

LIFESTYLE BEFORE RECRUITMENT AND STRESS FRACTURE OCCURRENCE DURING 12-MONTHS OF STRENUOUS TRAINING

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INTRODUCTION

Military training, especially army basic training, is a completely new environment for the new recruit. For many, it is a hostile environment and they either will get injured or not complete the basic training course. Soldiers at the beginning of their military training are especially prone to stress fracture (SF) development as indicated by as high as a 31% occurrence rate in a 14-week basic training course [1]. Recruits face high physical demands aimed to improve their physical fitness in order to perform their tasks successfully. This is especially true among combat recruits who face much greater physical demands due to their expected future tasks.

In recent years different studies were performed in order to evaluate why some recruits develop SF while others do not. A low level of physical fitness at recruitment [2, 3] and lower levels of physical activity prior to recruitment [4, 3, 5] were found to increase the risk for SF. However, this correlation was not consistent in all studies [6]. One study evaluated the type of the performed physical activity and found that recruits who played basketball at least three times a week for at least 2 yrs had a low risk for SF, while long distance running was not protective [1].

The aim of this study was to evaluate different aspects of lifestyle before recruitment in addition to physical activity that contribute to the SF occurrence rate among highly trained combat recruits.

METHODS

Subjects: The study group consisted of 59 men (18.5±0.5) starting basic training in an Israeli Defense Forces (IDF) combat unit. Seventeen participants were diagnosed with SF at least once by imaging methods, and 7 participants were diagnosed with SF according to clinical symptoms only and were excluded from analysis. All participants gave their signed consent before the beginning of the study.

Surveillance: All of the volunteers filled out a lifestyle questionnaire used routinely by the IDF to review recruit lifestyle before entering military service. The questionnaire evaluated different aspects of lifestyle such as importance of physical training, type and duration of exercise, importance of physical activity, and smoking habits. The questionnaire was completed the day after recruitment.

Medical surveillance was conducted by the unit's MDs according to IDF procedures. An orthopaedic specialist on behalf of the research team assisted by performing bi-monthly examinations of symptomatic soldiers, thus providing additional surveillance.

Data analysis: Statistical analysis was conducted using SPSS software by which all parameters were compared between the following groups: combat recruits who developed SF (SF) and combat recruits who did not develop SF (NSF).

RESULTS

Analysis of the questionnaires showed that 56.25% of the SF recruits reported that they had trained regularly before recruitment for more than a year while only 29.41% of the NSF group trained accordingly.

The distribution of the type of training was significantly different: the NSF group dedicated 2.82 exercises per week to heart-lung endurance exercise while the SF recruits performed only 2.07 heart-lung endurance exercises per week ($p < 0.05$). However, for the SF group each heart-lung endurance exercise was significantly ($p < 0.05$) longer than those performed by the NSF group (47.3 ± 14.9 min vs. 36.8 ± 15.8 min, respectively).

Before recruitment 81% of the SF recruits participated in competitive sport compared to 67.7% of the recruits from the NSF group. Furthermore, 37.5% of the SF group continued competing in the year before recruitment compared to 12.9% among the NSF. Two subjects from the SF group reported suffering from SF in the 5 years before recruitment, although they reached full recovery, while none of the NSF group reported any SF occurrence. No significant differences were found between the groups in smoking habits or calcium consumption.

CONCLUSIONS

The significant differences in the duration and frequency of heart-lung endurance exercise performed by the SF and NSF recruits indicates that longer training may cause more microdamage to the bone than shorter exercise despite the longer rest given to the bone.

Another important result is the differences in the training period as a preparation to recruitment and the participation in competitive sport. Both indicate higher motivation for excellence among the recruits who suffered from SF. Therefore, it is possible that the SF recruits performed more physical tasks than the NSF due to their high motivation.

These results indicate a need to educate candidates for military service regarding a proper physical fitness program that will prepare them for service without causing injuries prior to recruitment. Also it would be advisable to identify those who are especially highly motivated since they may perform more physical tasks than other recruits, and also might be less willing to seek medical care at early signs of SF.

In order to prevent SF development in military population an understanding of the risk factors for its development is necessary. Identification of recruits at high risk at recruitment (before exposure to the new environment) will enable the commanders of these recruits to implement a moderate training program and will provide greater awareness for early symptoms of SF among the medical team.

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