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Case Report

Bilateral Tibial Stress Fractures in a Zumba Participant

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Abstract

Zumbahas emerged as a widespread exercise program combining workout with entertainment. However, there are few scientific reports concerning consequences of this newly-developed activity. Recognizing the injuries that are common in Zumba is the key step for establishing specific preventive measures. We describe an otherwise healthy young female who developed bilateral tibial stress fractures after a few weeks of Zumba class participation. Using proper equipment andincreasing physical activity levels gradually, training of the instructors and providing greater awareness for participants can be regarded as to be principal strategies in order to avoid Zumba related injuries.

INTRODUCTION

Zumba is a newly-developed exercise program with dance and aerobic elements which are first originated in Columbia and widely spread all over the world [1,2]. Offering participants to meet American College of Sports Medicine criteria for recommended cardiovascular exercise intensity [2] , it was predicted to be one of most prevailing fitness classes in 2012 [1]. Zumba appears to promote healthy lifestyle not only by positively affecting body composition and helping maintanence of healthy body weight, but also by reducing daily stress due to itsenjoyable and motivating nature [1,2].

Contrary to its popularity, there are only few scientific reports about the consequences of Zumba [1,6]. Recognizing the types of injuries that are common in Zumba is the key step for establishing specific preventive measures. With this paper, we present an otherwise healthy young female who developed bilateral tibial stress fractures after starting Zumba class.

CASE PRESENTATION

A 30-year-old woman (168 cm and 67 kg, body mass index:24kg/m^2) presented with pain in the medial aspect of both knees. The patient started a Zumba class (1 hour/day, four days a week) three weeks ago. After the second week she complained bilateral knee pain first during walking and persisting at a lower level at rest. The pain progressively worsened after training courses. History did not point out any risk factors predisposing to osteoporosis including menstrual irregularity and smoking. She was a physician and she had not been engaged in any physical activity class before. She was wearing running shoes during the exercise.

Clinical examination revealed localized bilateral tenderness on the distal medial aspect of the knees. Pain was elicited during varus and valgus stress tests. The range of motion of both knees was normal and any sign of muscle imbalance, weakness or stiffness of the knee joints was absent.

Bilateral anteroposterior and lateral radiographs of the knees, complete blood count and blood biochemistry revealed normal results. Calcium and vitamin D levels were in normal limits. Magnetic resonance imaging revealed stress fractures located in the proximal metaphysis of both tibiae and bone marrow edema that surrounded the fractures (Figure 1A and 1B). A conservative treatment with reducing activity to the level of pain-free functioning resulted in the resolution of symptoms after six weeks. Informed consent was obtained from the patient for the publication of this case report.

DISCUSSION

We describe bilateral tibial stress fractures presented with pain in a female patient. Stress fractures are overuse injuries that result from cumulative impact ofrepetativemicrotrauma over the course of time [7-13]. Although rare in general population, stress fractures are considerably more common in the athletic subjects and military recruits [7,8]. Proposed risk factors include, excessive physical activity with limited rest periods,

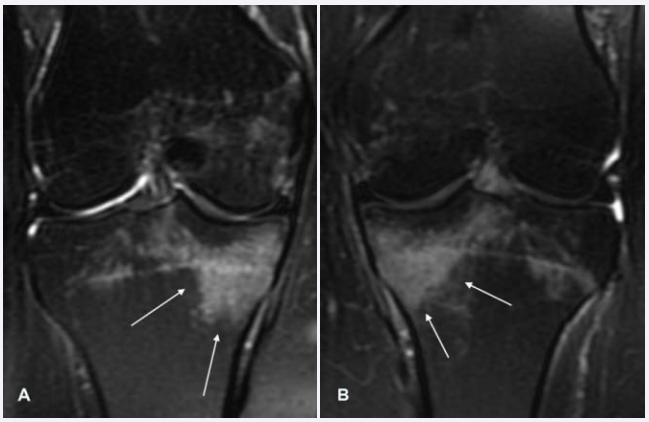

Figure 1 Coronal fat-suppressed T2-weighted images of right (A) and left (B) knee show bone marrow edema in the both side of medial tibial (arrows) plateau consistent with stress reaction.

smoking, female gender, low levels of vitamin D, abnormal body composition and biomechanical abnormalities [8,9]. Other factors such as eating disorders, menstrual irregularities and osteoporosis also contribute to the pathologic mechanism [9,11]. Our patient had none of these risk factors.

Overuse injuries can be associated with sports-related activities and someof them may beuniqueto a certainsport [7]. Understanding the types of injuries that are common in Zumba can help minimizing the risk among participants. Literature search revealed only one peer-reviewed original article focusing on musculoskeletal injuries associated with Zumba [2]. In this study, among 49 participants, almost one third reported an injury while taking Zumba, with multiple injuries in some patients. Although almost half of the injuries were reported to be related with the knee joint, the mentioned study did not note the kind of injury.

Our case was wearing running shoes during the exercises which are actually not recommended due to the threads under it [2,14]. Zumba moves include quick lateral, side to side movements [2,14] which have potential to create odd biomechanical forces distributed to femur and tibia. If feet stick to the floor, (instead of gliding) due to improper shoes or surface, then a torque is generated [5]. In order to prevent Zumba related injuries, an ideal shoe should allow twisting, turning and render stability for side motion. Running shoes and carpeted surfaces are discouraged which both make the feet to stick to the surface [6,14,15]. A recent report indicated a true aneurysm of the distal anterior tibial artery associated with wearing high sport shoes during Zumba class [6]. Inouye and colleagues called for agreater awareness of proper shoes for Zumba especially by training of instructors and they also recommended underlying this information in handouts given to trainees at the beginning [2].

Additionally, the number of Zumba classes per week was reported to be significantly associated with injury. Reports of injuries were higher amongst participants who took 4 or more classes versus 3 or fewer classes per week [2]. This was the first time that our case had been engaged in a physical activity class and she had started Zumba with four hours per week. Abundant evidence indicates that sudden increment in the intensity of the exercise and, introduction of different kind of training are additional risk factors for stress fractures [12,13]. Increasing physical activity levels gradually and avoiding high impact moves particularly in participants those are new to the fitness class would be preventive strategies [14,15]. Zumba Gold, which is a lower intensity alternative [5] , may be more suitable for beginners. Instructors can also substitute the moves according to participants by switching to low impact exercises [14].

Zumba seems to offer a relaxing escape from daily stressful routine. However due to it's newly emergence it may be prone to training errors which in turn can convert a healthy activity to a health hazard. This is the first report addressing a possible causal relationship between Zumba and bilateral tibial stress fractures. Clarification of whether it is a specific injury associated with Zumba awaits the results of future studies. However, training of instructors and participants is one of the crucial steps to reduce training errors. Avoiding sudden increase in physical activity, starting Zumba with fewer classes per week, wearing proper shoes are of vital importance to minimize the risk of Zumba related injuries.

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