The relationship between dentistry and forensic medicine

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Abstract

Aim: The study aimed to have an idea about which subjects the relationship between dentistry and forensic medicine focuses on.
Material and Methods: In the study, the consultation forms of the patients who were referred from Tokat Gaziosmanpaşa University, Medical Faculty, Forensic Medicine Department to Tokat Gaziosmanpaşa University, Faculty of Dentistry, Oral and Maxillofacial Surgery Department were examined. The forms of the patients admitted between January 2014, and January 2019 were analyzed. Demographic information such as gender, age, and the reasons for consultation was obtained from these forms.
Results: In this retrospective study, the consultation forms of sixty-three patients were examined. The reasons for consultation of patients were determined as age estimation (n=32, 50.8%), trauma (n=30, 47.6%) and malpractice (n=1, 1.6%). In patients who were exposed to trauma, physical assault (n=17, 56.7%), traffic accident (n=5, 16.7%), falling (n=2, 6.7%), and firearm injuries (n=1, 3.3%) were among causes of trauma. In the trauma cases, the hard tissues affected in the maxillofacial region were teeth (n=14, 46.7%), symphysis mandible (n=3, 10%), mandibular condyle (n=2, 6.6%) and angulus mandible (n=2, 6.6%). The gender distribution of the patients with age estimation is examined; it is seen that the great majority of them were women (n=30, 93.75%). Furthermore, it is seen that age determination is mostly needed between 15-20 years of age (n=27, 84.4%).
Conclusion: A dentist can be appointed as an expert for forensic events in professional life. Therefore, the dentist should pay attention to the training on judicial examination and approach to forensic cases.

Keywords: Dentistry; forensic dentistry; trauma

INTRODUCTION

Forensic dentistry, which is also called forensic odontology, is a science that helps justice on the issues, such as age determination, identification and determination of evidence, gender determination, and loss of function in the jaws, by evaluating dental findings in forensic cases. Since the jaws and teeth are the most durable parts of the body against the conditions such as burning of the dead body and spraying chemicals on the dead body to prevent the recognition of identity, their examination is one of the most accessible and most valuable methods used in identification (1).

Forensic dentistry deals not only with identification in the dead and finding missing persons but also with forensic cases in living individuals. The maturation of primary and permanent teeth are determinant in the age determination of individuals. In dentistry practice, departments such as pedodontics and orthodontics use age determination with radiographic methods in treatment planning (2, 3). In individuals who are exposed to trauma, the damages occurring in the oral maxillofacial region are treated by oral and maxillofacial surgeons. Since oral and maxillofacial surgeons have a grasp of anatomy in the maxillofacial region, they can easily evaluate the loss of function in a forensic case with the compensation issue.

The study aimed to have an idea about which subjects the relationship between dentistry and forensic medicine focuses on. Dentists will be informed about forensic issues that can help forensic medicine.

MATERIAL and METHODS

In this study, the consultation forms of the patients who were referred from Tokat Gaziosmanpaşa University, Medical Faculty, Forensic Medicine Department to Tokat Gaziosmanpaşa University, Faculty of Dentistry, Oral and Maxillofacial Surgery Department were analyzed. The forms of the patients admitted between January 2014, and January 2019 were examined. Demographic information such as gender, age, and the reasons for consultation were obtained from these forms. The patients whose consultation forms could not be reached in patient records

or the patients with incomplete consultation form were not included in the study. This retrospective study was approved by the local Ethics Committee (Project no:19-KAEK-039).

All of the study data were analyzed with SPSS 19 (IBM SPSS Statistics 19, SPSS inc., an IBM Co., Somers, NY). Analysis results were presented as mean and standard deviation. The variables were recorded using descriptive statistics. The mean values and percentages were reported.

RESULTS

In this study, the consultation forms of sixty-three patients (23 males, 40 females) were analyzed. The ages of these patients ranged from 9 to 77 (mean: 28.33 ± 16.1). The reasons for consultation of patients were determined as age estimation (n=32, 50.8%), trauma (n=30, 47.6%) and malpractice (n=1, 1.6%) (Figure 1).
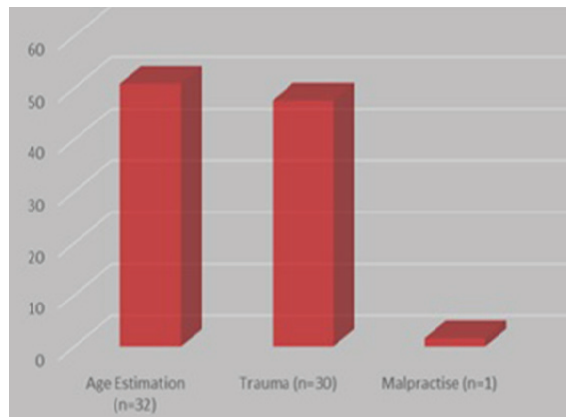

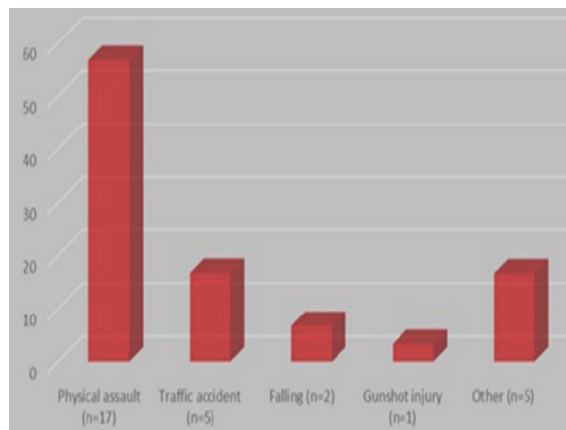**Figure 1.** The reasons for consultation

Figure 2. The causes of trauma

In patients who were exposed to trauma, physical assault (n=17, 56.7%), traffic accident (n=5, 16.7%), falling (n=2, 6.7%), and firearm injuries (n=1, 3.3%) were among causes of trauma (Figure 2). In the trauma cases, the hard tissues affected in the maxillofacial region were teeth (n=14, 46.7%), symphysis mandible (n=3, 10%), mandibular condyle (n=2, 6.6%) and angulus mandible (n=2, 6.6%) (Figure 3).

The gender distribution of the patients with age estimation is examined; it is seen that the great majority of them were women (n=30, 93.75%). Furthermore, it is seen that age determination is mostly needed between 15-20 years of age (n=27, 84.4%).
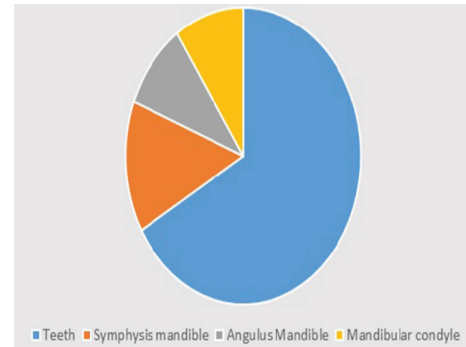

Figure 3. Affected tissues in the maxillofacial region after trauma

DISCUSSION

As scientists studying in various fields of forensic sciences, forensic dentists gather data by examining teeth, skeletons, and dental prostheses. They can identify the victims of murder or disaster by comparing the dental arch records and radiographies. They can also examine and evaluate bite marks detected on the human body or food as evidence. (4).

The concept of identification may be defined as to reveal any features providing a living or dead person to be identified, defined, and differentiated from others. Identification of a dead person as soon and exact as possible is an important issue in terms of humanity, sociality, religion, and also national and international law (5). Any information about the appearance of the person, for example, whether she/he has a birthmark or a surgical scar, or the clothes or jewelry she/he has worn for the last time, has an essential role in identification. If the person was fingerprinted or her/his DNA was analyzed when she/he was alive, these data are accessed. Fingerprint samples and any personal belongings that can be used in DNA comparison as comb or toothbrush may also be evaluated when needed (6). Dental identification is a method that was discovered in ancient times. In dental identification, the most important factor restricting the studies of dentists is the lack of regular dental records to be compared with the data gathered from the corpse in many countries. In cases where the citizens of the countries where these data are recorded regularly die in any disaster at home or abroad, their dental records can be used in identification. However, data recorded, especially by dentists, may include some errors and subjective information. When supported with dental radiograms, these data may provide more private, accurate, and objective results. (7)

Forensic dentistry also deals with forensic cases involving living persons besides the identification of the dead and finding the missing persons. In most of the studies

where traumatized body parts are evaluated in the frame of forensic cases, it has been detected that the most common body part injured in these cases is the head and neck region (8). Bones and teeth are the most damaged parts of the head and neck region. In forensic dentistry, the traumatic lesions described as cases which "cannot be eliminated with simple medical intervention" are tooth loss, subluxation of teeth and implants, tooth fractures affecting enamel dentin and pulp, cut in salivary glands, more than 5% abrasion of face skin, contusion, lacerations greater than 10 cm in the face skin, all kinds of nerve lesions in the face, partial or total rupture of the auricle, muscle laceration, deep and wide lacerations in the tongue, tongue ruptures and cuts, and Stenson's duct injury (9). In this study, some of the patients who consulted to dentistry had traumas. It was detected that the most common body part injured is teeth.

Age estimation by teeth is one of the most common methods in forensic dentistry. Tooth age is estimated by examination of developmental stages and eruption of permanent teeth in children and of structural changes in permanent teeth in adults (10). Teeth may be examined by radiography for age estimation. The techniques developed by Nolla in 1960 (11), Moorrees in 1963 (12), Haavikko in 1970 (13), and Demirjian and Goldstein in 1973 (14) for tooth age estimation are based on radio morphological evaluation of tooth development. However, the techniques developed by Mörnstaad et al. (15) and Cameriere (16) involves radiomorphometric examinations. The most known and commonly used technique among these is the Demirjian technique (14). There are many studies where these techniques are applied to the Turkish population (17-19). In this study, the ages of consulted patients were estimated via the Demirjian method. Most of the patients involved in age estimation were female. Most of these women were between 15-20 years old. Early marriages constitute a significant social problem. According to the standards specified in the international agreements, each marriage where one or both of the sides are under the age of eighteen is referred to as early marriage, and the girls who are forced to marry under the age of eighteen are child brides. However, any difference between regions may be foreseen in Turkey; as a developed country, 90% of the persons who marry at the age of 16-19 were women according to 2016 data of the Turkish Statistical Institute (20). For women directed to our clinic for age estimation, early marriage, and sexual abuse were among the reasons for age estimation.

This study has some limitations. Since the patients with trauma in the maxillofacial region were admired, such as plastic surgery and otolaryngology, the number of patients examined was low. Also, because some of the forensic cases had confidentiality, the causes of age determination could not be reached in all patients.

CONCLUSION

A dentist can be appointed as an expert for forensic events in professional life. Therefore, the dentist should pay attention to the training on judicial examination and approach to the forensic case.

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