To Compare the Effect of Taping Techniques and Conventional Treatment on Gait Variables in Patients With Flat Foot

**Abtract**

Aim: To compare the effect of taping techniques and conventional treatment on gait variables in patients with flat foot.

Methods: 30 subjects recruited and divided into 2 groups each having 15 patients. Group A (N=15) received isometric exercises and Group B (N=15) received isometric exercise and taping technique. Pre and post measurement for step length, stride length, toe out were taken.

Result: Step length in both Group A (48.31 ± 8.64 vs. 53.70 ± 9.49, t=3.96) and Group B (47.53 ± 7.50 vs. 64.32 ± 6.03, t=12.55) increased significantly (p<0.05), Stride length improved significantly more in Group B than Group A., Toe out levels improved significantly more in Group B than Group A. level of significance (p<0.05).

Conclusion: taping techniques can be an effective manoeuvre which can help in improvement of gait variables in patients with flat foot.

**Keywords**

Step length, Stride length, toe out angle, taping technique

**Introduction**

The normal foot is composite of 26 bones of foot and ankles; it contains 23 joints, more than 100 muscles, tendon ligament etc. 1. Bony structure is designed to transmit body weight to the ground. The arch of foot is demonstrates two extremes of anatomical structure position i.e. High arched and flat arch2. Pes planus is characterized by the decreasing or disappearing completely of the height of medial longitudinal arch of the foot.3 The effect of flat foot is loss of spring in the foot leads to a clumsy shuffling gait, loss of shock absorbing function makes the foot more liable to trauma and osteoarthritis, loss of the concavity of the sole leads to compression of the nerves and vessels of the sole.

Flat foot can also develop as an adult (“adult acquired flatfoot”) due to injury, illness, unusual or prolonged stress to the foot, faulty biomechanics, or as part of the normal aging process. This is most common in women over 40 years of age. Known risk factors include obesity, hypertension. However, if developed by adulthood, flat foot generally remain flat permanently. Methods to collect the foot arch shape include foot printing, X-ray, plantar pressure measurement, laser scanning measurement. Among the foot defects which cause disability flat foot is one the commonest.

Gould et al. refuted the fat pad theory with radiographic evidence of actual flattening of the medial longitudinal arch. Vanderwilde et al. confirmed these findings with the first comprehensive study on normative radiographic measurements of the foot in children. Persons with flat foot may also have a neutral or under pronating gait. Pronation is a natural form of shock absorption during running and walking, when the ankle rolls inward and the weight distribution in the foot shifts medially. Over pronation is excessive pronation; it disrupts the alignment of the leg and may result in injuries due to over-stressing of the knee and leg. The pronated (flat-arched) foot may be associated with excessive subtalar joint pronation. Abnormal compensatory foot pronation may cause passive instability and hyper mobility of the joints of the foot. Physiotherapy treatment is strengthening and endurance exercise to the intrinsic(warm water), corrective gait training with orthoses, bearing weight on lateral border of foot without orthoses, repetitive toe curling even with shoe on.(it provide resistance).

**Methods**

1. **Sample**

Sample: 30 subjects with age 18 – 25 years.

Source: Santosh Medical and Dental College Hospital

Population: 150 students of Santosh College of Physiotherapy.

Selection criteria:

- Inclusion criteria
  - Foot comes in contact with the ground when they stand.
  - Navicular drop test (minimum) 3.6 to 8.1 mm (maximum)

- Exclusion criteria
  - Any deformity of foot and ankle.
  - Tape allergies.
  - Any neurological problem and peripheral vascular disease.
  - History of fracture or trauma and surgery to lower limb.
  - Subject having calcaneal spur and planter fascitis.

**Sampling:**

Convenient sampling.

**Instrumentation**

Tools: → Tray, ink, Tape (2 inch and 3 Ns Tex kinesiology), chart paper, scale
VARIABLES
Independent variables – tapping techniques, exercises
Dependent variables – Stride length, Step length and angle of toe out

STUDY DESIGN: Experimental study design.

PROCEDURE
A 30 subjects with flat foot were recruited on the basis of inclusion and exclusion criteria and divided into two groups each having 15 subjects. ( i.e. Group A and Group B). An informed consent was signed by all subjects before participation in the study. Pre measurements were taken for the step length, stride length and angle of toe out for both the groups. Then group A were undergone for isometric exercises and group B were undergone for isometric exercises and taping. The post measurements were taken for the same variables.

PROCEDURE RELIABILITY
Navicular drop test
Take a marking pen and a piece of 3”x5” card stock. With the patient sitting comfortably (foot on the floor, but non weight bearing), palpate the medial aspect of each foot and find the navicular prominence (the most prominent bony landmark found inferior and somewhat anterior to the medial malleolus). Using the pen, make a mark on the patient’s skin at the point of the navicular prominence. Stand the card on the floor next to the medial arch of the foot and mark the card at the level of the navicular prominence. Ask the patient to stand, in a relaxed position. Once the arch is weight bearing, the navicular prominence will be somewhat lower. Make a second mark on the same side of the card at the new level of the navicular prominence. Repeat this procedure with the other foot. Now measure the difference between the two marks for each foot. If there is an obvious asymmetry from left to right, this is objective evidence of a functional foot problem.

RESULT
The data were summarized as Mean ± SD. The groups were compared by paired t test and independent Student’s t test. A two-sided (=2) p<0.05 was considered statistically significant.

Comparing the mean Step length within the groups (Table 1), the Step length in both Group A (48.31 ± 8.64 vs. 53.70 ± 9.49, t=3.96; p<0.05) and Group B (47.53 ± 7.50 vs. 64.32 ± 6.03, t=12.55; p<0.05) increased (improved) significantly (p<0.05). In other words, Step length of two groups was comparable. However, the mean Step length of Group B was found significantly (p<0.05) as compared to Group A (53.70 ± 9.49 vs. 64.32 ± 6.03; t=3.66; p<0.05).

II. Stride length
The pre and post treatments Stride length (cm) of two groups are summarized in Table 2 showed that the mean Stride length in both groups increased after the treatments and the increase was evident higher in Group B than Group A.

Table 2: Pre and post treatments Stride length (Mean ± SD) of two groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre treatment (n=15)</th>
<th>Post treatment (n=15)</th>
<th>t value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>93.84 ± 14.14 (71-129)</td>
<td>100.04 ± 15.85 (75-142)</td>
<td>6.57</td>
<td>p&lt;0.05</td>
</tr>
<tr>
<td>Group B</td>
<td>94.28 ± 13.19 (65-121)</td>
<td>113.69 ± 13.43 (92-145)</td>
<td>19.12</td>
<td>p&lt;0.05</td>
</tr>
</tbody>
</table>

Numbers in parenthesis represents the range (min-max)

Similarly, in other words, Stride length of two groups was comparable. However, the mean Stride length of Group B at post treatment was found significantly (p<0.05) as compared to Group A (100.04 ± 15.85 vs. 113.69 ± 13.43, t=2.54; p<0.05). In other words, after treatments, Stride length improved significantly more in Group B than Group A.

III. Toe out
The pre and post treatments Toe out levels (degree) of two groups showed that the mean Toe out levels in both groups increased after the treatments and the increase was evident higher in Group B than Group A.

Similarly, comparing the mean Toe out levels between the groups, the Toe out levels of two groups not differed (p>0.05) at pre treatment (day 0) i.e. found to be statistically the same (p>0.05). In other words, Toe out levels of two groups was comparable. However, the mean Toe out levels of Group B at post treatment was found significantly (p<0.05) different and 1.9 fold higher as compared to Group A (5.60 ± 1.30 vs. 6.53 ± 0.52, t=2.59; p<0.05).

For each period, comparative mean Step length between the groups (i.e. within periods).

Graph 1: Comparative mean Step length between the groups (i.e. within periods).

Table 1: Pre and post treatments Step length (Mean ± SD) of two groups

<table>
<thead>
<tr>
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<th>Post treatment (n=15)</th>
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</thead>
<tbody>
<tr>
<td>Group A</td>
<td>48.31 ± 8.64 (35-64)</td>
<td>53.70 ± 9.49 (41-68)</td>
<td>3.96</td>
<td>p&lt;0.05</td>
</tr>
<tr>
<td>Group B</td>
<td>47.53 ± 7.50 (34-63)</td>
<td>64.32 ± 6.03 (56-79)</td>
<td>12.55</td>
<td>p&lt;0.05</td>
</tr>
</tbody>
</table>

Comparing the mean Step length within the groups (Table 1), the Step length in both Group A (48.31 ± 8.64 vs. 53.70 ± 9.49, t=3.96; p<0.05) and Group B (47.53 ± 7.50 vs. 64.32 ± 6.03, t=12.55, p<0.05) increased (improved) significantly (p<0.05).
weaken it – causing the foot arch to fall. 9. Increases in the midtransal joint on its oblique axis and inversion of the midtarsal joint along its longitudinal axis. The intrinsic foot muscles may have a functional role for stabilizing the foot. According to previous research, Tibialis posterior tendon which is the main stabilizer of the foot arch. The structure and composition of tendon specimens had changed and found evidence of increased activity of some photolytic enzyme. The enzyme can break the medidial arch height and amount of arch height deformation during gait.

A description of weight-bearing pronation while the foot is flat on the ground may be made as follows, when the subtalar joints pronates, the calcaneus everts, plantar flexes and inverts. This results in dorsiflexion and abduction of the talars joints pronates, the calcaneus everts, plantar flexes and inverts. This results in dorsiflexion and abduction of the talars joints pronates, the calcaneus everts, plantar flexes and inverts. This results in dorsiflexion and abduction of the talars joints.

CONCLUSION

The study concluded that taping techniques can be an effective therapeutic manoeuvre which can help in the improvement of gait variables in the patients with flat foot. So null hypothesis is rejected.

REFERENCES