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Incidence of Tibial Stress Fracture in Filipino Collegiate Athletes

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Abstract: Tibial stress fractures (TSF) are common overuse injuries in athletes. Shin splints account for initial presentation of TSF. Athletes oftentimes disregard this symptom, which may lead to greater risk for injury, such as a stress fracture. In the Philippines, most injuries at the collegiate level are under reported, with athletes seeking orthopedic consults when pain is non-manageable. This study aimed to determine the incidence of tibial stress fracture in collegiate athletes. 150 collegiate athletes volunteered to participate in this study, answering a survey that include parameters pertaining to incidence of shin splints, progressing to TSF. 103 athletes experiencing shin splints were included in the analysis. Out of the 103, 39 consulted the doctor for evaluation. It was found that 23 out of 39 athletes, with majority of them being females (n = 19) were discovered to exhibit TSF. The incidence of tibial stress fracture in athletes with shin splints in the collegiate level was found to be higher in the female athlete population. Basketball and football showed the highest incidence of stress fractures. Training frequency and duration did not show any significant contribution in acquiring the injury. Thus, strategies for early detection and reducing the risk for shin splints, especially in the female athletes, should be warranted.

Keywords: Tibial Stress Fracture, Filipino, Collegiate Athletes

1. Introduction

Stress fracture is an overuse injury and occurs due to the inability of the bone to remodel in the setting of repetitive loading. The buildup of microdamage to the bone that is not repaired will result to a fracture. The threshold in the quantity of the strain is not exactly known and is connected to a number of individual host factors. Overuse injuries are progressive in nature and the athlete might not be aware of the presence and severity of the injury and may not seek consult until the stress fracture has propagated into a complete fracture [1, 10, 11]. Prevention and early management is essential for early return to sport and to avoid fracture propagation and other complications with late diagnosis [2]. Athletes participating in cross country running, track and field, triathlon, soccer, basketball and dance are commonly are commonly affected by stress fractures [6, 7].

One of the symptoms of a tibial stress fracture is shin pain, the athlete localizes the pain on the shaft at rest, during or after the activity. A differential in evaluation of shin pain in a possible overuse injury is shin splints. In tibial shaft stress fractures, the pain is progressive over a period of 2-4 weeks that can persist throughout the activity during weight bearing [1, 8].

A common complaint among athletes is shin pain or shin splints. They account for 0.7 to 20% of all sports medicine clinic injuries and commonly occur in individuals participating in strenuous activity such as military training and athletics. Certain sports such as running have a high occurrence of stress fractures, with the tibia being the most common site. It is described as pain in the anterior aspect of the leg with insidious onset and without a history of trauma. Pain is usually worst during activity and may be relieved by rest [2].

Clinically, Shin splints is also known as the medial tibial stress syndrome, which is a stress reaction in the bone, periosteum, and tendon that is caused by repetitive microtrauma [3]. It is essential to differentiate a shin splint from a stress fracture to provide proper management. A thorough history and physical exam are usually sufficient to make the diagnosis of medial tibial stress syndrome however,

some patients may require further imaging or work-up to rule out stress fractures or other pathology [3].

Tibial stress fracture is a common injury in the collegiate athletic setting that may be due to the increased in intensity of training and competition [9, 5]. A study conducted during the 2016 summer olympics in Rio showed the occurrence of stress fractures in Olympic athletes diagnosed via imaging with only the symptom of gradual onset of pain in the leg prior or during the Olympic games. It also showed that 36% of the athletes with the symptom had a stress fracture. The incidence of stress injuries were mostly in the lower extremities (84%), particularly tibia (44%) and metatarsals (12%), with two in the lumbar spine (8%). Stress injuries were most common in track and field athletes (44%) followed by volleyball players (16%), gymnastics (artistic) (12%) and other type of sports [4].

Most tibial stress fractures are managed conservatively and heal uneventfully however, some stress fractures if not detected early can be challenging, requiring surgery. Neglected stress fractures that will require surgery can prolong the athletes' recovery having a psychosocial impact, and, in the case of professional athletes, and, in the case of professional athletes, an economic impact [5].

In the Philippines, most injuries at the collegiate level are under reported and taken for granted. Coaches and athletes have a high tolerance in dealing with injuries prior to seeking medical opinion. Orthopedic consults are only sought once an athlete can no longer perform due to pain which most often is already a complicated case die to the late diagnosis and management.

The objective of this study is to determine the incidence of tibial stress fracture in collegiate athletes with the symptom of shin pain. To be able to identify what type of sport has the highest incidence and what type of training intensity and duration showed the most occurrence. The study aims to create awareness amongst the coaches and trainers about tibial stress fractures and its correlation to the type of sport, training intensity and duration for them to properly strategize their micro and macro training programs to avoid this injury. The study also aim to guide coaches, trainers and physical therapist as to when to seek an orthopedic consult upon the onset of symptoms.

2. Methodology

This is a retrospective descriptive study to investigate the incidence of tibial stress fractures in athletes with shin pain. The participants included in the survey are male and female Filipino athletes aged 18-24 years old who participated in the collegiate level of competition in the University Athletic Association of the Philippines (UAAP) for at least a year with a minimum of 3 days per week training frequency. The athletes surveyed played basketball, volleyball, football, and track and field from different schools. The questionnaires were disseminated by a research assistant and were self-completed. Consent was secured prior to answering the questionnaire. They answered the questionnaire physically or online through Google form. Incidence rates was used to compare sex, sport, training intensity, duration of symptom and the actual diagnosis of TSF in patients with the symptom of shin splints.

3. Results

A total of 150 participants answered the questionnaire (55 males and 95 females) with the mean age of 20±2. The majority of the participants that answered participated in basketball 44%, volleyball at 20%, football 19% and track and field at 17%. The time that the athletes have been playing their respective sport competitively is 10±1 years. The average training frequency was 6-7 days per week, once a day with a duration of 2-3 hours. All the athletes participated in endurance, strength, agility and power training during their sessions. Amongst the participants. 69.3% (n = 104) reported experiencing shin splints. One participant was excluded for further analysis due to invalid data. The shin splint pain scale, using the 10-point Borg scale, was 5.72 ± 2.25. The incidence of pain occurred at the start (n = 78), during (n = 22), and at end of training. Further, 52.4% (n = 54) recorded increasing pain when training intensity increases. 37.8 % (n = 39) of the athletes experiencing shin splints consulted a doctor, and 6.00% (n = 23) were diagnosed with TSF. Of the 23 athletes with TSF, 82.6 (n = 19) were females.

4. Discussion

This study aimed to investigate the incidence of TSF, with initial presentation of shin splints, among collegiate athletes in the Philippines. Descriptive statistics revealed at least 23 athletes out of 150 were found to have TSF from shin splints.

In this study, majority of athletes with TSF were females. This result was similar to previous studies which demonstrated higher incidence of TSF in females.

4.1. Age and Sex

In this study more than half of those diagnosed with a tibial stress fracture were females. It may be attributed to the occurrence of disordered menstruation that has been linked to stress fracture risk [12]. The female athlete triad (Disordered eating, amenorrhea and decrease BMD) has been hypothesized to also play a role in developing stress fractures in females [13, 14].

4.2. Type of Sport

Basketball showed the highest incidence of tibial stress fracture, it may be attributed to more participants playing basketball answered the questionnaire. The second most common sport with which the injury occurred was football, sport biomechanics to further studied to establish the epidemiology of the injury in this sport. Further studies are needed to delve into which type of sport in the collegiate level.

4.3. Training Duration and Intensity

Training duration and intensity was the same for all the participants with 6-7 days training frequency, once a day with

duration of 2-3 hours per session. It did not show any significant contribution in developing the injury.

4.4. Type of Training

All participants trained for endurance, agility, strength and power in their training programs of their respective sport. No data showed that a certain type of training could increase the probability in acquiring a tibial stress fracture.

4.5. Shin Splints

Majority of the athletes surveyed experienced shin pain during the start of the training with a tolerable pain scale that was not significant to cause a limb allowing them to continue to play.

4.6. Pain Scale

Data showed that those diagnosed with a stress fracture had a higher pain scale associated with difficulty in walking of having a limp. The increased pain scale and limp causing the inability to play was the tolerance in seeking orthopedic consult.

4.7. Stress Fracture

Data showed that less than half of the athletes experiencing progressive and severe shin pain consulted an orthopedic doctor.

5. Conclusion

The incidence of tibial stress fracture in patients with shin splints is at 23.5% and more commonly occur in females. Basketball and football showed the highest incidence of stress fractures. Training frequency and duration did not show any significant contribution in acquiring the injury. Majority of the athletes surveyed had experienced shin splints with different pain scales but less than half sought consult for the symptom. Early detection via imaging should be mandatory once the athlete experiences progressive anterior leg pain over a period of time. Prompt diagnosis is vital in preventing advancement into a complete fracture and shortening time for return to play.

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