



Effect of Faradic Foot Bath in Patients with Flat Foot: A Literature Review

Dr. Gayathri Devi¹

¹(PT), Department of Physiotherapy, Sridevraj Urs Medical College, Kolar.

Emails: gayathridevitsiddaraju@gmail.com¹

Abstract

randomized controlled trials, meta-analyses, and systematic reviews that investigated the role of faradic foot bath therapy in improving foot function. Evidence from these studies demonstrates that faradic stimulation enhances muscle activation, promotes local blood circulation, and strengthens the intrinsic muscles of the foot, thereby improving the structural integrity of the arch. The results of this study suggest that faradic foot bath stimulation can serve as a valuable physiotherapeutic intervention for individuals with flexible flat foot, aiding in restoring proper foot alignment, reducing pain and discomfort, and improving overall functional mobility. This non-invasive and cost-effective approach offers significant potential for inclusion in comprehensive rehabilitation programs for flat foot management. Flat foot, also known as pes planus, is a prevalent musculoskeletal condition that affects approximately 20% of the adult population, with its occurrence steadily rising. The condition is commonly observed in individuals who are overweight or obese, as excessive body weight places increased stress on the medial longitudinal arch, leading to its gradual collapse. This research focuses on assessing the therapeutic effectiveness of faradic foot bath stimulation in the management of flexible flat foot. An extensive review of relevant literature was conducted using reputable databases such as PubMed and Cochrane Library, emphasizing.

Keywords: Physical therapy , Faradic foot bath , Flat foot deformity , Faradic stimulation.

1. Introduction

The foot deformity that results in a reduction of the medial longitudinal arch is referred to as flat foot. The foot is the final joint in the lower kinetic chain and is further divided into functional, rigid, and structural flat feet. It bears the body's weight through two half columns. Individuals with flat feet experience a reduction in the medial arch when bearing weight, whereas those with structural flat feet show no such reduction. The condition may be either congenital or acquired. Flat foot can result from lameness, pronation, peroneal foot, rheumatoid arthritis, joint pain, muscle shortening, tendon laxity, or talar drop. Various contributing factors include prolonged sitting or resting positions, improper footwear, tight Achilles tendons, or tearing of ligaments and tendons. In young individuals, pes planus often occurs due to dysfunction of the dorsal tibial ligament, which supports the medial arch of the foot. Shortening or damage to the hip's outer rotator muscles can cause hip adduction and dynamic knee valgus, influencing foot pronation during running. Reduced joint strength

leads to decreased foot eversion and limited range of motion, which may contribute to hip and knee joint problems such as anterior cruciate ligament injury and patellofemoral pain syndrome. Flat foot may also cause ankle and foot issues like chronic ankle pain and plantar fasciitis. Studies show that 18-year-olds have a 2.5% incidence of bilateral flat foot, 22-year-olds have 3.75%, and 24-year-olds have 1.25%. The two main goals of treatment are foot realignment and pain relief. Arthrodesis and arthrodesis are common reconstructive surgical procedures used to correct flexible flat foot. Physiotherapy, barefoot walking, and other prescribed exercises are also effective in managing flat feet. The main objectives of these programs are to loosen constricted tissues, strengthen weak muscles, improve proprioception and balance, and enhance flexibility of the ankle and foot joints. Weight-bearing exercises on one leg are particularly beneficial for maintaining proper alignment and stability for proprioception and balance mid foot bone mobilization and Faradic stimulation of the foot



.Some people with generalized hyper laxity have severe flat feet that distort shoes .Medicine ,surgery and physical therapy are the three management options for flexible flat feet if there is any indication of inflammation, a doctor may give medications such as NSAIDS [1-3].

2. Biomechanics and Pathophysiology of Foot

The flat foot has been referred to by a variety of names. Pesplanus, Planovalgus, Calcaneo valgus and collapsed arches are few of more prevalent ones.

The human foot includes 26 bones, more than 30 joints, a number of intrinsic musculotendinous units, ten major extrinsic tendons and their corresponding muscles together with the neurovascular components, fat pads and skin these musculoskeletal systems provide a mobile, perceptive and adaptable base for standing as well as a means of balance and mobility during gait. The common end point of any condition that causes the medial longitudinal arch to collapse is known as the flat foot. Flatfeet can be asymptomatic or result in significant problems. As long as the flat foot performs in its usual capacity without any symptoms. It is currently accepted as a normal variety youngsters have flatfoot throughout development. There are numerous causes of developmental flat feet, which can be flexible or inflexible, symptomatic or asymptomatic. A tarsal coalition, a congenitally vertical talus, or an accessory navicular bone are a few examples of conditions that might result in aberrant bone and joint development. A flat foot deformity can also result from soft tissue of generalized ligamentous laxity. Adult flat feet can either be classified as acquired flat or as residual flat feet from a developmental origin. A tight triceps surae or isolated gastrocnemius tightness, posterior tibial tendon dysfunction, midfoot laxity, external rotation of the hindfoot, subluxation of the talus, traumatic deformities, ruptured plantar fascia, Charcot's foot, and neuromuscular imbalance (polio, Cerebral palsy, closed head injury, or after a cerebrovascular accident) are all linked to acquired flat feet. It is challenging to because there are so many possible causes for flat feet. It is difficult to pinpoint the exact cause in every circumstance [4-7].

2.1 Aim of the Study

Aim of the study is to identify additional research to find the effectiveness of Faradic Foot Bath in patients with flat foot [8-10].

2.2 Objective of the Study

- To find more information on effectiveness of faradic foot bath in patients with flat foot.
- To gather more data on impact of faradic foot bath in patients with flat foot [11-15].

3. Methodology

Research Design: Literature Review

Source of Data: PUBMED, Cochrane

Study Duration: 3 months.

Inclusion criteria:

1. Articles [2016 -2022].
2. Full-text articles.
3. Articles in English
4. Correction of deformity
5. Randomized control trail, Case studies, Meta-analysis, and Systematic review included.

Exclusion criteria:

1. Articles before 2017.
2. Abstract.
3. Articles in other languages.
4. Intervention of faradic foot bath not used.
5. Narrative review excluded.

KEYWORDS: Physical therapy, Faradic Foot Bath, Electrical Stimulation, Flat Foot, shown in Table 1.

4. Methodology

Research Design: Literature Review

Source of Data: PUBMED, Cochrane

Study Duration: 3 months.

Inclusion criteria:

1. Articles [2016 -2022].
2. Full-text articles.
3. Articles in English
4. Correction of deformity
5. Randomized control trail, Case studies, Meta-analysis, and Systematic review included.

Exclusion criteria:

1. Articles before 2017.
2. Abstract.
3. Articles in other languages.
4. Intervention of faradic foot bath not used.



5. Narrative review excluded.

Keywords: Physical therapy, Faradic Foot Bath, Electrical Stimulation, Flat Foot

Table 1 Results

SI No	Year/Author	Title of the Article	Type of Article	Methodology	Results	Remark
01	2017 Veerpreet kaur,Paramjeet Kaur , Kavitha kushal	Effect of faradic foot bath on flexible flat foot	Observational study	The study comprised A total of 30 subjects with flat feet Men and Women between 18 to 28 years were included, subjects with bilateral and unilateral flat foot patients were included subjects were assessed by the Staheli's Arch Index. All the patients were received total 3cweeks of intervention	Mean of pre and post value of Staheli's Arch Index is 1.36 and 1 respectively. The result shows highly significant in nature	This study concluded that Faradic Foot Bath intervention is highly effective to the people with flat foot and it is easily available, affordable, safe and effective treatment.
02	2017 Charleen D'Silva Santhosh Metgud , Anand Heggannavar	Comparative effect of Mobilization, Low dye taping and Faradic Foot Bath in subjects with flat foot	Randomized controlled trail	The study comprised a total of 51 subjects of aged between 18 to 30 years both males and females included. Group A was treated by talo navicular mobilization and conventional exercise for 20 repetitions of 3 sets. Group B received low dye taping Group C received Faradic Foot Bath and conventional exercises with 30 contractions, 3 repetitions	In group A , B and C patients had improvement in navicular drop height. According to the comparison between three groups there was no statistically significant difference and it is concluded that all groups were equally effective	This study concluded that the low dye taping and the Faradic Foot Bath mobilization are all effective in the treatment of flat feet and are readily available, affordable, safe and effective treatments



03	<p>2019 Khushboo A Patel Nupoor Kulkarni</p>	<p>The effect of intrinsic muscle strengthening exercises alone is being compared with the effect of Faradic foot bath combined with intrinsic muscle strengthening exercises in young individuals who have pes planus (flat foot).</p>	<p>Randomized Control trail</p>	<p>30 participants aged 18–25, men and women, took part in this study. Demographic data were collected and participants were assessed using the foot position index prior to the 3-week intervention. Group A was treated with intensive muscle-strengthening exercises and Group B was treated with a 3-week intervention of faradic foot bath and internal muscle-strengthening exercises.</p>	<p>The characteristics of all the people taking part were similar in the two groups. The outcomes from the two groups showed no statistically meaningful difference, so it was concluded that both groups were helpful.</p>	<p>The study concluded that the effects of intrinsic muscle strengthening exercises alone compared to faradic foot bath and intrinsic muscle strengthening exercises are all effective in the treatment of the flat feet and is an accessible, affordable, safe and effective treatment.</p>
04	<p>2018 Siddhi S Tendulkar, Vaishali V foot in young individuals with flat feet</p>	<p>Effect of Faradic stimulation vs. intrinsic muscle strengthening of foot in young individuals with flat feet</p>	<p>Experimental study</p>	<p>The current study included 30 participants of age group 18 to 30 years divided into 2 groups Group A and Group B Subjects in group A treated by Faradic stimulation to the intrinsic muscle of the foot Subjects with group B were treated by strengthening exercises for 4 weeks</p>	<p>The results show that participants benefited from strengthening exercises and were found to be effective in improving the foot posture index and foot functional index in people with flat feet. Internal muscle strength exercises stimulate proprioceptors in the legs and</p>	<p>This study concluded that the strengthening of the intrinsic muscle is more beneficial in improving foot posture index (FPI) and Foot function index (FFI) in individuals with flat feet</p>



					<p>this improve stability and voluntary muscle function</p>	
05	<p>2017 Santhosh Metgud , Charleen D' Silva ,Anand Heggannavar</p>	<p>Effect of low dye taping and Faradic Foot Bath in subjects with flat foot</p>	<p>Randomized clinical trial</p>	<p>The study comprised of thirty-four subjects aged between twenty-two to twenty-seven years, both males and females, who were included in this study. In this study, subjects were randomly allocated with seventeen people in each group, namely Group A and Group B. Group A was treated with low dye taping and Group B was treated with Faradic foot bath. It is three weeks of intervention.</p>	<p>"There was no statistically significant difference found between the groups. It was summarized as that the low-dye taping and faradic foot bath were equally effective in reducing the navicular drop height and arch index in subjects with flat foot."</p>	<p>The study concluded that both orthotic wedge low dye taping and faradic foot bath are effective in treating flat feet, increasing navicular height; thus, these treatments are effective and easy to achieve in the treatment of the flat feet.</p>
06	<p>2019 Juntip Namsawanh , Wichai Eungpinichpong , Ratana Vichiansiri ,Somchai Rattanathongkom</p>	<p>Effects of the short foot exercises with neuromuscular electrical stimulation on navicular height in flexible flat foot in thailand</p>	<p>Randomised control trail</p>	<p>This study comprised of 36 healthy people with flexible flat foot were randomly allocated to groups A and Group B Group A received treatment with SFE and Palcebo NMES treatment (Control Group) Group B received both SFE and NMES treatment (experimental group) It was 4 weeks of treatment protocol for</p>	<p>In , total 36 participants with flexible flat foot were recruited No participants left the trail . Data from all 36 participants were analysed comparatively with the study intervention was excellent, including all</p>	<p>This study concluded that both are effective treatment and these treatments are affordable and safe</p>



				navicular height of CSA of the Abductor and adductor muscle activity were assessed before and after treatment	18 participants in the experimental group	
--	--	--	--	---	---	--

5. Discussion

A literature review primarily aimed to observe the effect of faradic foot bath on patients with flatfoot include treatments such as mobilization, low dye taping, short foot intrinsic muscle strengthening, electrical stimulation such as faradic foot bath, foot arrangement and balance rehabilitation. Four out of six articles showed high quality of evidence proved that faradic foot bath (Electrical stimulation) showed significant results for flat foot. Few studies showed that individuals with flat foot also benefited from such as low dye taping and short foot exercise training. A study done by Veerpreet Kaur, stated that application of electrical stimulation reduces foot pain and aids in maintaining the medial longitudinal arch, its impact is statistically significant. Numerous research have emphasized the benefits of faradic foot bath and remedial activities for flexible flat foot and foot alignment problems. Another RCT's study states that exercises and electrical stimulation helps in treating or preventing flat feet and it lowers the prevalence of calluses, bunions, hammertoes and arthritis. Asymptomatic people with flatfeet were included in the current study. Additionally flat feet cause numerous biomechanical changes in the body have negative impact on the person's overall health. Present study's findings confirmed those made by authors regarding the superiority of exercise plus electrical stimulation over exercise alone for boosting quadriceps muscle strength. Literature done by Khushboo A Patel provided a benefits of strengthening exercises and electrical stimulation showed highly significant improvement. A study showed that recovery rates are significantly high after

three week of procedure and faradic foot bath can be beneficial with patients with flat foot. Siddhi S T Tendulkar conducted a study and it is aimed to define a comparison between the results and determined them, after receiving therapy with faradic stimulation the foot function as improved more than the foot posture index. By strengthening exercises of foot muscle improve stability and voluntary muscle activities. Another RCT conducted on Karnataka state that light colored taping works by controlling foot pronation by pulling the calcaneus anteriorly and medially which limits rare foot rotation and faradic foot bath increases quadriceps muscles strength both helps in controlling and improving of foot pronation. As these studies provide good evidence for benefits of physical therapy treatment in patients with flat foot. A few strengths of this study are it overviews the effect of advanced treatments available for flat feet. Some limitations of the study are only; the PubMed database and Google Scholar were used for search. with the scope of literature search, we found studies were conducted over various regions of the world it might be helpful to desire knowledge in clinical practice

Conclusion

In this literature review, six articles related to effect of faradic stimulation on patients with flat foot we concluded that evidence support that faradic stimulation helps in increasing the muscle strength in patients with flat foot. Electrical stimulation of frequency of 60 Hz is effective in improving muscle strength of patients with flat foot. These results were statistically found in this study.



Reference

- [1]. *Lainey CG, Wainsley RP, Andrew GM*. Effectiveness of exercise alone versus exercise plus electrical stimulation in strengthening the quadriceps muscle. *Physiotherapy Canada*. 1983 Jan-Feb;35(1):5-11.
- [2]. *Headlee DL, Leonard JL, Hart JM, Ingersoll CD, Hertel J*. Fatigue of the plantar intrinsic foot muscles increases navicular drop. *J Electromyogr Kinesiol*. 2008 Jun;18(3):420-5.
- [3]. *Maheswari & Mhaskar*. Essential Orthopedics (Including Clinical Methods). The Health Sciences Publisher. 2015;5:326
- [4]. *D'Silva C, Metgud S, Heggannavar A*. Comparative effect of mobilization, low dye taping and faradic foot bath in subjects with flat foot-A randomised clinical trial. *IOSR-JSPE*;2017;4(3):55-60.
- [5]. *Yu-Chi H, Lin-Yi W, Her-Cherng W, Kai-Lan C, Chau-Peng L*. The Relationship between the Flexible Flatfoot and Plantar Fasciitis: Ultrasonographic Evaluation. *Chang Gung Med J*. 2004; 27(6): 443-448.
- [6]. *Kısacık P, Tunay VB, Bek N, Atay ÖA, Selve J, Karaduman AA*. Short foot exercises have additional effects on knee pain, foot biomechanics, and lower extremity muscle strength in patients with patellofemoral pain. *Journal of Back and Musculoskeletal Rehabilitation*. 2021; 1-12. doi: 10.3233/BMR200255.
- [7]. *Chang Ryeol lee* et al. relationship between balance and foot pressure in fatigue of the plantar intrinsic foot muscle of adults with
- [8]. *Christopher Lee Gibson* et al. Alterations in Foot Plantar Pressures and Contact Area with Plantar Electrical Stimulation, 2013.
- [9]. *Sulowska I, oleksy L* et al. Influence of plantar short foot muscle exercises on foot posture and fundamental movement patterns in long distance runners, a nonrandomized non blinded clinical trial, 2016.
- [10]. *Tiberio D*. The effect of excessive subtalar joint pronation on patellofemoral mechanics: a theoretical model. *J Orthop Sports Phys Ther*. 1987;9(4):160-165. PubMed ID: 18797010 doi:10.2519/jospt.1987.9.4.160
- [11]. *Kang MH, Kim SY, Kang MJ, Yoon SH, Oh JS*. Effects of isometric hip movements on electromyographic activities of the trunk muscles during plank exercises. *J Phys Ther Sci*. 2016;28(8):2373-2375. PubMed ID: 27630435 doi:10.1589/jpts.28.237
- [12]. D. Stevens VK, Vleeming A, Bouche KG, Mathieu NN, Vanderstraeten GG, Danneels LA. Electromyographic activity of trunk and hip muscles during stabilization exercises in four-point kneeling in healthy volunteers. *Eur Spine J**. 2007;16(5):711-718. PubMed ID: 16896840 doi:10.1007/s00586-006-0181-1
- [13]. Neumann DA. *Kinesiology of the Musculoskeletal System: Foundations for Rehabilitation*. St. Louis, MO: Elsevier Health Sciences; 2013.
- [14]. DiGiovine NM, Jobe FW, Pink M, Perry J. An electromyographical analysis of the upper extremity in pitching. *J Shoulder Elbow Surg**. 1992;1(1):15-25. PubMed ID: 22958966 doi:10.1016/S1058-2746(09)80011-6
- [15]. Rasmus Nielsen G, Michael Rathleff S, Ole Simonsen H, Henning Langberg. Determination of normal values for navicular drop during walking: a new model correcting for foot length and gender. *J Foot Ankle Res**. 2009; 2:12.