INTRODUCTION

The ankle joint complex is comprised of the lower leg and the foot and forms the kinetic linkage allowing the lower limb to interact with the ground, a key requirement for gait and other activities of daily living. Despite bearing high compressive and shear forces during gait, the ankle's bony and ligamentous structure enables it to function with a high degree of stability, and compared with other joints such as the hip or knee, it appears far less susceptible to degenerative processes such as osteoarthritis, unless associated with prior trauma.1

The foot and ankle is made up of the twenty-six individual bones of the foot, together with the long-bones of the lower limb to form a total of thirty-three joints.2 Although frequently referred to as the 'ankle joint', there are a number of articulations which facilitate motion of the foot. The ankle joint complex is made up of the talocalcaneal (subtalar), tibiotalar (talocrural) and transverse-tarsal (talocalcaneonavicular) joint.1 The key movement of the ankle joint complex are plantar- and dorsiflexion, occurring in the sagittal plane, inversion-eversion, occurring in the frontal plane. Combinations of these motions across both the subtalar and tibiotaral joints create three-dimensional motions called supination and pronation.2,3

On the international level, tennis is featured in the Olympics and most notably in major tournaments, such as the Australian Open, Wimbledon Championships, French Open, and US Open. In the Philippines, there are various professional and amateur tennis tournaments; most notably, on the amateur

PREVALENCE OF CHRONIC ANKLE INSTABILITY IN HIGH SCHOOL AND COLLEGE LEVEL FEMALE TENNIS PLAYERS

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ABSTRACT

Background & objectives: Ankle sprain are the most common micro trauma injury in tennis players due to frequent running, pivoting, sudden stopping, acceleration, jumping and lunging movement. Residual symptoms following an ankle sprain are pain, disability or perceived instability. For better understanding of CAI and specific sports injury, biomechanics of ankle injury will assist in developing appropriate treatment strategies. Hence this study was intended to detect prevalence of chronic ankle instability in high school and college female tennis players.

Method: Sixty-five high school and college female tennis players were selected on the basis of selection criteria using simple random sampling. Data was collected through Cumberland ankle instability tool which include questions about ankle instability and demographic data and consent form. This assessed the ankle instability on the day to day activity. This scale includes questions on maximum 30 points. Subject may score between 0 and 30. Lower score indicating decreased ankle stability, and higher score indicating increased stability. A cut off score of less than 24 on CAIT identifies the chronic ankle instability.

Results: Overall prevalence of about 20% of the sample was found having chronic ankle instability. Out of this in 13.84% had unilateral CAI and 6.15% had bilateral CAI; and prevalence of CAI in high school is 25.92% and college is 15.78%, unilateral CAI of high school is 18.51% and college is 10.52%, bilateral CAI of high school is 7.40% and college is 5.26%.

Interpretation & Conclusion: The study can be concluded stating that there is a prevalence of chronic ankle instability in high school and college female tennis players. Athletic trainers should pay special attention to female tennis players for developing CAI due to repeated ankle injury.

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level, the UAAP typically features the best collegiate tennis players in the country. Collegiate players in the UAAP normally take up the sport at a young age, typically no later than ten years old. The risk of early introduction and regular participation in sports is that players starting young could acquire chronic injuries, especially when trained with techniques that are not compatible with what their bodies can tolerate. Furthermore, long-term sport participation can cause chronic and acute injuries in the developing bodies of child- and adolescent-aged athletes.9, 10

Injury due to participation in tennis may occur at any location in the musculoskeletal system. However, data show that most tennis injuries occur in the lower extremity (31%-67%), followed by the upper extremity (20%-49%) and lastly, the trunk (3%-21%).6,7 The most frequently injured parts of the lower extremity were the ankle and thigh, with ankle sprains being the most common specific injury. Upper extremity injuries most commonly involved the elbow and shoulder, with lateral epicondylitis being prevalent.5

Following an initial ankle sprain, up to 73% of patient’s experience at least one subsequent ankle sprain and 59% of those patients report long term disability.9 Swenson et al. reported that, from 2005 to 2008, ankle injuries were the most common recurrent injury with 28.3% of all recurrent injuries in high school athletes.10 The primary risk factor for an ankle sprain remains a history of a previous sprain.11 Between 30% and 70% of initial ankle sprains result in development of chronic ankle instability (CAI).12 CAI is defined as a condition resulting from a significant lateral ankle sprain with greater than 12 months of residual symptoms of “giving way” or subjective instability.13 The high rate of lateral ankle sprains, risk of long-term dysfunction, and high costs of health care make lateral ankle sprains a substantial concern for an active population. Physical disability subsequent to recurrent ankle sprains has included range of motion and strength deficits, sensorimotor alterations, balance impairments, gait alterations and post-traumatic osteoarthritis.14,15 Current research in these areas has focused on improving function and lessening disability associated with this condition, as well as identifying what leads to recurrent sprains. Current treatments include external ankle support to limit excessive motion associated with lateral ankle sprains and to increase sensory input via compression of the joint. Therapeutic exercise, including balance training, has been shown to improve balance as well as function in patients with CAI.16

The original description of ankle instability associated with multiple lateral ankle sprains has since been expanded and defined as CAI.13,19 Models have been proposed to better characterize those with CAI, but due to the complexity of condition, clinical identification of these patients remains a challenge.20 More specific guidelines on the diagnosis of CAI have helped to better identify the condition. Questionnaires have been developed to specifically target the associated disability and changes in quality of life.21 The foot and ankle ability measure (FAAM) and sport sub-scale (FAAM-S) look to identify deficits in function associated with foot and ankle injury and has been validated in CAI patient.22 Scores of less than 90% on the FAAM and less than 80% on the FAAM-S may be used to characterize disability in CAI patients. The Identification of Functional Ankle Instability (IdFAI) tool is a questionnaire that has been shown to be a reliable tool, identifying those with CAI as having scores >/11.23 The ankle instability instrument is a subjective tool to identify feelings of ankle instability in patients that have suffered recurrent ankle sprains if five yes responses are recorded. The Cumberland Ankle Instability Tool (CAIT) also looks to identify those with ankle instability. Scores of < 24 are considered to be indicative of a patient with CAI.13 the use of these survey tools has improved the ability of clinicians and researchers to identify and characterize patients suffering from CAI.

Tennis is a popular sport with tens of millions of players participating worldwide. The sport creates specific demands on the musculoskeletal system, with acute injuries, such as ankle sprains, being more frequent in the lower extremity.

Most of the previous articles evaluating residual symptoms following an ankle sprain are longitudinal or retrospective studies that focus on a variety of symptoms, such as pain, disability, or perceived instability. These symptoms may or may not be present in people with CAI. Because of these factors, it is difficult to identify an “at risk” population, or agree on an overall prevalence of CAI. To better understand CAI it is imperative that we determine the number of people who are affected by this condition, and specifically if one gender, sport or level of competition are at a greater risk of developing CAI. Athletic trainers, physicians, and strength coaches can use these data to establish preventative exercises for athletes in whom CAI is prevalent. Therefore, the purpose of this study is to determine the prevalence of CAI in high school and college female tennis player.

METHODOLOGY

The Descriptive study design was approved by the institutional research committee. This surveyed the prevalence rate of chronic ankle instability among high school and college female tennis players.

Sixty-five female high school and college tennis players were selected on the basis of selection criteria using simple random sampling. The demographic data was collected from each and the purpose of the study was explained to all the subjects.

We included High school and college female tennis players, who are playing tennis minimum 3-5 hours a week. Subject excluded were who had a history of a recent ankle fracture and ankle surgery, Subjects with a neurological disorder and Subjects who failed to completely answer the questionnaires.

The total number of respondent was 65 female tennis players. Simple random sampling methods were used to collect the data because the area taken for sampling was from different school and college team or individual tennis players. Data was collected through a questionnaire include questions about ankle instability and demographic data and consent form.

For grading ankle instability in female tennis players the tool being used is Cumberland ankle instability tool. This assessed the ankle instability on the day to day activity. This scale includes questions on maximum 30 point. Subject may score between 0 and 30. Lower score indicating decreased ankle stability, and higher score indicating increased stability. A cut off score of less than 24 on CAIT identifies the chronic ankle instability.
RESULT AND DATA ANALYSIS

Sixty-five high school and college female tennis players of mean age 19 years, SD=+ 1.81 were selected for the study (table -1). The mean and standard deviation was calculated for quantitative variables.

The above table 2 clearly shows the prevalence of chronic ankle instability in high school and college female tennis players. Also it present prevalence of CAI in high school is 25.92% and college is 15.78%, unilateral CAI of high school is 18.51% and college is 10.52%, bilateral CAI of high school is 7.40% and college is 5.26% and absent of CAI of high school 74% and college 84.21%.

The above table 3 clearly depicts the total prevalence of chronic ankle instability in high school and college female tennis players. Also it present prevalence of CAI 20%, unilateral CAI 13.84%, bilateral CAI 6.15% and absent of CAI 80%.

DISCUSSION

The present study was carried out to find the prevalence of chronic ankle instability in high school and college female tennis players. Data was collected through Cumberland ankle instability tool, which include questions for ankle instability.

While analyzing the outcome measures for this study, it was observed that according to statistical analysis, results of the study indicate the prevalence of CAI in high school more than college players.

Before finding out the prevalence of CAI between high school and college level players, we found the prevalence of CAI in each group. The prevalence of CAI was 20% of the sample, and prevalence of CAI in high school was 25.92% and college is 15.78%, according to earlier findings of other researcher on different population. They had a sample of 17172376 athletes to find out Epidemiology of US High School Sports-Related Ligamentous Ankle Injuries. Certified athletic trainers reported 5373 ankle sprain in athlete and rate were higher for girls than for boys.24

Injury due to participation in tennis may occur at any location in musculoskeletal system, however data shows that most tennis injury occur in lower extremity 31% to 6%, followed by frequently injured part of the lower extremity were ankle and thigh, with ankle sprain being the most common specific injury. This is in agreement with the previous studies done on epidemiology of tennis injuries at all levels of play, and to discuss recent findings in injury surveillance by the Association of Tennis Professionals (ATP) and Recent efforts in injury surveillance by the ATP and at the collegiate and junior levels have highlighted injury trends that will help guide injury prevention strategies at various levels of play and stated in his study that most injuries occurred in the lower extremities (41.7%), followed by upper extremities (25.0%), and trunk (16.7%).25

It is also observed that chronic ankle instability is due to repeated injury to lateral ligament in ankle. This is co related to the previous findings that Injury to lateral ligament of ankle is the most frequent and recurrent injury in players. The predominance of repetitive jumping, landings and contact with other players expose players of basketball to a high risk of ankle sprain. One of the residual complications of lateral ankle sprain is Functional ankle instability or Feeling of giving way in ankle during sporting activities. It is considered as a main cause of recurrent ankle sprain. The construct of FAI represents occurrence of sudden uncontrolled joint motion not exceeding the normal range during functional activity. Freeman et al. in 1965 first introduced the concept of FAI for classifying patients with on-going complaints of “giving way” of the ankle. It is estimated that 20% - 40% of all ankle sprains develops FAI. Other researcher reported that following acute ankle injury 40% of subjects continued to experience giving way even after 5 months. Proprioceptive deficits, delayed neuromuscular response, impairments and imbalance in muscle strength, decreased range of motion persistent ligamentous laxity, impaired balance, the presence of localized scar tissue etc. are proposed as some of the contributing factors of FAI.26

The results also show that prevalence of CAI unilateral was 13.84% and bilateral was 6.15%. This also shows that the prevalence of CAI unilaterally is more than bilaterally. So this study describes present of prevalence of chronic ankle instability in high school and college level tennis players.

CONCLUSION

The purpose of this study was to identify the prevalence of CAI among female high school and college tennis players using questionnaire specifically designed to identify the CAI. From the data obtained from this study we can determine that CAI occur in female tennis players is 20%, which helps us to determine that CAI in high school is 25.92% and college is 15.78%. From this data we conclude that high school female tennis players are more prone to develop CAI.

The presence of CAI will create long term concern for both the athletes and health care provider. Athletic trainers should pay special attention to female tennis players for developing CAI due to repeated ankle injury as they are at a higher risk for developing CAI after initial ankle injury. Targeting these populations for injury prevention or rehabilitation intervention could have a great impact on reducing the incidence of CAI.
Reference


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