

Functional Limitations in Congenital Talipes Equines Patients after Achilles tendon Release Post 3 Months

Sana Asgher¹, Shoaib Waqas², Muhammad Tariq³, Nabeela Dawood⁴, Hafiz Muhammad Asim⁵

¹Rehab Officer, Ghurki Trust Teaching Hospital, Lahore

²Associate Professor Lahore College of Physical Therapy, LMDC, Lahore

³Assistant Professor Lahore College of Physical Therapy, LMDC, Lahore

⁴Senior lecturer Lahore College of Physical Therapy, LMDC, Lahore

⁵ Professor, Lahore College of Physical Therapy, LMDC, Lahore

Author's Contribution

^{1, 3} Conception and design, Collection and assembly of data, Analysis and interpretation of the data, ^{2,4}Critical revision of the article for important intellectual content, Statistical expertise ³⁻⁵Final approval and guarantor of the article

Article Info.

Received: Dec 31, 2020

Acceptance: Feb 07, 2022

Conflict of Interest: None

Funding Sources: None

Address of Correspondence

Dr Shoaib Waqas

Email Id: shoaib.waqas@lmdc.edu.pk

ORID ID: 0000-0002-5592-3596

Cite this article as: Asghar S, Waqas S, Tariq M, Dawood N, Asim HM. Functional Limitations in Congenital Talipes Equines Patients after Achilles tendon Release Post 3 Months. JRCRS. 2022; 10(1):3-5.

<https://dx.doi.org/10.53389/JRCRS.2022100103>

A B S T R A C T

Background: The inability of the ankle to dorsiflex beyond neutral, with the subtalar joint in neutral and the knee in extension, causes difficulties walking is known as talipes equinus. Due to a congenital short Achilles tendon, toe walking with talipes equinus resulted in functional limitations and activity restrictions.

Objective: The purpose of this study was to identify functional limits in congenital Talipes equines after Achilles tendon release after 3 months on the Laavage and Ponseti Functional Rating Scale.

Methodology: A descriptive cross-sectional study was conducted at Ghurki Trust and Teaching Hospital, Lahore, for a period of 6 months from August 2020 to January 2021, in which 102 subjects were included based on inclusion criteria, which included age between 2 and 10 years by a convenient sampling technique, and who received physical therapy rehabilitation. The Lahore College of Physical Therapy's Ethical Committee, as well as the parents and patients, provided their approval. Laavage and Ponseti used the Functional Rating Scale (FRS) to determine each patient's functional limits. The six domains of the FRS scale are satisfaction, function, and discomfort, as well as the position of the heel when standing, passive motion, and walking. This scale represents the extent of functional limitation for these areas as a whole.

Results: From 102 patients, 4 patients (3.9%) presented with extreme functional limitations, 8 (7.8%) with severe functional limitations, 30 (29.4%) with moderate functional limitations, and 60 (58.8%) (n=30) patients were with mild functional limitations.

Conclusion: Patients, who underwent bilateral circumferential Achilles tendon release, had mild functional limitations when assessed through FRS post 3 month.

Keywords: Congenital Talipes Equinus, Achilles Tendon Release, Functional Limitations

Introduction

Talipes Equinus is defined as inability of ankle to dorsiflex beyond the neutral position with subtalar joint in neutral position and knee in extension.¹ The patients with equinus deformity presents with toe tip gait.² It has also been referred to as habitual toe walking and congenital short Achilles tendon (Calcaneus tendon).³

Children of congenital talipes equinus have limitation in passive ankle dorsiflexion and walk on their toes. This deformity results in abnormalities in gait which includes unstable ankle, decrease equilibrium, pelvic tilting and

metatarsal head collision.³ The incidence of talipes equinus is around 5%.⁴ Talipes equinus most commonly occurred in congenital conditions. In acquired conditions it occurs in cerebral palsy, neuromuscular disorders (muscular dystrophy). It can also occur after trauma i.e. nerve injury of anterior or posterior compartment of leg causes compartment syndrome and eventually leads to equinus deformity.²

Conservative management is being done till eight weeks of child age, after that radiographs are taken to confirm clinical suspicion and if one or more clinical findings i.e. (failure

to obtain dorsiflexion at right angle, rocker bottom appearance of foot, bean shaped breech appearance) are being noticed obtained then foot is vulnerable to corrective surgery.⁵ Best operative results are found if TA release procedure would have performed on early age group. Early age group achieve better forefoot alignment and better correction of deformity post operatively.⁶

Main surgical procedures used for correction are sliding lengthening (Vulpius, Baker, and Stair method), Sectional lengthening (Z lengthening procedure).⁴ Functional status is measured through functional rating scale for patients treated with bilateral circumferential TA release procedure by Laavage and Ponesti.⁷

While literature searches, definitely, there was plenty of literature which highlights the importance of physical therapy rehabilitation after Achilles tendon release and it's at international and national level but not particular in our setting. So to observe the Post-Operative functional limitations in congenital talipes equinus after physical therapy rehabilitation was done so that best possible measures should be taken by surgeons and pediatric physical therapist to minimize their limitations for uplifting their quality of life.

Methodology

A descriptive cross-sectional study was conducted at Ghurki Trust and Teaching Hospital, Lahore, for a period of 6 months from August 2020 to January 2021, in which 102 subjects were included based on inclusion criteria, which included age between 2 and 10 years by a convenient sampling technique, and who received physical therapy rehabilitation. The Lahore College of Physical Therapy's Ethical Committee, as well as the parents and patients, provided their approval. The functional rating scale (FRS) contains six domains: satisfaction, function, and pain, as well as heel position when standing, passive motion, and walking. The higher score at functional rating scale implies that there is more elevated level of limitation and less means lower level of limitation. On behalf of these domains, this scale collectively indicates about level of functional limitation with validity chronbach alpha (0.90) (7, 8) and greater inter and inter-rater reliability with ICC value 0.78. Statistical Package for Social Sciences (SPSS) version 22 was used to enter and analyze data. Descriptive statistics were used to present the study variables (tables, graphs and percentage).

Results

From 102 patients, 4 patients (3.9%) presented with extreme functional limitations, 8 (7.8%) with severe functional limitations, 30 (29.4%) with moderate functional limitations, and

60 (58.8%) (n=30) patients were with mild functional limitations. (Table I)

According to age group, patients from age group 3 to 4 years were with 50% functional limitation, age group 5 to 7 years was 18.62% and age group 8 to 10 years was 31.37% respectively. (Table II)

Table I: Total score of functional limitations

Functional limitation	N (%)
Extreme functional limitations	4 (3.9%)
Severe functional limitations	8 (7.8%)
Moderate functional limitations	30 (29.4%)
Mild functional limitations	60 (58.8%)
Total	102 (100%)

Table II: Functional limitation according to age groups

Functional limitation Age Groups	3 to 4 years	5 to 7 years	8 to 10 years	Total
Extreme functional limitations	1	1	2	4
Severe functional limitations	4	2	2	8
Moderate functional limitations	15	4	11	30
Mild functional limitations	31	12	17	60
Total	50%	18.62%	31.37%	100%

Discussion

Achilles tendon lengthening procedure was used after serial casting in order to gain normal foot alignment, pain-free functional foot with good mobility, without contractures and no long use of shoe wear modification. Functional Rating scale is used to assess' functional limitations after TA release procedure, in which functional limitations are categorized as extreme, severe, moderate and mild. The study found that maximum participants had mild functional limitations when assessed after 3 months of the TA release procedure.

Zhengxun Li et al have used two types of lengthening procedures in their studies i.e. Z lengthening and stair shaped Achilles lengthening technique. Both have good results but in stair shaped TA release 2-week immobilization period is sufficient as in current study, circumferential TA release procedure was analyzed and traditional immobilization period was taken. Results showed mild functional limitations at follow up.²

A study which was conducted in by Pearce CJ et al in 2019 , 9 patients were studied after TA release results were good in 7 patients and fair in two patients. There were no complications noted. All nine patients could walk with weight

bearing and were able to return to their previous job or school (1) while in current study, 4 patients (3.9%) presented with extreme functional limitations, 8 (7.8%) with severe functional limitations, 30 (29.4%) with moderate functional limitations, and 60 (58.8%) (n=30) patients were with mild functional limitations depicting the same aspect.⁸

Cheng Li Lin et al had taken 22 patients average age was 6.2 years. Immobilization period varies from 3 to 7 weeks. Overall results were good with no recurrence of deformity as depicted in current study.⁹

The results obtained in the second group, treated with our manipulation technique and cast immobilization followed by an open heel cord lengthening and a limited ankle release, were far superior to those obtained in the first group, treated with our manipulation technique and cast immobilization followed by an extensive posteromedial foot release.⁷

After the forefoot adduction and hind foot varus have been adequately treated, an early subcutaneous tenotomy of the Achilles tendon is performed for the club foot deformity with improved functional restriction, as in the current study, according to Hussain N et al.¹⁰

In future studies, there must be a research on comparison of functional limitations in different types of surgical release methods so that best method would be identified, applied and least functional limitations would be faced in future.

Conclusion

Patients, who underwent bilateral circumferential Achilles tendon release, had mild functional limitations when assessed through FRS post 3 month.

References

1. Hahn SB, Park HJ, Park HW, Kang HJ, Cho JH. Treatment of severe equinus deformity associated with extensive scarring of the leg. *Clinical Orthopaedics and Related Research*. 2001;393:250-7.
2. Li Z, Zhang N, Wang Y, Cao S, Huang Z, Hu Y. Stair-shaped Achilles tendon lengthening in continuity—A new method to treat equinus deformity in patients with spastic cerebral palsy. *Foot and Ankle Surgery*. 2019;25(2):165-8.
3. Sala DA, Shulman LH, Kennedy RF, Grant AD, Chu MLY. Idiopathic toe-walking: a review. *Developmental medicine and child neurology*. 1999;41(12):846-8.
4. Engström P, Tedroff K. Idiopathic toe-walking: prevalence and natural history from birth to ten years of age. *JBJS*. 2018;100(8):640-7.
5. Addosooki A, Tammam H, Morsy AF, Marzouq A, Ahmed EH, Ahmed AM, et al. Correlation of radiographic parameters with clinical correction in idiopathic congenital talipes equinovarus undergoing Ponseti treatment. *International Orthopaedics*. 2021:1-8.
6. Yamamoto H, Muneta T, Ishibashi T, Furuya K. Posteromedial release of congenital club foot in children over five years of age. *The Journal of bone and joint surgery British volume*. 1994;76(4):555-8.
7. Ippolito E, Farsetti P, Caterini R, Tudisco C. Long-term comparative results in patients with congenital clubfoot treated with two different protocols. *JBJS*. 2003;85(7):1286-94.
8. Pearce CJ, Carmichael J, Calder JD. Achilles tendinopathy and plantaris tendon release and division in the treatment of non-insertional Achilles tendinopathy. *Foot and Ankle Surgery*. 2012;18(2):124-7.
9. Lin C-L, Lin C-J, Huang M-T, Su W-R, Wu T-T. Mesh Achilles tendon lengthening—a new method to treat equinus deformity in patients with spastic cerebral palsy: surgical technique and early results. *Journal of Pediatric Orthopaedics B*. 2013;22(1):14-9.
10. Hussain N, Khan T, Ahmed A. Complete subcutaneous tenotomy of tendo-achilles in clubfoot patients—a four year follow up. *The Journal of Surgery*. 2004;2(1):17-9.

Copyright Policy

All Articles are made available under a Creative Commons "**Attribution-NonCommercial 4.0 International**" license. (<https://creativecommons.org/licenses/by-nc/4.0/>). Copyrights on any open access article published by *Journal Riphah college of Rehabilitation Science (JRCRS)* are retained by the author(s). Authors retain the rights of free downloading/unlimited e-print of full text and sharing/disseminating the article without any restriction, by any means; provided the article is correctly cited. JRCRS does not allow commercial use of the articles published. All articles published represent the view of the authors and do not reflect the official policy of JRCRS.