

Perception of Athletes Regarding Disability and Function in Chronic Ankle Instability

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Abstract

Background: Foot and ankle function is crucial to successful performance of any sports. Athletes' own perception about function of foot and ankle is more important than clinical screening. This may lead to further clinical interference of any level. Athletes continue to play without addressing any deficit of foot and ankle which usually further leads to more severe injuries. Estimation about perception of athletes about their foot issues may help improve sports by reducing intensity and cost of disability. **Objective:** The objective of the study was to determine the perception of athletes regarding disability and function in chronic ankle instability. **Methods:** It was a cross sectional studies which as conducted among 30 athletes using sample of convenience. Both male and female athletes with age ranging between 18 years to 30 years were included. The data was collected using the questionnaire which was given to each participant after taking signed consent. Demographics, Foot and ankle disability index FADI and Self-Reported Foot and Ankle Questionnaire (SEFAS). The participants were helped in calculating their body mass index. In case participants were also helped in interpretation any question in questionnaire. The data was analyzed using SPSS 25.0. **Results:** The results regarding descriptive statistics of FADI Function Score, FADI pain score, FADI total score and Total SEFAS showed that there was mean and standard deviation of 70.56 ± 9.27 , 13.46 ± 1.79 , 80.76 ± 10.37 and 36.56 ± 6.06 respectively. The results regarding descriptive statistics of FADI total score and total SEFAS showed that there was mean and standard deviation of 80.76 ± 10.37 and 36.56 ± 6.06 respectively. Both scales were highly correlated (Pearson correlation 0.816). **Conclusion:** The finding of study concluded that there was very mild disability of foot and ankle according to self-assessment and perception of young athletes.

Keywords: Athletes; Foot and ankle function; Disability; Sports

Abbreviations: FADI: Foot and Ankle Disability; PT: Physical Therapy; SEFAS: Self-reported Foot and Ankle Scale; SPSS: Statistical Package for Social Sciences

Introduction

Ankle instability is a development of residual symptoms following a lateral ankle sprain that includes complains giving way. Lateral ankle sprain is very ordinary orthopedic injury reason by unexpected inversion forces frequently together a plantar flexed situation of the foot. Maximum Shock in sports injuries (10%-30% of all the sports) is experienced by ankle joint. Every year 2-7 persons per 1000 in common population suffers ankle injuries. [1,2] Ankle sprain is known to be the most recurring, almost 20% patients with ankle sprain develop chronic ankle instability. There are two types of ankle instability, *i.e.* mechanical and functional. Mechanical instability occurs due to ligament laxity while functional ankle instability is induced by postural control, muscle weakness, neuromuscular and proprioceptive deficiencies. [3,4] Peroneal nerve injury is observed in almost 86% of the patients with grade 3 ankle sprain and tibial nerve stretch injury is seen in 83% of the patients. Romberg test is performed to check the proprioception. Imaging modalities like magnetic resonance imaging is used the most in patients with chronic ankle instability. Ligamentous injuries like swelling, laxity or wavy ligament and discontinuity can be observed on MRI. [5]

The occurrence of ankle sprains is most ordinary in sports such as basketball, rugby, soccer, volleyball, and handball in addition to criteria when investigating insufficiencies in chronic ankle instability. [6] Historically, this used to be an injury that was always treated with surgery. Just because the results in terms of how much power had in getting back to activity and the risk of re rupture, was much lower with doing surgery. Now, the studies have shown that getting people back to early functional rehab actually has just as good of results. As physiotherapy don't have all the risks of infection and wound healing problems that can get with surgery, so based on this prospect conservative treatment is more focused these days. [7]

There are different grades of sprains and this is usually used for us as physicians to kind of determine prognosis. A how to treat initially, grade one is just for the ligament is stretched. Usually able to walk a little bit, just a little sort. Grade 2 there's a partial

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tear in one of the ligaments. Again, we can walk, but it's limping much more than grade 3. There's a full tear and it's really hard to put weight on that leg initially. Most of these always get treated with non-operative management initially and so some people will put patients in a cast for a few weeks. Some will just give a boot or an air cast. If it's a grade one sprain. Usually just need kind of an ankle brace. [8]

Things like rest, ice, compression and elevation are used as 1st line of management. And then physical therapy can help kind of help regain the balance and the proprioception and most of what we found is that at least 10 weeks to 12 weeks of physical therapy is what's required to get the maximum benefit. Like said, most of these will heal within six months and really only need an MRI if having issues such as recurrent swelling, a recurrent pain to rule out any other sort of injury to the cartilage or the other tendons around the ankle. [9] The area affected should be ruled out as when on the bone and the pain is getting worse and more persistent is probably it is worth seeing a doctor sooner rather than later, just to make sure that there's nothing like a stress fracture or a real fracture going on. [10]

Cavazos et al. conducted a study regarding sports injuries regarding foot and ankle and showed that estimated incidence to be more than 3 million a year and at a rate of 2.15/1,000 in the US alone, despite the millions of ankle injuries sustained annually, the true incidence may be underestimated. This review highlighted the epidemiology, pathoetiology, pathoanatomy, and biomechanics of foot and ankle, enabling sports physicians to implement the best practice guidelines and protocols to manage this common enigma. [11] Mahrouqi et al. conducted a study to compare self-reported function, disability, instability, physical activity and total quality of life between adults with and without ankle symptoms. 394 individuals participated in this study of which 270 were symptomatic and 124 were asymptomatic and their mean age was 48.8 years. The symptomatic individuals (patients with ankle pain or stiffness) and asymptomatic individuals filled a cross-sectional online survey. Symptomatic individuals reported greater instability, impaired function, ankle instability and worse quality of life as compared to the patients with symptomatic individuals. [12]

Nanbancha et al. in 2019 conducted a study to compare corticomotor excitability and neuromuscular function of the muscles around the ankle joint between athletes with chronic ankle instability and athletes without chronic ankle instability. 19 athletes with chronic ankle instability were included in this study. To measure the corticomotor excitability, transcranial magnetic stimulation was performed to the tibialis anterior, peroneus longus and gastrocnemius medialis. Jump test was used to assess the neuromuscular function with the help of EMG activity. The study concluded that corticomotor excitability in tibialis anterior and peroneus longus was decreased and latency was increased in tibialis anterior and gastrocnemius muscle. Also chronic ankle instability showed functional neuromuscular deficits by decreasing EMG activity of the peroneus longus muscle and dorsiflexor muscle's strength was also decreased. [13] Wisthoff et al. conducted a cohort study in 2018 to compare ankle strength measurements in athletes who have mechanical laxity and report functional instability after a history of unilateral

ankle sprains. 165 national collegiate athletes participated in this study. To measure the functional ankle instability, Cumberland ankle instability tool was used and mechanical ankle instability was measured by checking the laxity of the both anterior and eversion/inversion movement. This study concludes that college athletes with mechanical ankle instability showed planter flexion and eversion strength deficits between ankles. [14]

Thompson et al. in 2019 conducted a cross sectional laboratory experimental study in 2019 to assess altered spinal-level sensorimotor control related to pain and perceived instability in people with chronic ankle instability. The objective of this study was to compare recurrent inhibition, soleus spinal reflex excitability and presynaptic inhibition between chronic ankle instability, healthy populace and acute lateral ankle sprain control. 36 participants were involved in this study and 3 groups were made. Static double and single leg stance movement was used to examine the pre-synaptic excitability, recurrent inhibition of the spinal-reflex pathway and soleus H-reflex recruitments curves. This study concluded that the participants with chronic ankle instability showed an incapacity to repress soleus spinal reflexes during tasks and increased postural threat; most probably it is because of disinhibition of pre-synaptic mechanisms. The study also came to a conclusion that changes in spinal-level sensorimotor control in chronic ankle instability may be contributed pain and perceived instability. [15]

Hunt et al. in 2016 conducted a study to understand pattern and incidence of athletes' participating in wide range athletic sports. It was in context of increasing foot and ankle injuries in competitive and collegiate athletes. These also included the injuries with missed and considerable breaks in sports due to interventional and/or surgical reasons. The study was aimed to develop implementative practice strategies, protocols for returning to play, injury prevention program and so on by understanding incidence and injury pattern. It was concluded that prevalence of foot and ankle injuries were around 27%. It was directly linked with athletes with a missed time or returning to sports after period of intervention without proper return to sports phase. [16]

The literature showed consistent evidence regarding increasing foot and ankle dysfunction. This is likely due to increased awareness and self-assessment about foot and ankle issue which resulted in more reporting. However, there is less literature directly measuring athletes' level of perception about their foot and ankle issues. This study has been aimed to Figure 1 out this level of perception based on exclusive subjective assessment.

Materials and Methods

A cross sectional survey was conducted in Lahore. Data was collected from Pakistan sports board coaching and training center, Lahore. Inferential study was performed for this cross sectional survey in athletes. Non probability convenient sampling was done with the volunteer participation of athletes and the sample size was calculated from Rao soft software where confidence interval was 95%, margin of error as 5%, population distribution as 50% and response distribution as 5%. So, its sample size was calculated as 30 with reference to the population of athletes. Athletes of all sports were included with

inclusion criteria of VAS from 1 onwards, including both males and females having age of 18 years to 30 years. While athletes having any ankle fracture in the present or past were or with any pathological disease were excluded. Duration of the study was 6 months after approval of synopsis. The questionnaire was given to each participant after taking signed consent. Demographics were added in the Foot and Ankle Disability Index (FADI) and Self-reported Foot and Ankle Questionnaire (SEFAS). The participants were helped in calculating their body mass index. In case participants were also helped for interpretation any question in questionnaire.

Results

The results regarding descriptive statistics of age, weight, height and body mass index showed that there was mean and standard deviation of 23.80 ± 3.24 , 68.30 ± 8.83 , 68.00 ± 2.97 and 22.86 ± 2.16 respectively. The results regarding descriptive statistics of FADI function score, FADI pain score, FADI total score and total SEFAS showed that there was mean and standard deviation of 70.56 ± 9.27 , 13.46 ± 1.79 , 80.76 ± 10.37 and 36.56 ± 6.06 respectively in Tables 1-4.

The results regarding ‘usual description of pain’ showed that

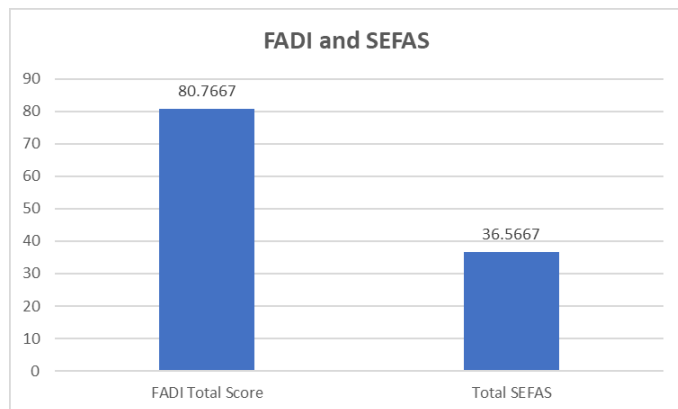


Figure 1: FADI and SEFAS scores.

| | Mean | Std. Deviation |
|--------------------------------------|---------|----------------|
| Age | 23.8 | 3.24197 |
| Weight (Kg) | 68.3 | 8.83235 |
| Height (in) | 68 | 2.97113 |
| Body Mass Index (Kg/m ²) | 22.8667 | 2.16131 |

The results regarding descriptive statistics of age, weight, height and body mass index showed that there was mean and standard deviation of 23.80 ± 3.24 , 68.30 ± 8.83 , 68.00 ± 2.97 and 22.86 ± 2.16 respectively.

| | Mean | Std. Deviation |
|---------------------|---------|----------------|
| FADI function score | 70.5667 | 9.27988 |
| FADI pain score | 13.4667 | 1.79527 |
| FADI total score | 80.7667 | 10.37132 |
| Total SEFAS | 36.5667 | 6.06109 |

The results regarding descriptive statistics of FADI Function Score, FADI pain score, FADI total score and Total SEFAS showed that there was mean and standard deviation of 70.56 ± 9.27 , 13.46 ± 1.79 , 80.76 ± 10.37 and 36.56 ± 6.06 respectively.

Table 3: FADI and SEFAS.

| | Descriptive Statistics | | |
|------------------|------------------------|----------------|----|
| | Mean | Std. Deviation | N |
| FADI total score | 80.7667 | 10.37132 | 30 |
| Total SEFAS | 36.5667 | 6.06109 | 30 |

The results regarding descriptive statistics of FADI Total Score and Total SEFAS showed that there was mean and standard deviation of 80.76 ± 10.37 and 36.56 ± 6.06 respectively. Both scales were highly correlated (Pearson correlation 0.816).

Table 4: Correlations.

| | | FADI total score | Total SEFAS |
|------------------|---------------------|------------------|-------------|
| FADI total score | Pearson correlation | 1 | .816** |
| | Sig. (2-tailed) | | 0 |
| | N | 30 | 30 |
| Total SEFAS | Pearson correlation | .816** | 1 |
| | Sig. (2-tailed) | 0 | |
| | N | 30 | 30 |

** : Correlation is significant at the 0.01 level (2-tailed).

there were 26.7% with mild, 53.3% with very mild while rest of 20% were having no pain to describe. The results regarding usual description of pain showed that there were 26.7% with mild, 53.3% with very mild while rest of 20% were having no pain to describe. The results regarding being able to walk on uneven ground showed that there were 30% with moderate difficulty, 50% with little difficulty while rest of 20% were able to walk easily. The results regarding need to use orthotic, heel lift or special shoes showed that there were 23.3% used often, 53.3% used occasionally while rest of 23.3% never used an orthotic device. The results regarding ‘Pain interference with usual work including house work and hobbies’ showed that there were 26.7% with moderate pain, 46.7% with very mild pain while rest of 26.7% were having no pain to describe. The results regarding ‘Limp when walking because of foot and ankle’ showed that there were 20.0% limped some days, 43.3% limped for only one or two days while 36.7% never limped. The results regarding ability to climb a flight of stairs showed that there were 13.3% with moderate difficulty, 56.7% with little difficulty and 30.0% were able to climb a flight of stairs easily. The results regarding trouble in bed at night from pain showed that there were 16.7% had trouble for some nights, 66.7% were having trouble in only one or two nights while only 16.7% were having no trouble. The results regarding effect on usual recreational activities from pain showed that there were 13.3% were feeling effect moderately, 66.7% with little bit effect while 20.0 were having no effect at all. The results regarding foot swelling showed that there were 26.7 often developed swelling, 53.3% occasionally and 20.0 were developing no swelling at all. The results regarding pain in standing from chair after taking a meal showed that there were 20.0% with moderate pain, 43.3% with slight pain while 36.7% were having no pain to describe. The results regarding sever sudden pain shooting stabbing or spasm showed that there were 30.0 had severe pain some days, 33.3% having pain for one or two days while 36.7% were having no pain in anyway. The results regarding descriptive statistics of FADI. Total score and Total SEFAS showed that there was mean and standard deviation of 80.76 ± 10.37 and 36.56 ± 6.06 respectively. Both scales were highly correlated (Pearson correlation 0.816).

Discussion

The findings of current study showed that on average respondents were of age 24 years with an age deviation of 3 years. This data reflects that the respondents were very youngsters. Although, athletes all over the world are found in this age bracket, however, the very young age in current study might be due to occasional athletes in study.

Average weight of the respondents was 68 kilograms with a deviation of 8 kilograms. This shows that on average respondents were of average body mass index. Average body mass index is an important requirement of any sports. Average height of respondents was 68 inches with a standard deviation of 2.9 inches and the same was average weight in kilograms. This puts body mass index to ideal range. In depth study of data regarding body mass index showed that only few respondents were crossing normal body mass index and were in overweight category while there were no respondents in upper limits such as obesity or obese. [17-19] The scores of Foot and Ankle Disability Index (FADI) were most important parameters of this study. As FADI has two domains those of function and pain. Both scores showed very mild disability issues in which function was slightly more affected than pain domain. Pain domain showed that almost all respondents were pain free. The same facts are ebbing reflected in total FADI score which shows that it was not even close to cut off scores of disabilities. On average 80% score of scale indicates that all respondents were having normal foot and ankle function. This is in contrast to previous studies in which there is countable ratio of athletes with affected foot and ankle disability. This may be due to other comparative favorable parameters such as age range in this study indicates very young athletes and most of athletes were male while in international studies equal ratio of male female has been taken. Female gender itself is a risk factor for foot and ankle disability due to hormonal differences that make females more mobile yet subtle. There is a strong evidence in sport that women are more susceptible to foot and ankle issues due to underlying hormonal system and extreme variety of footwear use over the time. It has been further reported that male has less foot and ankle related issues as compared to females. In current study majority of subjects were male and this is likely reason of mild foot and ankle issues in athletes included in this study. [20]

Another measure used such as self-reported foot and ankle measure showed in depth item by item reflection of foot and ankle function. Usual description of pain showed very mild pain, majority showed that their pain only aggravates after 16 minutes-30 minutes, majority showed mild difficulty to walk on uneven surface. Another measure, total SEFAS showed mean and standard deviation to be 36.57 ± 6.06 , while the curve was positively skewed towards greater values. Used such as self-reported foot and ankle measure showed in depth item by item reflection of foot and ankle function. Usual description of pain showed very mild pain, majority showed that their pain only aggravates after 16 minutes-30 minutes, majority showed mild difficulty to walk on uneven surface, majority having heel pain only occasionally, majority with a bit pain interference with activities of daily living, majority having pain only a day or two in a week, majority with little difficulty in climbing stairs and

recreational activities. [21] The previous studies mostly focused on objective measurement of ankle disability while only one study researched about self-assessed or perceived disability of foot and ankle. For example, a study conducted by Brown et al. compared functional instability and mechanical instability and it was indicated that foot and ankle disability index was not much different from those of objective measurements. There is also consistent evidence from other sources which showed that self-assessment by foot and ankle disability index can be reliably used. [22] The design of study was also different from majority previous study where longitudinal studies have been conducted while this study was descriptive cross sectional. [23]

Information obtained from self-reported outcome measurement tools is only beneficial if there is enough evidence to support the scores and interpretation of obtained scores. In previous studies there have been implemented many tools to measure ankle instability with little or no sport from evidence about their validity and reliability. The current study was complete in terms of choosing scale for measuring self-perceived foot and ankle disability. Another distinguishing feature of current study from previous studies is choosing double outcome measures such as FADI and SEFAS which ensured usability of these outcome measures. [24] Previous studies authors and clinicians have declared underlying food condition for which measurement was being applied however in current study outcome such as foot ankle and disability index was applied directly on otherwise healthy athletes. Moreover, in previous studies other ankle and foot condition such as fractures chronic foot pain plantar fasciitis and calcaneal fractures have also been taken in consideration for measuring their disability while in current study the same outcome was applied on athletes in the field. Increment study to out the measures have been used perceived foot and ankle function why in previous studies around 14 different instruments have been used in one way or another for the same purpose. The current study was pure self-assessed measurement of ankle function without any clinical examination for clinical measurement of food conditions. [25] Other studies have discussed daily life routine aspects as well. For example, it's a fact that foot health is listed for below as compared to other problems after life such as heard skin care nutrition or any other musculoskeletal disorder of back or neck. This is the reason that foot pain and function have gained less attention in literature despite the fact that incidence of foot related problem is very high and it's a common daily life problem. A survey conducted by the American podiatric medical association reported that almost 51% of adults were having some kind of food problem in a past year and were not aware of getting solve their problem from a medical expert due to less awareness. It means dad not only e athlete rather as a routine life problem self-perception about foot and ankle function is considerable. [6,18]

Another important aspect that other studies have discussed is variety of footwear being used in different spans of year. It is very important aspect because at leaves only uses their standard footwear during practice time while in rest of their date night routine may have used other non-recommended footwear such as flip-flops in summer may lead to greater foot problems. In current study this aspect was not survey however it is a common observation that people including athletes change their footwear

based on weather and temperature conditions. In females it becomes even more critical because the use of high heels may lead to buy mechanically changed center of gravity and the body weight shifts to 4 foot and it may lead to shortened gastrocnemius which ultimately lead to reduced dorsiflexion or decreased performance due to impaired quality of dorsiflexion. Insured it is proven that various types of footwear may impact differently on foot and ankle function and it should be we studied in athletes as well which type of shoe wear used in day to day routine.

In short, the current study showed dad foot and ankle function was in good condition and there was very mild disability as per reported by athletes. It was quite the opposite of as hypothesized and also opposite to what previous studies have reported. The main differences in current study and previous studies were differences of design and the method of measurement which was subjective in in this study while in previous study had mixed method are only objective method for measurement of disability. The final impression is very healthy that athlete's beer negligible amount of disability. Further studies may be conducted in variety of athletes based on sports, age range and specific gender.

Conclusion

The finding of study concluded that there was very mild disability of foot and ankle according to self-assessment and perception of young athletes. The results of study should be disseminated for awareness purpose. Moreover, it as a self-assessed survey while physical assessment test can also be applied in future by physical therapist and compared with these observational self-assessed results.

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