot ankle Int*; 2004; June; 25 (6):387-90.

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