

# A Survey of Occupational Injuries During Preclinical Courses Among Dental Students

## Diş Hekimliği Öğrencileri Arasında Preklinik Dersleri Sırasında Meydana Gelen Mesleki Yaralanmaların Araştırılması

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**ABSTRACT Objective:** It is important for the dental schools to report the occupational injuries experienced by the students during the preclinical education and to identify the problems according to these reports and to educate the students on these issues. Therefore, it was aimed to determine the dental students' exposure to different injuries during the preclinical courses in the present study. **Material and Methods:** An anonymous questionnaire on the type, number of injuries, and which preclinical course took place was distributed to the second-year dental students. Also, items for which protective equipment was used, hepatitis B vaccination status, and reporting were available in the questionnaire. Descriptive statistics of the findings of the questionnaire were made. **Results:** Of the students, 98.8% reported that they were injured at least once and 19.3% reported being injured more than five times. The most common injury was finger cutting with metal band (72.3%). This was followed by an endodontic file injury (69.9%). The preclinical course of endodontics was the highest number of injuries (85.5%) followed by prosthetic dentistry (75.9%). It was determined that 81.9% of the students already had hepatitis B vaccine. It was seen that only 20.5% of the students did report the injury to the faculty member after the injury. **Conclusion:** During the preclinical training, the incidences of injuries were found to be high. Obtaining this information can be useful in reducing the number of such injuries in the future by taking necessary measures.

**ÖZET Amaç:** Diş hekimliği fakültelerinde, klinik öncesi eğitimi sırasında öğrencilerin yaşadığı mesleki yaralanmaları rapor etmeleri, bu raporlara göre problemlerin tespit edilmesi ve bu konularda öğrencilerin eğitilmesi son derece önemlidir. Bu nedenle, bu çalışmada diş hekimliği öğrencilerinin klinik öncesi eğitim dersleri sırasında maruz kaldıkları farklı yaralanmaların belirlenmesi amaçlanmıştır. **Gereç ve Yöntemler:** İkinci sınıf diş hekimliği öğrencilerine, klinik öncesi eğitim dersleri boyunca yaşadıkları yaralanmaların türü, yaralanma sayısı ve hangi klinik öncesi eğitim dersinde meydana geldiği ile ilgili isimsiz anketler dağıtıldı. Ayrıca ankette koruyucu ekipman kullanımı, hepatit B aşılanma durumu ve yaralanmanın raporlanma durumu ile ilgili sorular da yer aldı. Anket bulgularının tanımlayıcı istatistikleri yapıldı. **Bulgular:** Öğrencilerin %98,8'i en az bir kez klinik öncesi eğitim derslerinde yaralandıklarını bildirdi. Öğrencilerin %19,3'ü ise beş defadan fazla yaralandığını bildirdi. En sık karşılaşılan yaralanma, metal bantla parmak kesilmesi idi (%72,3). Bunu kanal aleti ile yaralanma izledi (%69,9). En fazla yaralanmanın (%85,5) endodonti klinik öncesi eğitim derslerinde meydana geldiği tespit edildi ve bunu protez klinik öncesi eğitim dersleri (%75,9) izledi. Öğrencilerin %81,9'unun zaten hepatit B aşısı olduğu tespit edildi. Öğrencilerin sadece %20,5'inin yaralanma sonrasında durumu sorumlu öğretim üyesine bildirdiği görülmüştür. **Sonuç:** Bu çalışmanın bulgularına göre, klinik öncesi eğitim sırasında, öğrencilerde yaralanma görülme sıklığı yüksek bulunmuştur. Bu bilgilerin elde edilmesi, gelecekte bu tür yaralanmaların sayısını azaltmak için gerekli önlemleri alınması için yararlı olabilir.

**Keywords:** Occupational injury; education; dental students

**Anahtar Kelimeler:** Meslek yaralanmaları; eğitim; diş hekimliği öğrencileri

In dental schools, dentistry students may be injured due to different reasons during their education. Some injuries may be caused by factors

related to patient treatment. Other injuries may occur during preclinical training. The percutaneous injuries experienced by the students during their clinical den-

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tistry education were reported more frequently in the literature.<sup>1,2</sup> The rate of exposure to injury during treatment of the patients can be up to 4.2 per 100 patients per year for dental students.<sup>2</sup> Dental schools reported that 31% to 36% of percutaneous injuries were needlestick injuries.<sup>3,4</sup> The next most common causes of injury are the use of a bur and the use of scaler.<sup>2,4</sup>

With the use of information on the causes and rates of these injuries experienced by dental students, dental schools can take the necessary precautions and measures. Therefore, it is very important to document the injuries that students experience fully and completely. However, it is reported in the literature that this documentation is not sufficient.<sup>1</sup> It is also very important to identify the injuries that occur in preclinical education environment. Preclinical training in dentistry is an educational environment in which clinical conditions are simulated prior to patient treatment. Similar injuries can occur, even if preclinical education is not exactly the same with general dental practice. In the preclinical training, the hand tools and treatment procedures used during the clinic training are used and applied.

The transmission risk associated with percutaneous exposure to Hepatitis B virus (HBV) is estimated to be 2 percent for HBeAg-negative and about 30 percent for HBeAg-positive blood. Fortunately, effective HBV vaccination programs have significantly reduced the risk for HBV transmission among health care workers.<sup>1</sup> Although preclinical students are not in direct contact with the infectious materials such as patient blood and saliva, injuries occurring in the other workplaces that are not performed in the clinic should be equally serious.<sup>5</sup> During preclinical education, if students do not take protection measures against potential infectious sources for Hepatitis B and C virus and are not trained in this, they may be more vulnerable to blood or saliva transmitted diseases during their clinical training in the future.<sup>6</sup> Another issue is that preclinical students generally use human teeth in preclinical courses for educational purposes. The Occupational Safety and Health Administration (OSHA) Bloodborne Pathogens Standard recognizes human teeth as a potential source of bloodborne pathogens.<sup>7</sup> Therefore, in order to prevent the potential cross-infection, students should take pre-

ventive measures against bloodborne pathogens when using human teeth for educational purposes.

It is the responsibility of academic institutions to provide an appropriate training in infection control to protect students. However, there is no enough information available to change dental education programs. For this reason, we need information about student injuries occurring in preclinical education areas. In this questionnaire, occupational injuries experienced by dental students during preclinical training were evaluated.

## MATERIAL AND METHODS

Ethical approval for the study was obtained from the Ethics Committee of Biruni University, Turkey (2019/25-23). This study was conducted in compliance with the Helsinki Declaration. Students were informed about the objective of the study, content of being a participant and procedures. The second-year dental students were asked to complete a survey. The survey was distributed at the end of the preclinical courses. Students were told that participation was voluntary. Informed consent was implied when students completed and returned their questionnaires.

The survey comprised ten items divided into sections for demographic items (such as gender and age), occupational injuries (such as, nature and number incidents), vaccination status regarding HBV, and reporting.

Data from the completed questionnaires were entered into a database and subsequently analyzed using the Statistical Package for the Social Sciences (SPSS) software version 18.0. Basic statistics were calculated, including prevalence rates and overall numbers of occupational exposures as a percentage.

## RESULTS

Overall, 97.6% of dental students ( $n=83/85$ ) returned the questionnaire. Approximately 59% ( $n=49$ ) of the participants were female, 41% ( $n=34$ ) were male. The median age was 21.95 years (range 18- 34 years).

Overall, 98.8% ( $n=82/83$ ) of dental students had exposed at least one occupational injury during their preclinical education. Majority of the students ( $n=46$ ,

55.4%) had experienced injuries for 2-5 times. The most common type of injury was that the student cut his hand while trying to cut the metal tape of the appropriate length without the use of scissors ( $n=60$ , 72.3%). This was followed by an endodontic file injury ( $n=58$ , 69.9%) and bur injury ( $n=44$ , 53%), respectively. Amount of injuries and in which clinical course they occurred are summarized in Table 1.

Only 20.5% of exposed dental students told all of their injuries to appropriate academic personal and 79.5% did not report the injuries. The major reason (49.4%) for not reporting injury was low risk perception by the students. Details for a low reporting rate are summarized in Table 2.

The protective equipment usage and status of HBV vaccination are as follows: 81.9% of the students had HBV vaccination and 18.1% of the student did not have HBV vaccination. When students who had not been vaccinated against HBV were asked about HBV vaccine after the injury, nine of them gave a positive answer.

## DISCUSSION

Students learn the treatment procedures used in patients in their preclinical education courses in dentistry. Therefore, it is important to teach the students working safety in preclinical education in reducing clinical injuries in the future. For example, in this study it was found that 70% of the students were injured by cutting their fingers with metal band when trying to cut the tape to the appropriate size. This is probably because the instructor did not emphasize that it was wrong to cut the metal band by hand during preclinical courses. Cutting the finger with a metal band in the clinic may cause a significant percutaneous injury. Similarly, approximately 70 percent of the students were injured with an endodontic file. Such percutaneous injuries may be sufficient for the student to receive infectious diseases from the patients in clinical environment. Therefore, the determination of injuries experienced by students in preclinical education and the application of solutions

**TABLE 1:** Gender, age and amount of injuries, and in which clinical course they occurred.

Gender:	n	%	Mean	Low	Max	
Male	34	42	Age:	21.95	18	34
Female	49	59				
Total	83	100				
				<i>n</i>	<i>%</i>	
How many times did you sustain an injury during your first clinical training courses?			I have never injured	1	1.2	
			Only one time	18	21.7	
			2-5 times	46	55.4	
			More than 5 times	16	19.3	
Which kind of injuries did you experienced during your preclinical education? You can select multiple options.			Cutting finger by metal band	60	72.3	
			Injury by endodontic file	58	69.9	
			Injury by dental bur	44	53.0	
			Injury by dental explorer	39	47	
			Injury by dental metal wire	37	44.6	
			Injury by spirit stove	31	37.3	
			Injury by needle stick	29	34.9	
			Injury by plaster blade	17	20.5	
			Injury by scissor	5	6	
			Injury by scaler	3	3.6	
In which preclinical courses did the injury occur? You can select multiple options.			Endodontics	71	85.5	
			Prosthodontics	63	75.9	
			Restorative dentistry	55	66.3	

**TABLE 2:** Reasons for the lack of reporting of clinical injury.

When you were injured, did you inform the responsible faculty member of the clinic?	n	%	n	%		
	No	66	79.5	Yes	17	20.5
If you have not reported the injury you were exposed to, what is the cause? You can select multiple options.						
I was wounded with a sterile instrument. I didn't see it to be required for reporting.				10	12.0	
I didn't report for not worrying.				41	49.4	
I didn't know what to do when I was injured.				9	10.8	
I did not report, because I had an HBV vaccine				31	37.3	
I thought the patient had a low risk of transmitting infectious diseases.				8	9.6	
I couldn't take the time to report the situation.				19	22.9	

to this will reduce the risk of infectious diseases for dental students in the future.

It has been reported in previous studies that students reported a smaller number of injuries in dental schools.<sup>1,5,8</sup> In one study, it stated that only 19 percent of total injuries were reported.<sup>1</sup> Obviously, for some reasons, students do not report this situation to the person concerned as soon they are injured. In the literature, there is not enough information about under-reporting injuries occur during preclinical education. In this survey, we asked the students why they did not report their injuries to the responsible faculty member. About half of the students (49.4%) stated that they did not report because they did not worry, 37.4 percent of the students stated that they do not report because they already have hepatitis B vaccines and 22.9 percent stated that they could not spare time to report the situation. Similar excuses have also been reported for reporting a missing number of clinical injuries.<sup>8,9</sup> An important reason why students report an insufficient number of injuries may be the fact that faculty members did not emphasize such situations enough.<sup>5</sup>

It is indisputable that it is important that the injury information should be complete and accurate. On the other hand, it is evident that the students' immediate reporting of their injuries caused underreporting. On the other hand, if the participation in the well-organized questionnaire studies is high, the injury information of the students can be determined more accurately. Therefore, faculty administrators may consider to conduct surveys at regular intervals, such as in this study, and it may be useful in identifying the causes of injuries and reducing their frequency.

## CONCLUSION

To summarize, almost all dental students were injured during preclinical training at least once. Most injuries are caused by penetrating and cutting dental instruments. In the future, preclinical injuries should be recorded accurately in order to take necessary measures to protect dental students from clinical injuries that are at risk of infectious diseases. The university should take necessary preventive measures to prevent cross-infection from human teeth in the pre-clinical education environment. These measures are to provide hepatitis B vaccines and provide students with the necessary training on standard prevention measures and ensure their implementation in education program.

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### Conflict of Interest

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

### Authorship Contributions

**Idea/Concept:** Muhammet Kerim Ayar; **Design:** Muhammet Kerim Ayar; Emin Orkun Olcay, Merve Varol Olcay; **Control/Supervision:** Muhammet Kerim Ayar, Emin Orkun Olcay, Merve Varol Olcay; **Data Collection and/or Processing:** Emin Orkun

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