Effect of Medical Insoles on the Ground Reaction Force during Gait in People with Flat Feet

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ABSTRACT
Background: Flat feet a common problem in children, adolescents and adults. This disorder is a condition that is known to reduce the medial longitudinal arch of foot. If the condition is detected early and appropriate measures to be taken in order to correct and prevent its escalation, which can prevent possible complications. One of the common treatments for patients using medical insoles arch support. Objective: The aim of this study was to assess the effect of medical insoles on balance during walking in persons with flat foot is. Review: The sample size of the study 12 patients with flat foot. These subjects had a mean age of 12 ± 2 years and a similar weight was selected. After assessment, the subjects were asked to point to a distance of seven steps to reach the gauge force platform In both cases, the desired floor without insoles on a force plate to take steps to find your natural gait cycle. Results: The study consists of two layers, the lower layer of foam polyurethane and the top layer is in place, creating an arc of polymer chemicals is prone. And balance while walking was assessed. Results: When using shoe insoles compared with the force of the collision and the first peak showed a slight increase. (P=.0287) transmission on the toe (second peak) also showed a slight increase. (P=.0196). Conclusion: The results of this study showed that this type of foam causes little change compared to the balance that may be due to the type of shoe insole, insole layer stiffness, low weight subjects.

INTRODUCTION

Flat foot is a condition where the foot bends patients are lacking. Arch forces exerted by the ground are reduced and does not allow all forces to the body. But the people with flat foot arch to the lack of all these forces applied to the body, resulting in chain-like effects in all joints, especially the spine. Problem flat foot, commonly known as Shell, is a joint called congenital. Joint laxity causes the arch area of the foot while standing on legs disappear; the complete absence of one or both bone formation in the area, their ankles and feet, or engages in the form of non-arc inborn foot is effective [14]. Flat feet can lead to complications such as inflammation of the plantar ligaments, inflammation of the Achilles tendon and the posterior tibial muscle, causing compression fractures in the lower limbs and dead skin tissue is misplaced. Since flat feet were placed on how it can affect other bones in the body can cause pain in the ankles, knees and pelvic [15].

So far, many studies on the effect of insoles on plantar pressure distribution is performed [16], however, few studies on understanding the characteristics of the reaction force from insole has been done. Waked, on the effect of floor stiffness on the vertical component of ground reaction force concluded that by reducing the hard floor, the vertical ground reaction force is increased [18]. Krstyng also showed that the internal components - External hard insoles with medial reverse changes [6]. AMC KA, study the effect of the hard insole is made of ethyl vinyl acetate middle of the ground reaction force looked and saw a significant difference [17]. Kulku, also concluded that the immediate use of silicone insoles in people with flat feet moderating effect on the forces exerted on the foot of the kinematic data is [20]. Leung, paper reported that the two components of vertical and anterior (UCBL) insole UC JBL posterior ground reaction force in the two-soled shoes walking shoes compared to no effect. The only significant difference in components - lateral ground reaction force compared with two state-soled shoes and shoes had been observed [19] described above, extensive studies of the effect of hard and soft insoles are compared.

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In this study the effect of combining the two foam layers and the top layer to the bottom layer of polyurethane on the site of an arc prone on the ground reaction force was studied.

Methods Participants:
The overall objective of this study was to evaluate the effect of medical insoles on balance during walking in persons with flat foot was. In this study, 150 students in summer classes at the football ground Razavi were evaluated. First of all these people by the mirror box (Pdaskvp) and then recorded by the foot (foot-prints) were examined and 25 of these people have flat foot. Data were collected on these subjects and 12 subjects with weight, height and age matched, were selected.

Methodology:
All samples signed consent to participate in the questionnaire's test subjects was recorded. Necessary training to implementation, such as walking on a force plate and a set of steps to put the seventh step on the force plate were provided to the subjects them several times a experiment was exercises. For this purpose, firstly, Force plate on the ground and the distance from the subject (at least seven step away) and the subjects were placed in a walking shoe stepping on a force plate with regular exercise Then the subjects were asked to use a flat foot insoles embedded and re-do the walking and stepping on the force plate. Since it may be difficult since subjects were asked to perform each operation (with and without insoles) three times and the mean of three steps was chosen for analysis. The test with and without medical insoles, medical insoles for people with flat feet were performed. Data were collected In order to analyze the use of force plate sampling frequency of 120 Hz, analysis and processing of particular parts of the curves obtained in the different direction and was assessed valuation.

Medical insole device that is used to maintain health and regulate the pressure on the legs and feet walking be used. Determined by examining and measuring the pressure distribution on the foot of each person needs to have his ups and downs on the insole creates be appropriately changed to pressure on the foot. In this research, some doctors recommend insoles for flat foot robot Hani medical companies in the market are used. The insole consists of layers made of a lower layer and upper layer of the bridge port in a Peron is localizing arc of the polymer chemicals.

Results:
In order to analyze the data and test the research hypotheses in the Kolmogorov Smirnov test was used to evaluate data normality. According to data normality, the dependent t-test was used to compare changes between groups. Data analysis for all tests a significant level P<0.05 spss16 and software using excel 2007 version was done. (Table 1)

Table 1: Results of Kolmogorov Smirnov test variable reaction force.

<table>
<thead>
<tr>
<th>Significance level of k-s</th>
<th>Z-statistic</th>
<th>Standard deviation</th>
<th>Average</th>
<th>Status</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.748</td>
<td>0.678</td>
<td>0.25</td>
<td>1.31</td>
<td>Not using insoles</td>
<td>The first peak</td>
</tr>
<tr>
<td>0.613</td>
<td>0.759</td>
<td>0.15</td>
<td>0.84</td>
<td>Not using insoles</td>
<td>Dents</td>
</tr>
<tr>
<td>0.928</td>
<td>0.544</td>
<td>0.13</td>
<td>1.06</td>
<td>Not using insoles</td>
<td>The second peak</td>
</tr>
<tr>
<td>0.451</td>
<td>0.860</td>
<td>0.13</td>
<td>1.29</td>
<td>using insoles</td>
<td>The first peak</td>
</tr>
<tr>
<td>0.931</td>
<td>0.541</td>
<td>0.18</td>
<td>0.82</td>
<td>using insoles</td>
<td>Dents</td>
</tr>
<tr>
<td>0.636</td>
<td>0.745</td>
<td>0.17</td>
<td>1.09</td>
<td>using insoles</td>
<td>The second peak</td>
</tr>
</tbody>
</table>

To evaluate the effect of medical insoles on vertical component of ground reaction force (first peak, the second peak troughs) during walking in persons with flat foot, two-sample t-test was used for dependent and results are as follows. (table 2, Fig 1). (table 3, Fig 2). (table 4, Fig 3).

Table 2: Results of t-test for comparing the first peak forces during walking with and without insoles, medical insoles.

<table>
<thead>
<tr>
<th>Significance level</th>
<th>DF</th>
<th>t-statistic</th>
<th>Standard deviation</th>
<th>Average</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.287</td>
<td>23</td>
<td>1.09</td>
<td>0.218</td>
<td>1.24</td>
<td>Not using insoles</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.131</td>
<td>1.29</td>
<td>using insoles</td>
</tr>
</tbody>
</table>

Table 3: Results of t-test to compare the indentation force during walking with and without insoles, medical insoles.

<table>
<thead>
<tr>
<th>Significance level</th>
<th>DF</th>
<th>t-statistic</th>
<th>Standard deviation</th>
<th>Average</th>
<th>Status</th>
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<tbody>
<tr>
<td>0.657</td>
<td>23</td>
<td>-0.45</td>
<td>0.154</td>
<td>0.835</td>
<td>Not using insoles</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.168</td>
<td>0.823</td>
<td>using insoles</td>
</tr>
</tbody>
</table>
Table 4: Results of t-test to compare the peak forces during walking with and without insoles, medical insoles.

<table>
<thead>
<tr>
<th>Significance level</th>
<th>DF</th>
<th>t-statistic</th>
<th>Standard deviation</th>
<th>Average</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.196</td>
<td>23</td>
<td>1.33</td>
<td>0.130</td>
<td>1.06</td>
<td>Not using insoles</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.174</td>
<td>1.09</td>
<td>using insoles</td>
</tr>
</tbody>
</table>
By comparing the ground reaction force (first peak, the second peak troughs) of the use or non-use of insoles in the above tables, the first peak of the ground reaction force \( p=0.287 \), ground reaction force and indentation \( P=0.657 \) and a second peak in the ground reaction force \( P=0.196 \) no significant difference in the use and non-use of insoles. The use of insoles in people with flat foot on ground reaction force (first peak, the second peak troughs) are not affected and only minor changes were observed in these areas.

**Discussion:**

One reason for there to be flexible flat foot in children, the false habit that creates this problem. Based on these results, medical insoles used in the shoes of the people with flat feet, Ground reaction force a change that results in pressure on the legs and upper members in physical activity is also a little change.

Non-structural changes in children than adults due to better stabilize the answer. Thus, this study shows that children with changes in children with flat foot insole can be done. Study of abnormalities in childhood, adulthood will prevent additional expenses, and may be the future of human society is healthy and dynamic.

The present findings obtained from this study can be said that the research was conducted:

Leung and colleagues also examined the impact of UC Avrtyz JBL ground reaction forces, a significant difference between the two modes on the vertical component at the top of the shoes and insoles the shoes I saw the results of the present study is in agreement [7] and the study of viscoelastic shoe insoles Nyg and colleagues in relation to the impact on ground reaction force on the runners, no difference was observed using insole force to deal with the results of the present study is consistent with the conventional insoles. [10] As well as the study on the impact KvIkv et silicone insoles on the ground reaction force in people with flat feet shoe insoles shoes, there was a significant difference between modes Compared with the results of the present study is consistent with the common-soled shoes. (8) Miller and colleagues in a study on the effectiveness of corrective Avrtyz-hay heel on the ground reaction force with flat Pabyn 5 to 10 degrees, Significant reductions in energy (10%) saw the beginning of the static phase is inconsistent with the results of the present study [8]. The reason for this difference may be due to the type of foam is used, so that the study used Miller insoles made of plastic polymer and probably more difficult than the foam used in the study and how much material is more difficult, The greater the reduction in force. Chen and colleagues also investigated the effect of name shoes and insoles on gait patterns flatfoot did. As a result, the step length for walking with shoes and insoles support significantly longer than were walking barefoot. These changes indicate that excessive pronation in flatfoot deformity may wear shoes and insoles to increase the medial longitudinal arch are improved. The study results are pretty inconsistent [9].

Finally Glance and colleagues investigated the effect of insoles on the ground reaction force in people with flexible flat floor looked Para This quasi-experimental study showed that the use of vertical ground reaction force causes change soled shoes compared to But to apply the Perron silicon layer on a conventional insole ethyl vinyl acetate alone cannot visible impact on the ground reaction force is reduced. This study is the Non-aligned. For the present study we used Perron insole and dual-port bridge Gradyvd and the study was conducted on children (1).

**Conclusion:**

This is probably due to the lack of statistically significant differences of insoles made because of a combination of a bridge port has high hardness Despite having Peron layer, there is sufficient flexibility in the floor, so the floor cannot effectively absorb the ground reaction force and will continue to diminish. The second reason may be due to the type of insoles insoles in which case the other should be used. The bridge port basis
was tough as leather and ethyl vinyl acetate. And this led to some degree of shock absorption and flexibility to prevent insole. Cumin is because when the hard floor back to the original form of exercise will weigh less and slower.

Another reason may be the lack of significant differences and similarities between samples are close to each other in hard-soled shoes and use the cited. Another reason could be as low weight and age and walking participants also noted. Overall, the research showed that the use of low-floor changing the vertical ground reaction force compared to shoes, from Perón silicon layer on the other hand to apply common insole Polyphlore alone cannot be harmed port observable the balance is improved.

REFERENCES


