

# Prevalence of Various Anomalous Structures during Surgery in Resistant Congenital Talipes Equinovarus

SYED ALI RAZA<sup>1</sup>, MUHAMMAD ASAD MUNIR<sup>2</sup>, FAROOQ MASOUD WATTOO<sup>3</sup>, MUMTAZ HUSSAIN<sup>4</sup>, MUHAMMAD USMAN KHALID<sup>5</sup>, MUHAMMAD HANIF MIAN<sup>6</sup>

<sup>1</sup>Senior Registrar Orthopaedic Surgery, Mayo Hospital, Lahore.

<sup>2</sup>Senior Medical Officer Orthopaedic & Spine Surgery, Lahore General Hospital, Lahore.

<sup>3</sup>Consultant Surgeon Orthopaedic Surgery, DHQ Hospital, Sheikhpura.

<sup>4</sup>Assistant professor Orthopaedic Surgery, Children Hospital, Lahore.

<sup>5</sup>Assistant professor Orthopaedic Surgery, Mayo Hospital, Lahore.

<sup>6</sup>Professor of Orthopaedic & Spine Surgery, Lahore General Hospital, Lahore.

Correspondence to Dr Syed Ali Raza, Email ssherazi1990@yahoo.com, Cell 03415456057

## ABSTRACT

**Aim:** To determine the prevalence of various anomalous structures during surgery in cases presenting with resistant congenital talipes equinovarus.

**Study Design:** Case Series.

**Place and duration of study:** It was a multicentric study conducted at Mayo Hospital, Lahore and The Children's hospital and the Institute of child health, Lahore retrospectively during 01-07-2018 to 30-06-2020.

**Methodology:** In this cross sectional study the cases of both genders with age less than 15 years suffering from resistant congenital talipes equinovarus were included via non probability consecutive sampling. Then these cases underwent correction by Posteromedial release and various anomalies were observed and noted.

**Results:** In this present study 20 cases were included and out of these 14 (70%) were males and 6 (30%) females. Mean age of the subjects was  $4.57 \pm 3.47$  years and mean duration of club foot was  $3.01 \pm 0.79$  years. Out of 20 cases, 16 (80%) cases had bilateral deformity. The most common anomaly detected was Accessory soleus muscle, observed in 6 (30%) of the cases followed by flexor digitorum accessorius longus (FDAL) muscle which was seen in 2 (10%) of the cases. Tarsal coalition were noted in 1 (5%) case.

**Conclusion:** Accessory soleus muscle is the most common anomaly followed by flexor digitorum accessorius longus in cases with congenital talipes equinovarus.

**Keywords:** CETV, FDAL, Coalition.

## INTRODUCTION

Congenital talipes equinovarus (CTEV) or clubfoot is most prevalent congenital limb deformity<sup>1,2</sup>. The prevalence of clubfoot is 5 to 6 per thousand live births, while 80 percent children are living in developing states<sup>3-4</sup>. Both genders are affected by CTEV but more prevalence is observed among males than females. The problem could be bilateral or unilateral. The factors that encourage development comprise neuromuscular conditions, amniotic fluid volume, aneuploidy, genetic syndromes, several gestations and genetic factors<sup>5,6</sup>.

If not timely treated, the malformation will continue and steadily become rigid caused by secondary modifications in the joints and tarsal bones. Permanent weight bearing on lateral border or dorsolateral aspect of foot will lead to pain on walking, callus formation, and difficulty in wearing standard shoes. These could finally affect to the skin breakdown, significant decrease in ambulation level and constraint in the job opportunities<sup>7,8</sup>.

There are number of neurological or musculoskeletal abnormalities either due to the absence of one structure or due to presence of an extra anomalous one can result in Congenital talipes equinovarus. But none of the clinical signs or examination denote a classical underlying pathology leading to club foot. The most common per operative finding during surgery is peroneal nerve

dysfunction. This is followed by FDAL (flexor digitorum accessorius longus). In fewer cases, an abnormal link between tarsal bones is seen which is called as tarsal coalition and believed that it is the outcome of congenital failure of differentiation during developing fetal foot. The accessory soleus muscle (ASM) is also seen in few number of the cases and is a supernumerary muscle bundle developed from soleus muscle, located in front of Achilles tendon, ending either on Achilles tendon or on calcaneus itself<sup>9-11</sup>.

There was no such study seen in our populations, that's why this was planned to quantify the burden of these anomalies in cases with club foot.

The objective of the study was to determine the prevalence of various anomalous structures during surgery in cases presenting with resistant congenital talipes equinovarus.

## PATIENTS AND METHODS;

This multicentric descriptive cases series was carried out at Lahore General Hospital, Lahore and The Children's hospital and the Institute of child health, Lahore during 01-07-2017 to 30-06-2018. In this study the cases of both genders with age less than 9 years suffering from resistant congenital talipes equinovarus were included via non probability consecutive sampling. The cases with any history of trauma to foot, those with history of burn and deformity and the cases that were previously operated for corrective surgery were excluded from this study. Then

Received on 17-07-2020

Accepted on 29-11-2020

these cases underwent correction by posteromedial release and various anomalies were observed and noted.

**Statistical analysis:** SPSS version 24.0 was used for data analysis. Numerical data was presented as mean and standard deviations and Categorical data as frequency and percentages.

## RESULTS

In this present study 20 cases were included and out of these 115 (69.69%) were males and 50 (30.31%) females (table I). Mean age of the subjects was  $4.57 \pm 3.47$  years and mean duration of club foot was  $3.01 \pm 0.79$  years as shown in table II. Out of 20 cases, 14 (70%) cases had bilateral deformity. The most common anomaly detected was Accessory soleus muscle, observed in 6 (30%) of the cases followed by flexor digitorum accessorius longus muscle which was seen in 2 (10) of the cases. Tarsal coalition were noted in 1 (5%) case each as displayed in table III.

Table I: Gender and laterality of club foot (n= 20)

	n	%age
Male	14	70
Female	6	30
Bilateral	16	80
Unilateral	4	20

Table II: Study variables (n= 20)

Variables	Mean $\pm$ SD	Range
Age	$4.57 \pm 3.47$	1-9
Weight	$13.57 \pm 5.09$	3-28
Duration of club foot (yrs)	$3.01 \pm 0.79$	0-9

Table III: Types of anomalies detected (n= 20)

Anomalies	n	%age
Accessory soleus muscle	6	30
Flexor digitorum accessorius longus	2	10
Tarsal coalition	1	5

## DISCUSSION

Congenital talipes equinovarus (CTEV) or clubfoot is one of the common congenital musculoskeletal anomalies and a number of cases are being referred annually at specialized centres. There are multiple underlying anatomical variances and abnormalities leading to its development.<sup>[12-14]</sup>In the present study, the most common anomaly detected was Accessory soleus muscle observed in 6 (30%) of the cases followed by flexor digitorum accessorius longus muscle which was seen in 2 (10%) of the cases. Tarsal coalition was noted in 1(5%) case. These results were in line with the findings of the studies done in the past.

The accessory soleus muscle (ASM) was the most commonly demonstrated anatomical variation in calf muscles. The prevalence ranged from 0.7% to 10% in previous studies and was 30% in the present study<sup>16</sup>. Kouvalchouk and teammates anticipated that it was present among 10 percent of all persons<sup>17</sup>. A few authors, such as Kendi et al. and Christodoulou et al. believed that happening of ASM was an uncommon anatomical change<sup>18,19</sup>. A study done by Downey and Siegeman reported 13(1.9%) cases of an ASM in 689 cadavers<sup>20</sup>.

The flexor digitorum accessorius longus (FADL) was also the second most frequent accessory muscle in ankle and foot region in other studies. This tendon and muscle, mostly observed unilaterally with an anticipated incidence of 6 to 12 percent while more prevalent in males and was 10% in the present study. The origin of flexor digitorum accessorius longus is changeable and can occur from various structures in deep posterior cubicles of leg. Patients may complain of a fullness in medial ankle and infrequently will have a positive Samir-Adam sign on the physical examination<sup>15</sup>.

Tarsal coalition was also observed in 5% of the cases in present study and overall its incidence was reported from < 1 percent to 13 percent in the previous data. Mostly the patients are found with more than 1 coalition in same foot while 50 percent patients are bilateral. Most frequent coalitions involve calcaneonavicular and talocalcaneal bone. In several series, the talocalcaneal coalitions comprise up to 48 percent of all cases of tarsal coalition. It does not seem to be a gender preference of the tarsal coalition<sup>21</sup>.

## CONCLUSION

Accessory soleus muscle is the most common anomaly followed by flexor digitorum accessorius longus in cases with congenital talipes equinovarus.

## REFERENCES

1. Shah MQ, Khan A, Zardad MS, Iqbal R, Ahmed S. Ponseti technique for management of congenital idiopathic club foot. *J Ayub Med Coll Abbottabad*. 2017; 29(2): 246-9.
2. Pullinger M, Southorn T, Easton V, Hutchinson R, Smith RP, Sanghrajka AP. An evaluation of prenatal ultrasound screening for CTEV: accuracy data from a single NHS University Teaching Hospital. *Bone Joint J*. 2014; 96B(7).
3. Kumar A, Sagar V, Runu R, Ranjan M. Treatment of neglected, relapsed, resistant clubfoot by ligamentotaxis using jess and evaluated podographically. *Int J Contemp Med Res*. 2017; 4(9): 1833-5.
4. Leonchuk SS, Neretin AS, Shevtsov VI. Complications in treatment of older children with congenital clubfoot by Ilizarov external fixator. *J Orthop Trauma Surg Related Res*. 2017; 12(3): 21-4.
5. Hussain S, Inam M, Arif M, Sattar A, Saeed M. Turco's postero-medial release for congenital talipes equino-varus. *Gomal J Med Sci*. 2007; 5(2): 51-4.
6. Lauson S, Alvarez C, Patel MS, Langlois S. Outcome of prenatally diagnosed isolated clubfoot. *Ultrasound Obstet Gynecol*. 2010; 35: 708-14.
7. Gunalan R, Mazelan A, Lee YPB, Saw A. Pattern of presentation and outcome of short-term treatment for idiopathic clubfoot/CTEV with ponseti method. *Malaysian Orthopaedic J*. 2016; 10(3): 21-5.
8. Ganesan B, Luximon A, Al-Jumaily AA, Yip J, Gibbons PJ, Chivers A. Developing a three-dimensional (3D) assessment method for clubfoot—a study protocol. *Front Physiol*. 2018; 8: 1098.
9. Balasankar G, Ameersing L, Al-Jumaily A. Current conservative management and classification of club foot: a review. *J Pediatr Rehabilitation Med*. 2016: 1-8.
10. Jeevan RR, Vijayaragavan E, Kirubac A. 3 dimensional modeling of an ankle foot orthosis for clubfoot deformity. *Int J of Biomed Res*. 2011; 2(3): 171-180.

11. Wallander HM. Congenital clubfoot. Aspects on epidemiology, residual deformity and patient reported outcome. *Acta Orthop.* 2010; 339(81): 1-25.
12. Wallander HM. Congenital clubfoot. Aspects on epidemiology, residual deformity and patient reported outcome. *Acta Orthop.* 2010; 339(81): 1-25.
13. Maranhão DA, Volpon JB. Congenital clubfoot. *Acta Ortop Bras.* 2011; 19(3): 163-9.
14. Kruse L, Gurnett CA, Hootnick D, Dobbs M. Magnetic resonance angiography in clubfoot and vertical talus: a feasibility study. *Clin Orthop Relat Res.* 2009; 467(5): 1250-5.
15. LaVallee JR, Pourcho AM, Henning PT, Lambert HW. Sonographic identification of the flexor digitorum accessorius longus tendon. *PMR J.* 2018; 10: 325-7.
16. Kishta WE, Mansour EH, Ibrahim MM. The accessory soleus muscle as a cause of persistent equinus in clubfeet treated by the ponseti method: a report of 16 cases. *Acta Orthop Belg.* 2010; 76: 658-62.
17. Kouvalchouk JF, Lecocq J, Parier J, Fischer M. The accessory soleus muscle : a report of 21 cases and a review of the literature. *Rev Chir Orthop Réparatrice Appar Mot.* 2005; 91: 232-8.
18. Christodoulou A, Terzidis I, Natsis K, Gigis I, Pournaras J. Soleus accessorius, an anomalous muscle in a young athlete: case report and analysis of the literature. *Br J Sports Med.* 2004; 38(6): e38.
19. Kendi TK, Erakar A, Oktay O, Yildiz HY, Saglik Y. Accessory soleus muscle. *J Am Podiatr Med Assoc.* 2004; 94: 587-9.
20. Downey MS, Siegerman J. Accessory soleus muscle: a review of the literature and case report. *J Foot Ankle Surg.* 1996; 35: 537-43.
21. Zhou B, Tang K, Hardy M. Talocalcaneal coalition combined with flatfoot in children: diagnosis and treatment: a review. *J Orthop Surg Res.* 2014; 9: 129.
22. Rani M, Kumari P. Congenital clubfoot: a comprehensive review. *Ortho Rheum Open Access.* 2017; 8(1): 555728.
23. Tabatabaei S, Haddadpour A, Mehdinasab SA. Results of posteromedial release in resistant talipes equinovarus (club foot). *Pak J Med Sci.* 2011; 27(4): 851-4.