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Effect of Faradic Foot Bath on Flexible Flat Foot

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Abstract: ***Background: Flatfoot is a condition in which the there is reduction in medial longitudinal arch Interventions used to attempt to correct excessive pronation include Faradic Foot Bath, orthotics and corrective exercises programme. Therefore the purpose of the study is to describe the outcome for a series of patient with Flexible Flat Foot who will be treated with Physical therapy treatment program, given by the researcher. Design: An Observational Study. Method: The Study sample included 30 subjects of age group 18-28years. Subjects were then asked to sign the Consent form and gave their will regarding being enrolled in the study. During the assessment, subjects were assessed by the Staheli's Arch Index. Assessments were done as per the Assessment form. All the patients were received total intervention for 3 Weeks. The patients were assessed at baseline and after 3 Weeks. Results: After statistical analysis, a significant improvement was found in the Staheli's Arch Index. The level of improvement ($p<0.0001$) was significant high with Faradic Foot Bath on Flexible Flat Foot. Conclusion: The present study has concluded that Faradic Foot Bath is effective foe 3 weeks in the management of flexible flat foot. However, it was statistically significant found in this study.***

Keywords: Faradic Foot Bath, Flexible Flat Foot, Staheli's Arch Index

1. Introduction

The foot is the terminal joint in the lower kinetic chain and the body weight is borne through two half columns of the foot with the medial border of each foot raised from the ground. [1] Flat foot is also known as Pes Planus, is a foot deformity in which there is reduction in the medial longitudinal arch.[2] There are two types of flat foot deformities. The first type (Rigid or Congenital Flat Foot) is relatively rare. The second type is (Acquired or Flexible Flat Foot). In this case the deformity is similar to the rigid flat foot, but the foot is mobile and there are few, if any, soft tissue contracture and bony changes. [3] According to age 18 years were having 2.5% of bilateral flat foot, 22 years were having 3.75% bilateral flat foot, 24% years were having 3.75% bilateral flat foot,24 years were having 1.25% bilateral flat foot.[4] The biomechanical causes are divided into Congenital and Acquired. The congenital causes are infantile or physiological, congenital vertical talus and the acquired causes are occupational, obesity, postural, secondary to anatomical defect elsewhere (External rotation of the limb, Genu Valgum, Equines deformity of the ankle, Varus deformity of the foot). The other causes are paralytic - flaccid flat foot, spasmodic- due to peroneal spasm , arthritic- rheumatoid arthritis, traumatic- fracture calcaneum.[5]

Flexible flat feet can occasionally be painful with more specific complaints after intense exercises or long walks. The pain is diffuse in the feet and lower legs. [6] Flexible flat feet rarely cause pain or disability in infancy and childhood. Children in this age group usually present for evaluation because of their parents concern about the appearance of the feet or because of a family history of special shoe wearing during childhood.[7,8] In some patients with general hyper laxity, the flat foot can be severe and deforms the shoes.[9]

There are three treatments for the management of the Flexible Flat Foot that are Medication, Surgery, Physiotherapy. Medical (Non Steroidal Anti Inflammatory Drugs NSAIDS) may be prescribed if any evidence of inflammation is present. [10] Surgery: The goals of the surgery are Pain reduction and realignment of the foot. Surgical management of the Flexible Flat Foot can be grouped into three types of reconstructive procedures, Arthrodesis and Arthroresis.[11,12,13] Physiotherapy: Exercise for flat feet, the form of barefoot walking and also prescribe activities have also been used.[14] The Main focus of exercise program is on stretching tight structures, strengthening the weak components and improving proproception and balance. For maintaining flexibility- Passive ROM exercise of ankle and all foot joint. For proprioception and balance: single leg weight bearing. [9] Mobilizing the bones of the midfoot and faradic stimulation for the foot. [2]

2. Research Methodology

Study Design: An Observational Study
Research Setting: Adesh University, Bathinda
Sample Size: 30 Subjects
Sampling Method: Convenient Sampling

Ethical Approval and Consent

Approval was taken for this study from the Institutional Research Committee and Ethical Committee of Adesh University, Bathinda. All the subjects were informed about the nature of the study and written and verbal informed consent was taken.

Sampling Criteria

Inclusion criteria

- Age group = 18 – 28 years (Males and Females)
- Subjects with unilateral or Bilateral Flexible Flat Foot

Exclusion criteria:

- Traumatic injury of foot and leg (eg. fractures)
- Soft tissue injury of lower limb (eg. Strains & Sprains)

- Subjects received any medical or conservative treatment for arch management
- History of any lower limb surgery
- Lower Limb Pathology
- Any Neurological Condition of Lower Limb

Variables
Independent- Faradic Foot Bath
Dependent- Staheli's Arch Index

Tools of Data Collection:
- Stamp Ink
- Brush
- Centimeter Scale
- A4 Sheets

Outcome Measure

Staheli's arch index: Staheli's Arch Index is used to calculate the ratio of the area of the middle third to the whole toeless footprint area. Staheli's has characterized the width of the foot in the area of the arch and the heel, and the ration between these widths is called the Staheli's arch index. (9)

PI = A/B

- Here A = Measurement of the support width of the central region to the foot.
- B = measurement of the support width of the heel region to the foot.

Figure 7.1

Reliability of the Arch Index: The Arch Index demonstrated excellent reliability, with an intra class correlation coefficient of (ICC) 0.99 (95% CI, 0.97-0.99). (15)

Procedure
30 Subjects were included in this study after the approval from Institutional Research Committee and Ethical Committee of Adesh University on the basis of selection criteria. Subjects were then asked to sign the Consent form and gave their will regarding being enrolled in the study. During the assessment, subjects were assessed by the Staheli's Arch Index. Assessments were done as per the Assessment form. Before giving the treatment the equipment was checked with the help of tester. All the patients were received total intervention for3 Weeks. The patients were assessed at baseline and after 3 Weeks.

Foot Print Study: For obtaining foot prints, we used floor as a platform. A Sheet of paper was stabled by the therapist's hands on the floor. After applying ink we requested the subject to stand and perform a small flexion of the ipsilateral knee (about 30), with the aid of the investigator and then to go to the initial position, removing the foot from sheet. (16)

Treatment Protocol

Faradic Foot Bath- Electric stimulation of frequencies above 60 Hz helps in improving the muscular strength. (2) The pattern of electrical stimulation will set to reduce a maximum tetanic contraction within the participant's pain threshold. The Galvanic setting will be zero. The Faradic setting will be determined by patient's tolerance. Pulse Mode 10 minute (10 Sec Contraction with 50 Sec rest period and 10 repititions) 5 sessions per week for 3 week. (17, 18) The subjects will be in sitting position and the foot placed in tray filled with water. The placement of the electrodes one at the heel and other at metatarsal head to stimulate the intrinsic muscles of foot. (1)

3. Results

Staheli's arch index (in mm)	Pre-value	Post-value	t – value	p– value*
Mean	1.36	1	28.82	< 0.0001

*p < 0.0001 is significant

Mean of Pre and Post value of Staheli's arch index is 1.36 and 1 respectively. The t- value is 28.82 at p- value 0.0001. The result shows that it is highly significant in nature.

4. Discussion

The aim of this study was to find the effect of Faradic Foot Bath on Flexible Flat Foot. The effect has been studied by the means of clinical evaluation. As there were limited studies in the literature which showed the effect of Faradic Foot Bath alone on flexible flat foot. Therefore, present study was focused on it.

The results of the present study indicated that the Faradic Foot Bath was effective in improving the medial longitudinal arch in flexible flat foot. There was a higher statistically significant difference found in between the pre and post treatment Staheli's arch index measurements applied to the subjects with flexible flat foot.

The effect of the Faradic Foot Bath is statistically significant as it decreases the foot pronation in flexible flat foot and it helps to maintain the medial longitudinal arch.

Many studies stressed on the effect of Faradic Foot Bath and corrective exercises on flexible flat foot on foot alignment factors. In flat foot – the head of the talus bone is displaced medially and distal from the navicular. As a result, the spring ligament and the tendon of the tibialis posterior muscles are stretched, so much so that the individual with flat foot loses the function of the medial longitudinal arch.

Charleen D' Silva et al, (2017) conducted the study on Comparative effect of mobiliztion, Low Dye Taping and Faradic Foot Bath in subjects with Flat Foot. This study

concluded that the intragroup comparison results showed a decrease in the navicular drop height in all the groups which was stastically significant. There was no change in the arch index post the intervention in moblization, low dye taping and faradic foot bath group.

Neel M Blitz e al (2010), Conducted a study on Therapeutic management of Flexible Flat Foot. They conclude that flexible flat foot is the complex condition various non-surgical modalities can be used to structurally realign the foot. Surgical intervention is warranted when conservative treatment has failed. The objective of any treatment is to re-align the foot and eliminate pain.

Menz HB et al (2005), Conducted a study on Validity of three clinical techniques for measurement of static foot posture in older people. They concluded that Arch Index Navicular height and the foot posture index are significantly co-related with measurements obtained from radiographs. Therefore provide useful information regarding the structure of medial longitudinal arch.

Lee JE et al (2013), Conducted a study on A Comparison of muscle activities in the lower extremity between flat and normal feet during one leg standing. They concluded that the person with flat feet have reduced biomechanical ability for absorbing external impacts during activities of daily living raising their risk of incurring Physical damage compare to person with normal feet.

Tulaya Prachgosin et al (2015), Conducted a study on Medial longitudinal arch biomechanics evaluation during gait in subjects with flexible flat foot. They concluded that a significantly greater eversion deforming force acting at the medial longitudinal arch flexibility and abnormal ground reaction forces in a flatfoot group during walking, which reflected the deficit of foot function in a flatfoot group.

5. Limitations of the Study

Within the context of study, there were several limitations that may have affected the results.

- The sample size of the study was small.
- Sample was chosen from only one area.
- The treatment was only for 3 Weeks i.e., a short term study.
- More measuring tools can be used to evaluate Arch index to make the data statistically more significant.

6. Future Scope of the Study

- Furthermore studies can be done on different population.
- The intervention can be used in combination to treat flexible flat foot.
- The study can be done on large number of subjects.

7. Conclusion

The present study has concluded that Faradic Foot Bath is effective for 3 Weeks in the management of flexible flat foot. However, it was statistically found in this study.

References

[1] Wood J F. Structure and Function as seen in the foot. Ulster Med J.2007;13(1):4
[2] D'Silva C, Metgud S, Heggannavar A. Comparative effect of moblization, low dye taping and faradic foot bath in subjects with flat foot-A randomised clinical trial. IOSR-JSPE;2017,4(3):55-60
[3] David J. Magee. Orthopedic Physical Assessment. Elsevier publisher. 2014;6:902-912
[4] Miss. Tejashree Bhoir, Deepak B. Anap, Abhijit Diwate. Prevalence of flat foot among 18-25 years old physiotherapy students: cross sectional study. IJBAMR.2014;3(4):272-278.
[5] Maheswari & Mhaskar. Essential Orthopedics (Including Clinical Methods).The Health Sciences Publisher.2015;5:326
[6] Fabri G. Clinical practice. Static, axial and rotational deformities of the lower extremity in children. Eur J Pediatr. 2010;169(5):529-34
[7] Mosca B S. Flexible flat foot in children and adolescence. J Child Orthop .2010;4(2):107-21.
[8] Houghton K M. Review for the generalist: Evolution of pediatric foot and ankle pain. Pediatr Rheumatol Online J 2008;6:6
[9] Halabchi F, Mazaheri R. Paediatric flexible flatfoot clinical aspects and algorithmic approach. Iran.J. Pediatr . 2013:23(3):247-60
[10] Blitz M. N, Stabile J. R, Giorgini J. R, Didomencio A. L. Flexible pediatric and Adolescent Pes Planovalgus: Conservative and surgical treatment options. Clin Podiatr Med Surg. 2010;27:59-77
[11] Harris E J, Vanore J V, Thomas J L. Diagnosis and treatment and pediatric flat foot. J Foot Ankle Surg.2004;43(6):341-73
[12] Labobitz J M. The algorithmic approach to pediatric flexible pes plano valgus. Clin Podiatr Med Surg 2006;23(1): 57-76
[13] Kwon J Y, Myerson M S. Management of the flexible flat foot in the child: A focus on the use of osteotomies for correction. Foot Ankle Clin 2010;15(2)309-22
[14] Evans A M, Rome K. A chochrane review of the ev idence for non surgical intervention for flexible pediatric flat feet. Eur J Phys Rehab Med 2011;47(1):69-89
[15] Menz HB, Shannon M. Validity of thrre clinical techniques for the measurement of static foot posture in older people. Orthop Sports Phys Therr. 2005;35(8):479-86.
[16] Shahrivar F.M. The effect of insole with corrective exercises on some of physical and motor fitness factors in girls with Flexible Flat Foot. European Journal of Experimental Biology, 2014, 4(1):534-537.
[17] Halbach J W , Steraus D, Comparison of electo-myo stimulation to isokinetic training in increasing poer of the knee extensor mechanism. *JOSPT* 2(1):20-24
[18] Forster and Palastanga. Clayton's Electrotherapy Theory and Practice.*CBS publiser & Distributors*.2005;8:49-61.