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Area of Expertise: Orthopaedics

Title: Sports participation and ankle injury prevalence among medical school students.

Short title: Sports injury among medical school students.

Abstract

Purpose: The aim of this study is to evaluate the prevalence of ankle injuries and the tendency of medical students to participate in sports, and the effect of medical school preparation and study process on participation in sports.

Material and methods: A cross-sectional descriptive study was conducted among medical students at Pamukkale University Faculty of Medicine. Data were collected using an online questionnaire covering aspects of sports participation before and after medical school, types and frequency of sports played, and history of ankle injuries. Statistical analysis was performed to examine changes in sports participation and injury prevalence.

Results: A total of 253 students took part in the study. Of these, 135 (53.4%) participated in sports before medical school, with volleyball (28%), football (17%) and basketball (17%) being the most common. Ankle injuries were particularly common in football (50%), basketball (33%) and volleyball (21%). After starting medical school, 48 of the students reduced or stopped their sports activities, citing academic workload as the main reason. However, 46 students started sports activities especially fitness.

Conclusion: The study highlights a significant decline in sports participation during the university entrance exam among medical students due to academic pressure, with a notable prevalence of ankle injuries in high-impact sports. During medical school education, there is an increasing tendency to engage in fitness-style sports with a lower risk of injury.

Keywords: Sports participation, medical students, ankle injuries, physical activity.

Makale başlığı: Tıp fakültesi öğrencileri arasında spor katılımı ve ayak bileği yaralanmalarının yaygınlığı.

Kısa Başlık: Tıp fakültesi öğrencilerinde spor yaralanmaları.

Öz

Amaç: Bu çalışma, tıp fakültesi öğrencilerinin spora katılım eğilimleri ve ayak bileği yaralanmalarının yaygınlığını ve tıp fakültesi hazırlanma ve okuma sürecinin spora katılıma etkisini değerlendirmeyi amaçlamaktadır.

Gereç ve yöntem: Pamukkale Üniversitesi Tıp Fakültesi öğrencileri arasında kesitsel tanımlayıcı bir çalışma yapılmıştır. Veriler, tıp fakültesinden önce ve sonra spora katılım, yapılan spor türleri ve sıklığı ile ayak bileği yaralanması öyküsünü kapsayan çevrimiçi bir anket kullanılarak toplanmıştır. Spora katılım ve yaralanma prevalansındaki değişiklikleri incelemek için istatistiksel analiz yapılmıştır.

Bulgular: Çalışmaya toplam 253 öğrenci katıldı. Bunlardan 135'i (%53,4) tıp fakültesine başlamadan önce herhangi bir spor dalında aktivite yapmıştır. Öğrencilerin yaptığı en yaygın sporlar voleybol (%28), futbol (%17) ve basketbol (%17) idi. Ayak bileği yaralanmaları özellikle futbol (%50), basketbol (%33) ve voleybolda (%21) yaygındı. Tıp fakültesine başladıktan sonra, öğrencilerin 48'i spor faaliyetlerini azaltmış veya durdurmuş, bunun ana nedeni olarak da akademik iş yükünü göstermiştir. Ancak, 46 öğrenci özellikle fitness olmak üzere tıp fakültesine başladıktan sonra spor aktivitelerine başlamıştır.

Sonuç: Bu çalışma, tıp öğrencileri arasında üniversite giriş sınavı sırasında akademik baskı nedeniyle spora katılımda önemli bir düşüş olduğunu ve yüksek etkili sporlarda ayak bileği yaralanmalarının yaygınlığını vurgulamaktadır. Tıp fakültesi eğitimi sırasında, yaralanma riski daha düşük olan fitness tarzı sporlara katılım eğilimi artmaktadır.

Anahtar kelimeler: Spor katılımı, tıp fakültesi öğrencileri, ayak bileği yaralanmaları, fiziksel aktivite.

Introduction

Participation in sport is an important component of overall health. It contributes to physical fitness, injury prevention and mental well-being. Previous research has shown that participating in sport has many benefits. These include improved cardiovascular function, musculoskeletal strength and cognitive performance [1]. There are many benefits to taking part in sport. These include improvements in physical and mental health, self-esteem, the ability to work in a team and a reduction in cigarette smoking. Despite these benefits, the risk of injury must also be considered. In the United States, there are an estimated 4.5 million sports- and recreation-related injuries among children and young adults each year [2]. However, the transition from secondary school to medical school often leads to significant changes in lifestyle, including a decrease in physical activity due to increased academic demands [3].

Studies have shown that time constraints, academic workload and stress management challenges are the main reasons for a decrease in physical activity among medical students [4]. Studies focusing on high school and college athletes have shown that injuries, especially ankle injuries, are prevalent in those participating in sports such as basketball, football and volleyball [5]. Injury rates among high school and college athletes remain significant, with ankle sprains among the most commonly reported injuries, according to the first decade of web-based sports injury surveillance [6].

Furthermore, an analysis of epidemiological trends in collegiate athletics indicates that the incidence of foot and ankle injuries varies according to sport, frequency of participation, and history of previous injury [7]. Understanding these trends is critical to developing injury prevention strategies tailored to medical students. Medical students may have limited opportunities for structured rehabilitation due to academic commitments [8]. In addition, the importance of early intervention and rehabilitation programmes to reduce long-term disability has been highlighted in studies of lateral ligament complex ankle sprains and lower limb injuries in athletes [9].

This study aims to assess the impact of medical education on trends in sports participation and the prevalence of ankle injuries among medical students. Through the study of these factors, educational institutions can develop tailored interventions to promote physical activity whilst minimising the risk of injury [10].

Materials and methods

This cross-sectional descriptive study was conducted with the approval of Pamukkale University Non-Interventional Clinical Research Ethics Committee. The study

was approved by the Pamukkale University Non-Interventional Clinical Research Ethics Committee (date: 05.03.2020 and number:60116787-020/19227).

The study sample included students of Pamukkale University Faculty of Medicine in different academic years: Year 1 (78 students, 30.8%), Year 2 (118 students, 46.6%), Year 3 (38 students, 15%), Year 4 (9 students, 3.6%), Year 5 (7 students, 2.8%) and Year 6 (3 students, 1.2%).

Data was collected using an online questionnaire via Google Forms. The survey consisted of 26 questions covering different aspects of sports participation and injury, including

- Sports participation before and after starting medical school.
- Type and frequency of sports played.
- History of ankle injuries during sports participation.
- Incidence of ankle injuries during medical training.

The questionnaire was distributed online on 21 May 2024 and responses were collected until 4 June 2024. The collected data were analysed using statistical and graphical methods.

Results

A total of 253 students participated in the survey. Of these, 135 students (53.4%) were involved in sport before starting medical school. Of these, 59 (43%) were female and 76 (57%) were male. The most common sports were volleyball (28%), football (17%), basketball (17%), fitness (13%), tennis (8%), swimming (8%) and contact sports (7%).

During the preparation period for the university entrance examination, 101 out of 135 students (74%) stopped playing sport, mainly because of the academic workload. Of these, 60 students (59%) resumed sport after starting medical school, while 41 (40%) continued to do no sport due to academic intensity and lack of motivation. In addition, 34 students continued to play sport during exam preparation, of whom 27 (79%) continued to play sport during medical school, while 7 (20%) stopped due to academic workload.

After entering medical school, 87 students who had previously participated in sport continued to do so. The distribution of sports among them was as follows: 31 students (35%) participated in fitness, 18 (20%) in football, 17 (19%) in volleyball, 6 (6%) in tennis, 6 (6%) in running and 3 (3%) in basketball. In terms of frequency, 4 students (4%) reported doing sport once a month, 27 (31%) once a week, 45 (51%) three times a week and 11 (12%) daily.

Of the 118 students who did not exercise before medical school, 46 (38%) started exercising after enrolling in medical school. The most common sports chosen were

fitness (25 students, 54%), pilates (6 students, 13%), football (4 students, 8%), running (3 students, 6%), volleyball (2 students, 4%), tennis (2 students, 4%) and swimming (2 students, 4%). In terms of frequency of exercise, 4 students (7%) reported exercising once a month, 14 (26%) once a week, 32 (61%) three times a week and 2 (3%) daily.

In total, 133 (52%) of the 253 students surveyed continued or started playing sport during medical school. The most common sports were fitness (56 students, 42%), football (22 students, 16%), volleyball (19 students, 14%), running (9 students, 6%) and tennis (8 students, 6%). In terms of frequency, 8 students (6%) exercised once a month, 41 (30%) once a week, 77 (57%) three times a week and 13 (9%) daily. Total participation in sport before medical school, during university entrance exams and during medical school, as shown in Figure 1 and Table 1. Ankle injury rates varied between the sports listed in Table 2.

Discussion

The results of this study are consistent with previous research indicating that academic responsibilities significantly reduce student sport participation [2]. A study by Kerr et al. [11] of the first decade of web-based sports injury surveillance and a survey of sports participation and sports injuries in Calgary area high schools highlight a decline in student sports participation due to increasing academic pressures. Similarly, our study found that 74% of students who participated in sport prior to medical school discontinued their activities during the pre-medical school period. And 40% of them never took up sport again. However, relevant associations between academic performance and VO₂ max, diastolic blood pressure and respiratory insomnia were found by Redondo Flórez et al. [12]. They emphasise the importance of implementing different programmes to improve these factors, especially physical activity and sleep habits, to improve academic performance [12].

According to this study, volleyball was the most common sport before starting medical school (28%), whereas fitness was the most common sport during medical school (42%). This can be interpreted as students moving away from contact sports to reduce the risk of injury, to stay fit and to increase the importance of looking good. The pressure to look good is an issue for students regardless of their course, according to Sundgot Borgen et al. [13]. It is also thought that the fact that fitness sport can be done individually, does not require a team, does not require an instructor and is easily accessible may have contributed to the increase in participation.

In this study, the incidence of foot and ankle injuries among students before they start medical school is 23%, with football and basketball having the highest rates of ankle

injuries. Ankle injuries are a common problem among student athletes, particularly in high-impact sports. Research suggests that ankle sprains are among the most common injuries in sports such as basketball, football and volleyball, including the epidemiology of lateral ligament complex ankle sprains in National Collegiate Athletic Association sports and the incidence and epidemiology of foot and ankle injuries in elite collegiate athletes [6]. Hunt et al. [5] examined the incidence and epidemiology of foot and ankle injuries in elite college athletes and found that 27% of injuries to the foot and ankle occurred in college athletes.

Furthermore, the importance of early intervention and rehabilitation programmes is highlighted by the characteristics of athletic training services for patients with ankle sprains sustained during high school athletics and the epidemiology of lower leg soft tissue injuries in high school athletes [10]. In this study, 38% of students who sustained an ankle injury continued to participate after treatment, highlighting the need for appropriate protocols to help facilitate safe return to play.

In view of the demanding nature of medical education, our findings suggest that universities could incorporate structured programmes of physical activity that fit into the schedules of students.

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Conflict of interest: No conflict of interest was declared by the authors.

References

1. Pizzarro J, Chiang B, Malyavko A, et al. Epidemiology of Sports Injuries Among High School Athletes in the United States: Data From 2015 to 2019 [retracted in: *Orthop J Sports Med.* 2024 Nov 5;12(10):23259671241290250. doi:10.1177/23259671241290250.]. *Orthop J Sports Med.* 2024;12(5):23259671241252637. Published 2024 May 22. doi:10.1177/23259671241252637
2. Spitnale MJ, Mathews CG 3rd, Barnes AJ, Thier ZT, Jackson JB 3rd. Epidemiology of Lower Leg Soft Tissue Injuries in High School Athletes. *Foot Ankle Orthop.* 2022;7(1):24730114211057886. Published 2022 Jan 11. doi:10.1177/24730114211057886

3. Clifton DR, Hertel J, Onate JA, et al. The First Decade of Web-Based Sports Injury Surveillance: Descriptive Epidemiology of Injuries in US High School Girls' Basketball (2005-2006 Through 2013-2014) and National Collegiate Athletic Association Women's Basketball (2004-2005 Through 2013-2014). *J Athl Train*. 2018;53(11):1037-1048. doi:10.4085/1062-6050-150-17
4. Emery CA, Meeuwisse WH, McAllister JR. Survey of sport participation and sport injury in Calgary and area high schools. *Clin J Sport Med*. 2006;16(1):20-26. doi:10.1097/01.jsm.0000184638.72075.b7
5. Hunt KJ, Hurwit D, Robell K, Gatewood C, Botser IB, Matheson G. Incidence and Epidemiology of Foot and Ankle Injuries in Elite Collegiate Athletes. *Am J Sports Med*. 2017;45(2):426-433. doi:10.1177/0363546516666815
6. Roos KG, Kerr ZY, Mauntel TC, Djoko A, Dompier TP, Wikstrom EA. The Epidemiology of Lateral Ligament Complex Ankle Sprains in National Collegiate Athletic Association Sports. *Am J Sports Med*. 2017;45(1):201-209. doi:10.1177/0363546516660980
7. Harmon KG, Drezner J, Gammons M, et al. American Medical Society for Sports Medicine position statement: concussion in sport. *Clin J Sport Med*. 2013;23(1):1-18. doi:10.1097/JSM.0b013e31827f5f93
8. Manoel LS, Xixirry MG, Soeira TP, Saad MC, Riberto M. Identification of Ankle Injury Risk Factors in Professional Soccer Players Through a Preseason Functional Assessment. *Orthop J Sports Med*. 2020;8(6):2325967120928434. Published 2020 Jun 24. doi:10.1177/2325967120928434
9. Gulbrandsen M, Hartigan DE, Patel KA, Makovicka JL, Tummala SV, Chhabra A. Ten-year epidemiology of ankle injuries in men's and women's collegiate soccer players. *J Athl Train*. 2019;54(8):881-888. doi:10.4085/1062-6050-144-18
10. Simon JE, Wikstrom EA, Grooms DR, Docherty CL, Dompier TP, Kerr ZY. Athletic training service characteristics for patients with ankle sprains sustained during high school athletics. *J Athl Train*. 2019;54(6):676-683. doi:10.4085/1062-6050-449-16
11. Kerr ZY, Gregory AJ, Wosmek J, et al. The first decade of web-based sports injury surveillance: Epidemiology of injuries in high school girls' volleyball and collegiate women's volleyball. *J Ath Tra*. 2018;53(10):926-937. doi:10.4085/1062-6050-162-17
12. Redondo Flórez L, Ramos-Campo DJ, Clemente Suárez VJ. Relationship between Physical Fitness and Academic Performance in University Students. *Int J Environ Res Public Health*. 2022;19(22):14750. Published 2022 Nov 10. doi:10.3390/ijerph192214750

13. Sundgot Borgen C, Sundgot Borgen J, Bratland Sanda S, et al. Body appreciation and body appearance pressure in Norwegian university students comparing exercise science students and other students. *BMC Public Health*. 2021;21(1):532. Published 2021 Mar 19. doi:10.1186/s12889-021-10550-0

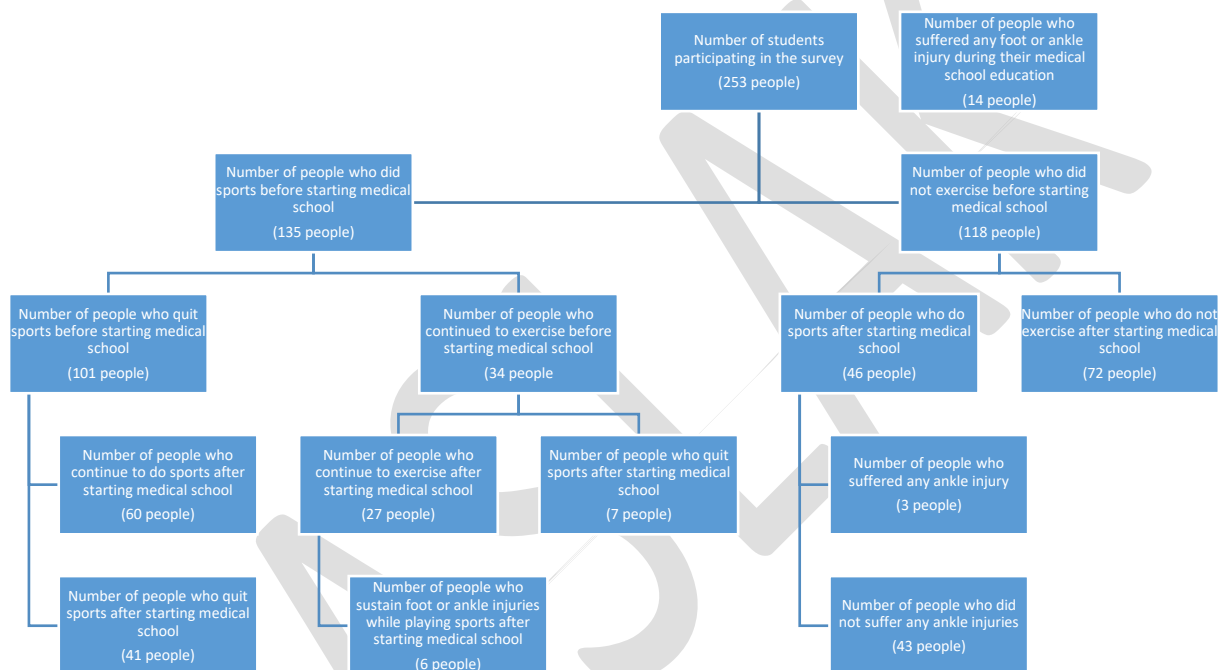


Figure 1. Participation in sport before medical school, during university entrance exams and during medical school

Table 1. Participation in sport before starting medical school and during medical school

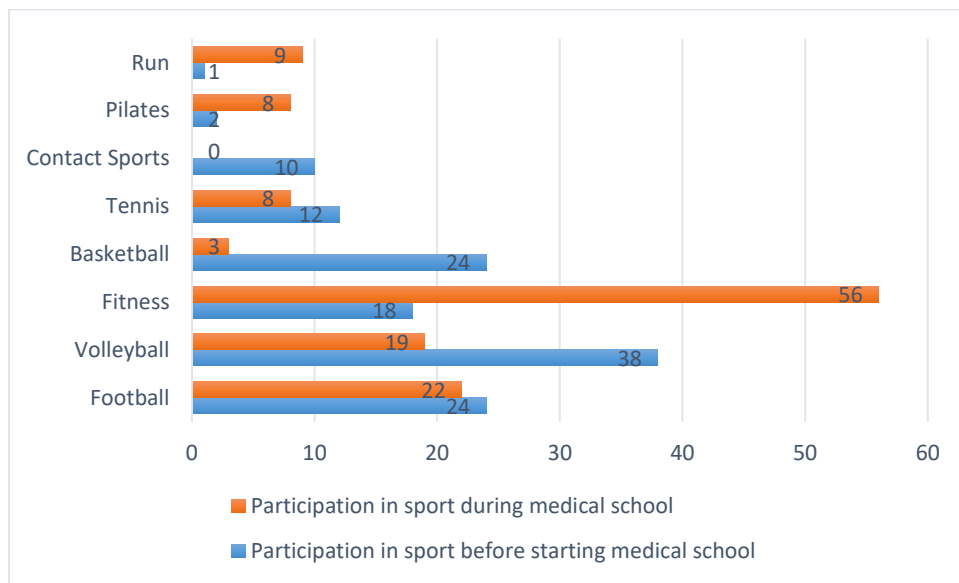


Table 2. Ankle injury rates varied between the sports

| | Minor Injury (Healing within 1-15 days) | | Moderate Injury (Healing within 15 days-2 months) | | Serious Injury (Healing over 2 months) | | Injury rate in people doing sports as a percentage | |
|----------------|--|-------------------------------|--|-------------------------------|---|-------------------------------|--|-------------------------------|
| | Before starting medical school | After starting medical school | Before starting medical school | After starting medical school | Before starting medical school | After starting medical school | Before starting medical school | After starting medical school |
| Football | 9 people | 3 people | 3 people | 1 person | - | - | 50% | 22% |
| Basketball | 6 people | - | 1 person | - | 1 person | - | 33% | - |
| Volleyball | 5 people | 2 people | 2 people | 1 person | 1 person | - | 21% | 11% |
| Tennis | 2 people | - | 1 person | - | - | - | 25% | - |
| Contact sports | 1 person | - | 1 person | - | - | - | 20% | - |
| Pilates | - | 1 person | - | - | - | - | - | 16% |

Yucens M, Aktas H, Sandalci RU, Polat A. Sports participation and ankle injury prevalence among medical school students. Pam Med J 2024;18:....-....

Yücens M, Aktaş H, Sandalcı RÜ, Polat A. Tıp fakültesi öğrencileri arasında spor katılımı ve ayak bileği yaralanmalarının yaygınlığı. Pam Tıp Derg 2024;18:....-....

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