



## A CASE STUDY ON REPLACEMENT OF MUSCLE FIBERS BY FATTY TISSUES

**Dr. Ajitkumar S. Wahane<sup>\*1</sup>, Dr. Kanika Jain<sup>2</sup>, Dr. Abhijit Patil<sup>3</sup>, Dr Akshdeep Meshram<sup>4</sup>, Dr. Ankit Tyagi<sup>5</sup>**

<sup>1</sup>Asst. Professor, Dept. of Rachna-Sharir, Pia, Vadodara Gujarat.

<sup>2</sup>PG Scholar 1st YEAR Dept. of Rachna Sharir, Pia, Vadodara Gujarat.

<sup>3</sup>HOD & Professor, DEPT. of Rachna-Sharir, Pia, Vadodara Gujarat.

<sup>4</sup>Professor, Dept. of Rachna-Sharir, Pia, Vadodara Gujarat.

<sup>5</sup>Asst. Professor, Dept. Of Rachna-Sharir, Pia, Vadodara Gujarat.

**\*Corresponding Author: Dr. Ajitkumar S. Wahane**

Asst. Professor, Dept. of Rachna-Sharir, Pia, Vadodara Gujarat.

Article Received on 22/07/2019

Article Revised on 12/08/2019

Article Accepted on 02/09/2019

### ABSTRACT

Muscles of the back of leg found in two groups namely superficial and deep. Superficial muscles include Gastrocnemius, Soleus and Plantaris. Deep muscles are the popliteus, tibialis posterior, flexor digitorum longus and flexor hallucis longus. A wide variety of variations can occur in these muscles. It may be due to any congenital anomaly or physiological variations or any pathology of musculo-skeleton system. Here we typically report a case observed while doing UG 1<sup>st</sup> year (2018-19 Batch) dissection where the muscle bundle of Gastrocnemius and Soleus was intact (not damaged or impaired in any way) as whole but muscle fibers were modified/replaced by fatty tissue.

The variation is rarely seen and must have caused a lot of problems to person during walking, running etc.

**KEYWORDS:** popliteus, tibialis posterior, flexor digitorum longus and flexor hallucis longus.

### INTRODUCTION

Leg is divided into two compartments namely posterior and anterior. In posterior compartments further the muscles are divided into two groups - A- Superficial B- Deep.

Superficial group comprises of Gastrocnemius, Soleus and Plantaris. These muscles are known as calf muscle.

**Gastrocnemius** is the most superficial muscle. It is large & powerful muscle having two heads i.e., medial and lateral. Medial head being larger than lateral. Medial head arises from posterior superior depression on medial condyle of femur with adjoining raised area on popliteal surface along with capsule of knee joint. Lateral head originates from lateral surface of lateral condyle of femur with lateral supracondylar line and capsule of knee joint.

Gastrocnemius inserts onto the heel bone via the Achilles tendon.

**Soleus** -Its a sole shaped multipinnate muscle which lies deep to gastrocnemius. It has a dome shaped origin from back of head and posterior 1/4th of the shaft of fibula along with soleal line and middle 1/3rd of medial border of shaft of tibia. It inserts onto the heel bone along with the gastrocnemius via the Achilles tendon.

Gastrocnemius and soleus together known as Gastrosoleus or Triceps Surae.

**Plantaris** muscle is a small pencil-sized muscle tapering down to a fine tendon. that runs along the posterior aspect of the leg beneath the gastrocnemius and soleus muscles to attach to the Achilles tendon or to the medial side of the tubercle of the calcaneus. It is a vestigial, accessory muscle. It is absent in only 7–20% of limbs.

**Nerve Supply-** All the superficial muscles of posterior leg are supplied by tibial nerve.

**Importance of Gastrocnemius and Soleus** - Both the muscles are strong plantar flexors of foot at the ankle joint. Gastrocnemius also flexes knee. Both the above flexion movements are very important for walking. Soleus is more powerful but Gastrocnemius is faster acting. While walking soleus overcome the inertia of weight and gastrocnemius provides the increase in speed. Soleus is chiefly postural muscle to steady the leg on foot while gastrocnemius is adopted for an erect posture and bipedal gait of man. Soleus play important role in circulation, contraction of which helps in venous return from lower limb through large valve-less sinuses and when the muscle relaxes it sucks blood from superficial

vein through perforation thus Soleus is also known as peripheral heart.

**Dissection procedure** - Deep fascia of leg was vertically incised and reflected. Then flexor retinaculum and tendons enclosed in synovial sheet passing deep to it was identified. Medial and lateral heads of gastrocnemius was identified. After that medial belly was dissected 5cm distal to its origin reflecting it laterally made popliteal vessels, tibial nerve and plantaris visible. Then lateral head was dissected 5cm distal to origin and reflected. Both bellies are then turned distally to identify soleus.



### CASE REPORT

During conducting a routine dissection for undergraduates in Parul Institute of Ayurveda College, we found a typical case of muscle modification / transformation into fatty tissue. When deep fascia was reflected vertically Flexor retinaculum and the tendons were seen and identified. But while looking for bellies of medial and lateral head of gastrocnemius, we found the intact bundle but the muscle fibres were modified into fatty tissue. Later when medial belly was cut and reflected popliteal vessels and tibial nerve and plantaris muscle was seen. But when lateral head of gastrocnemius was reflected and both bellies were made separate again the bundle of soleus was seen but not the muscle fibres. Here also the fibres were replaced by fatty tissues. Other than these two abnormal major muscles no other abnormality was detected.

### DISCUSSION

Variations of such kind are not normal with the major muscles like Gastrocnemius and Soleus. As both the muscles are major muscle of leg doing important functions like weight bearing, walking, flexion, circulation. So any variation in such muscle can lead to a number of problems and complications.

### CONCLUSION

We cannot say whether the abnormality was by birth or occurred in later developmental stage of life. Sarcopenia

is the degenerative loss of skeletal muscle mass associated with the ageing process. In Sarcopenia there is decrease in the size of the muscle along with replacement of muscle fibres with fat. It normally affects balance, gait and overall ability of daily living.

Variations like this can lead to a number of complications so knowledge of this case may be importance to clinicians while having a case of circulatory disorders, cardiac disorders, paralysis, musculo-skeletal disorders.

### REFERENCES

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