

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/mjafi

Original Article

Gender differential and implications in the epidemiology of stress fractures among cadets of Indian Armed Forces



Air Cmde R. Kunte^{a,*}, D. Basannar^b, Col K. Chatterjee^c,
Gp Capt P.K. Agarwal, (Retd)^d, Col L. Prasad^e, Surg Cdr P. Dubey^f,
Gp Capt P.R. Ravi^g

^a Professor & Head, Department of Community Medicine, Armed Forces Medical College, Pune 411040, India

^b Scientist F, Dept of Community Medicine, Armed Forces Medical College, Pune 411040, India

^c Associate Professor, Department of Community Medicine, Armed Forces Medical College, Pune 411040, India

^d Specialist Orthopedic Surgeon, NMC Medical Centre, Al Ain, United Arab Emirates

^e Medical Officer In Charge, ECHS, Secunderabad, India

^f Senior Medical Officer, Kochi Naval Base, Kerala, India

^g Senior Adviser (Anaesthesia), Command Hospital (AF), Bengaluru, India

ARTICLE INFO

Article history:

Received 9 July 2016

Accepted 26 September 2017

Available online 15 November 2017

Keywords:

Stress fractures in military training

Stress fractures in females

Prevention of stress fractures

ABSTRACT

Background: Most studies on stress fractures in India have been carried out among recruits against officer trainees and limited to males. With the continuous induction of women in the Armed Forces, it was decided to carry out a study among officer trainees of the three services and compare the epidemiology among genders.

Methods: A prospective study was carried out in 2011–2012 at Training Institutes of the three services where male and female cadets train together. Baseline data was collected for all trainees who joined the academy during the study period. All cadets were followed up for development of stress fractures for which details were taken. Additional information was taken from the Training Institute.

Results: A total of 3220 cadets (2612 male and 608 female cadets) were included in the study. Overall 276 cadets were observed to have stress fractures during training – making an incidence of 6.9% for male cadets and 15.8% for female cadets. Females were found to have a significantly higher incidence of stress fractures. Further the distribution and onset of stress fractures in females was observed to be distinct from males.

Conclusion: The significant gender differential observed in the study indicates differential role of intrinsic and extrinsic risk factors in the causation of stress fractures among male and female. Special consideration needs to be given to these while planning and implementing measures for prevention. Further studies may be carried out on subject and on the effect of interventions in stress fracture prevention.

© 2017 Published by Elsevier B.V. on behalf of Director General, Armed Forces Medical Services.

* Corresponding author.

E-mail address: renuka_kunte@yahoo.com (R. Kunte).

<http://dx.doi.org/10.1016/j.mjafi.2017.09.018>

0377-1237/© 2017 Published by Elsevier B.V. on behalf of Director General, Armed Forces Medical Services.

Introduction

A stress fracture is an 'overuse injury' to bone that results from the accumulation of strain damage from repetitive load cycles much lower than the stress required to fracture the bone in a single-load cycle. Stress fractures are commonly associated with vigorous exercise, especially that involving repetitive, weight-bearing loads, like running or marching.¹ They occur secondary to bone fatigue when normal bone is unable to keep up with repair when repeatedly damaged or stressed.²

Stress fractures are somewhat unique to military training, or at least, are seen to occur more frequently and regularly in the military compared with most athletic training programmes, except distance running.³ They are the single most important cause of hospital admissions during military training, and result in loss of training days in addition to affecting quality.

The aetiology of stress fractures is multi-factorial, and the risk factors can be broadly categorized into intrinsic and extrinsic risk factors. Intrinsic risk factors include *mechanical factors* such as aerobic fitness at the time of training, as well as *hormonal* and *nutritional factors* and gender. Among these, gender, i.e. female sex and physical conditioning prior to, or at the time of beginning training have been consistently identified as important risk factors. Extrinsic risk factors include *factors* related to *physical training, especially volume and intensity of training.*^{1,2,4,5}

Stress fractures classically present with gradual onset of localized pain at a typical site following repeated strenuous physical activity. They can be diagnosed clinically, however are confirmed by radiographs. Most stress fractures are managed conservatively. What is more important is the prevention of stress fractures during training, for which broad strategies include various modifications of training. Improving aerobic fitness of trainees prior to training also has a role.⁴

Stress fractures in military training have been extensively studied in the world including in the Indian Armed Forces, and strategies for prevention being implemented. Most studies in India have been carried out among 'recruits' as against 'cadets' or 'officer trainees'. Only one published study is available which was carried out among Air Force cadets including females, in 2000-2004.⁶ It was therefore felt necessary to study the epidemiology of stress fractures among cadets of the three services, and, to compare it between genders, since it may have implications in prevention. This assumes greater relevance with the increasing and regular induction of females in the Armed Forces in different branches. Consequently, a study was carried out among the 'officer cadets' in the training establishments of the Army, Navy and Air Force, where gentlemen and female cadets participated in the same training regimen, to see a gender differential if any.

Material and methods

A large prospective multi-centric study was undertaken to study the epidemiology of stress fractures among male and female cadets in training establishments of the three services during 2011-2012. A single officers training establishment from each of the three services, i.e. Army, Navy and Air Force,

where both male and female cadets trained together for their basic training was selected for the purpose of the study. Appropriate approvals from the institutional ethics committee and from the administrative authorities of the establishments were taken for the conduct of the study.

All cadets who joined the institute for training during the study period were included in this study. Baseline data was collected for all the cadets at the beginning of the term (after informed consent), by medical officers at the training institute on a suitably designed validated performa. In addition to personal particulars, it included information on anthropometric parameters and history of physical activity prior to joining training. All the cadets were followed up for the term for development of stress fractures, if any. Detailed information was recorded on a separate questionnaire for those cadets who were diagnosed to have sustained stress fractures as per case definition (radiologically confirmed by the presence of a fracture or callous). This information covered all important features of stress fracture, i.e. onset, presentation, treatment given and disposal etc., and, was collected from the cadet as well as the medical officer at the training institute. Additional information on various aspects of training, i.e. aspects of physical training, scheduling of events like cross country, equipment, shoes provided, infrastructure available, and the measures in place for reduction of stress fractures at the establishment, was noted by interviewing the administrative authorities. Quantitative data was analyzed using SPSS version 20. A qualitative analysis of all attributes of physical training and measures in place for prevention of stress fractures was also carried out for the three training establishments for comparison.

Results

A total of 3220 cadets (2612 male and 608 female cadets) were included in the study. The baseline data available for 2739 cadets is summarized in [Table 1](#). The mean age for male cadets was 22.7 years and that for female cadets was 22.6 years. Maximum number of cadets, i.e. nearly 50% of male cadets and 60% of female cadets were in the age group 22-24 years. Anthropometrically, the female cadets had significantly lesser height, weight and BMI as compared to the male cadets. A significantly more number of male cadets (63%) as against 48.7% of female cadets gave history of carrying out 'physical activity' in the form of brisk walking, running, sports or swimming for more than six months prior to joining the training establishment.

Overall, 276 cadets were observed to sustain stress fractures during training, making the combined incidence of stress fractures to be 8.6%. The cumulative incidence for male cadets during the study period was 6.9%, and that for female cadets was 15.8%. The relative risk of sustaining stress fractures during training was 2.29 ($p < 0.001$) for female cadets in comparison with male cadets.

The different types of stress fractures sustained by male and female cadets are as shown in [Fig. 1](#). A total of 188 fractures were observed in 180 male cadets during the study. It is seen that stress fracture tibia was the commonest fracture seen (accounting for >90% of stress fractures), in gentlemen

Download English Version:

<https://daneshyari.com/en/article/8706965>

Download Persian Version:

<https://daneshyari.com/article/8706965>

[Daneshyari.com](https://daneshyari.com)