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ORIGINAL ARTICLE

Demographic profile of Sports Injuries among Trainees of a Premier Training Institute of India

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ABSTRACT

Introduction: Injuries are recognized as a leading health problem in professional physical training. Many of these involve physical damage caused by microtrauma (overuse) in recreation, sports, training, and job performance. These are commonly seen in Training institutes world over and are a cause of concern due to loss of precious training hours. This study was conducted at a hospital catering to a premier Training Institute in southern part of India where trainees undergo three years of vigorous physical training and suffer different musculoskeletal injuries. The purpose of this study was to determine the incidence of training-related musculoskeletal injuries and to classify different injuries.

Materials and methods: This retrospective case–control study was conducted at the hospital catering to a premier Training Institute of India, from January to December 2017. All the trainees who reported sick with musculoskeletal problems were included in the study depending on inclusion and exclusion criteria. Injury profile of the trainees was studied based on the type of activity being performed and the mode of injury. All the trainees were examined by the PMR specialist and definitive treatment was prescribed depending on type and extent of injury.

Results: A total of 677 male trainees between the age group of 17 and 21 years were included. Most of the injuries occurred during the early phase of training. Most common injury among trainees are knee contusion (16.23%) followed by low backache (11.67%). Percentage of stress fracture is 14%, and mostly seen in 2nd term trainees. The incidence of upper extremity injury compared with lower extremity is 11.85%. Inflammation and pain (overuse) were the largest injury type category, including 80.03% of all injuries.

Conclusion: Considering the magnitude of training injuries in physical training, there is a need for substantial study in the areas of surveillance, prevention, and treatment of the training or sports related injuries.

Keywords: Injury profile, Physical training, Sports Injury.

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INTRODUCTION

Injuries are recognized as a leading health problem in the Sports and Training Academies world over. Musculoskeletal injuries are common in this young, active population. Many of these involve physical damage caused by microtrauma (overuse) in recreation, sports, training, and job performance.

Because of the strenuous physical and mental effort involved in personnel activities, a high level of physical fitness is required by the most trainees, therefore, engage in a rigorous exercise training program during their initial months of training. It is well known that basic training affected by a variety of physiologic parameters like body mass index, skin folds, aerobic capacity, and muscular endurance.[1-5]

The most common types of injuries seen in military and athletic populations are musculoskeletal overuse injuries. The majority of the injuries associated with military training occur at or below the knee. A study during Army infantry basic training reported that the five most commonly diagnosed conditions were pain attributed to overuse or stress syndrome (23.8%), muscle strains (8.6%), ankle sprains (6.3%), overuse knee injuries (5.9%), and stress fractures (3.0%).[6] The incidence of overuse injuries, particularly in the lower limbs, is the major cause of training days lost during military recruit training. Stress fractures appear to be the most common problem reported during these training periods, with incidence rates ranging from 1.5 to 64%.[7]

One of the premier training institutes located in southern India is imparting high caliber training to the selected trainees. Approximately 300 trainees get admission to this institution for a three-year long course divided into six semesters of six months duration each. During this three years course, the trainees undergo vigorous physical training and varied sports activities, resulting in different musculoskeletal injuries. The purpose of this study was to determine the incidence of injury-related musculoskeletal conditions in the military training and to classify different injuries.

AIMS AND OBJECTIVES

The aim of this study was to study the pattern of different musculoskeletal injuries during physical training and suggest remedial measures to reduce the incidence.

MATERIALS AND METHODS

This retrospective case–control study was conducted at the hospital catering to a premier training institute of southern India from January to December 2017. All the trainees who reported sick with musculoskeletal problems were included in the study depending on the following inclusion and exclusion criteria.

Inclusion Criteria

- Injuries required medical attention for more than 3 days
- Injuries that hampered routine training activity.

Exclusion Criteria

- Injuries that generally heal with rest within 72 hours
- Injuries associated with any systemic disorder.

After getting ethical clearance from the hospital Ethics Committee, all the trainees who fulfilled the above criteria were included in the study. Injury profile of the trainees was done based on the type of activity involved and the mode of injury. After the detailed initial assessment, definitive treatment was prescribed and patients needing supervised treatment were hospitalised.

RESULTS

In our study, all trainees were male in the age group between 17 and 21 years (Tables 1 and 2).

Total upper limb injuries are 69, which include shoulder contusion, dislocation, rotator cuff injury, elbow and wrist contusion, and scaphoid fracture (Graphs 1 to 4).

DISCUSSION

This case–control study was conducted at hospital located in premier training institute of India from January to

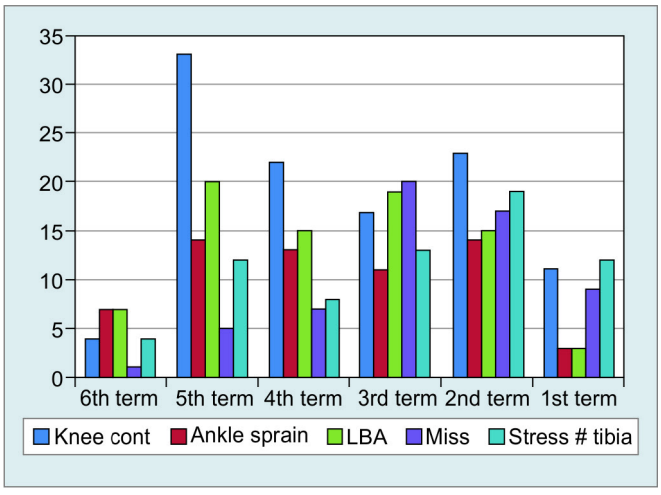
Table 1: Sick report number from January to December 2017

Jan	*Feb*	*March*	*April*	*May*	*June*	*July*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
599	925	966	982	507	55	811	1129	966	1301	1223	53

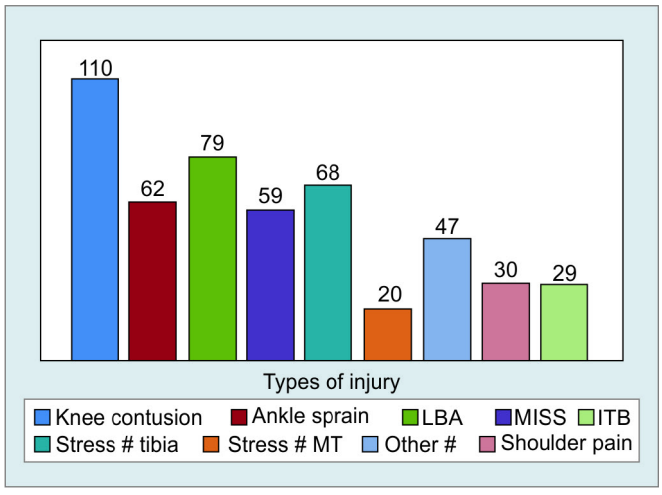
Table 2: Different injuries in cadets based on term

	Knee cont	*Ankle sprain*	*LBA*	*MTSS*	*Stress tibia*	*Other fracture*	*Stress # MT*	*ITB*	*Shoulder pain*	*Others*	*Total*
6th term	4	7	7	1	4	8	0	2	3	9	45
5th term	33	14	20	5	12	14	5	2	10	37	152
4th term	22	13	15	7	8	9	2	7	9	30	122
3rd term	17	11	19	20	13	6	3	9	2	35	135
2nd term	23	14	15	17	19	6	7	8	5	43	157
1st term	11	3	3	9	12	4	3	1	1	19	66
	110	62	79	59	68	47	20	29	30	173	677
%	16.23	9.16	11.67	8.71	10.04	6.94	2.95	4.28	4.43	25.55	

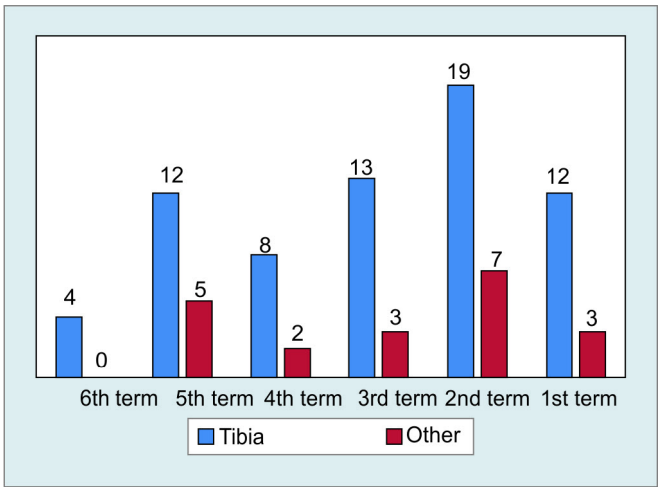
LBA: Low backache; MTSS: Medial tibial stress syndrome; MT: Metatarsal; ITB: Iliotibial tract



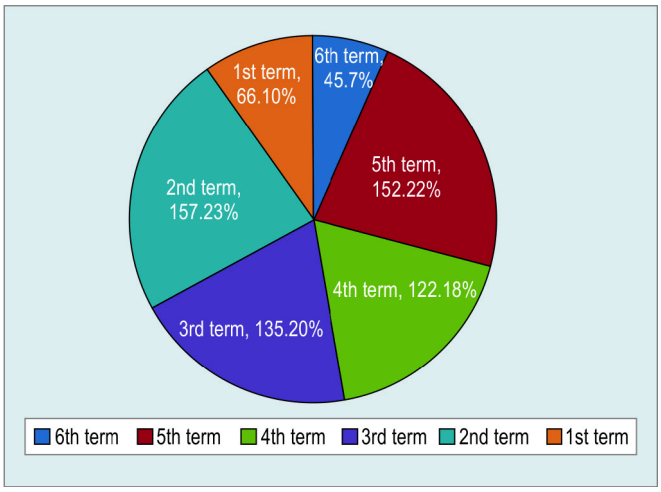
Graph 1: Multiple bar diagram showing injury pattern based on term. Knee contusion and low backache (LBA) most common among 5th termers may be due to vigorous stress and strain of physical training, and knee contusion is the commonest injury among all term cadets, stress fracture is most common among 2nd termers, whereas MTSS is mostly seen among 3rd term cadets



Graph 2: Bar diagram showing the different injury patterns among cadets. In our study, knee contusion is the most common injury among cadets followed by low back pain



Graph 3: Multiple bar diagram showing rates of stress fracture among cadets. Stress fracture tibia is the most common stress fracture observed in cadets and 2nd term cadets are mostly affected



Graph 4: Pie diagram showing the incidence of injury at each term; 2nd term cadets are mostly affected followed by 5th term cadets

December 2017. We included totally 677 trainees in our study.

Our study categorizes different injury patterns depending on the duration of training. In this study, we have analyzed different injuries based on the region affected.

In our study from the table that most of the injuries were noted in the 2nd and 5th term trainees, whereas very less number of trainees of 6th term were affected.

Most common injury among trainees was knee contusion (16.23%), followed by low backache (11.67%). Percentage of stress fracture is quite high, 13%. Stress fracture is mostly seen in 2nd term trainees; 29.55% of total stress fractures occurred during 2nd term trainees. Among stress fracture, tibia was the most affecting, this being 77.27%.

Among total injury cases, 2nd term trainees are mostly affected, being 23.19%, and least affected are 6th term trainees percentage, being 6.65. The possible reason may be sudden increase in the physical activity after 1st term and at 6th term, muscle becomes strong enough to resist injuries.

In our study, the incidence of upper extremity injury compared with lower extremity is 11.85%. Kelth G et al[8] found incidence of upper extremity to be 14%, which is quite comparable to our study.

Inflammation and pain (overuse) were the largest injury type category, including 80.03% of all injuries which is also at par with the study done by Kelth G et al.[8] Inflammation and pain of lower extremity and lumber region, being the most common injury, were 29.7 and 11.67% respectively. Upper extremity comprises 10.19% of all injuries and shoulder comprises 62% of upper extremity injury.

According to Keton et al,[6] among 449 trainees, the incidence of the most common injuries was stress fractures (13.4%), iliotibial band syndrome (10.9%), patellofemoral syndrome (9.4%), Achilles tendinitis (6.7%), and periostitis (3.1%). In our study, the incidence of stress fracture is 13%, whereas incidence of ITB is 14%.

According to Mitchell et al,[9] the proportion of stress fracture was 8.6% with tibia being the most common site, 57.6%. In our study, the percentage of stress fracture is quite high, being 13%, and stress fracture tibia was 77%.

This study identifies different injury types that can be targeted and prevented and provides incidence of injury over time. Although some of these injuries may result from acute traumatic causes, they more often result from the cumulative effects of microtraumatic forces that are common in many physical activities and work settings. Activities commonly associated with these injuries can involve (1) overtraining, (2) overexertion, (3) repetitive movements and activities, (4) forceful actions, and (5) extreme joint positions. In addition to their direct effect in causing new injuries, these microtraumatic forces may also exacerbate or extend previous injuries or cause previous injuries to recur, such as in recurrent joint (shoulder) dislocations and recurrent back strains.

Preventive Strategies

Preventive strategies should be directed at the primary factors contributing to risks for musculoskeletal injuries, such as the amount and level of intensity of the training, and levels of physical fitness. The intervention may include reduction in the amount of running miles, reduced total running volume, running in ability groups, and greater variety in types of training exercises (i.e., multiaxial, neuromuscular, proprioceptive, and agility exercises), gradual build-up of exercise and military hiking, and emphasis on aerobic activities in early training phases before progressing to anaerobic activities and strength conditioning.[8,10] Special attention may be

emphasized on prevention of knee injuries by introducing protective orthosis, proprioceptive training, and muscle strengthening.

CONCLUSION

Considering the magnitude of training injuries in active populations, there is a substantial amount of work that remains to be performed, especially in the areas of surveillance, prevention, and treatment. Modifiable risk factors have been identified, suggesting that overuse and other training injuries could be decreased with proper interventions. Given the size of the problem, a systematic process of prevention should be initiated starting with routine surveillance to identify high-risk populations for the purpose of prioritizing research and prevention. Properly planned interventions should then be implemented with the expectation of dramatically reduced lost work/training time, attrition, and medical costs, while increasing military readiness.

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