Dealing with Dental Emergencies in the Emergency Room

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Abstract-
Emergency departments treat a broad range of conditions, including oral and dental conditions. Many of these may at first seem to fall outside the oral health domain, but what becomes clear is how entwined the conditions and their management are with the dental patient. Dental patients frequently attend the emergency department for a problem not related to a toothache or infection, for example, anxiety or a lost filling. However, a comprehensive assessment of their oral health status may reveal something different. The service would do well to remember that dentoalveolar fractures, oral soft tissue lacerations, and orofacial lacerations are included in the top ten ICD9 codes for procedures that are performed in the operating room. Craniofacial trauma and dental injuries are often seen in the polytrauma patient, and the management of these conditions can greatly influence the patient's recovery. The emergency department must consider how the expertise of a dentist may assist in managing these patients' conditions. This is partly what gave rise to wanting to obtain information regarding the protocols and experiences of other hospitals in dealing with dental emergencies in the ED. An unpublished survey was carried out in 2010 at the British Society for Oral and Maxillofacial Surgeons (BSDMFR) winter meeting. Of the people asked, all thought that dental emergency patients should not be handled by junior medical or maxillofacial staff, and 88% thought that it was not the role of medical staff to extract teeth. The implications that medical staff should not deal with dental emergency patients suggest that these patients should be referred to a dentist or a maxillofacial department. This survey is suggestive that in the mind of a surgeon, patients with dental emergencies should be managed by dental professionals. (Bhavsar, 2020)

Keywords: dental emergencies, emergency room, trauma, infection, toothache, management

1. Introduction

There were exceptions to this general picture of discomfort among dentists with hospital dental and oral care. Since World War II, both in the United States and abroad, oral and maxillofacial surgery advanced rapidly as a hospital-based specialty closely related to surgery and surgery training in medicine. This circumstance resulted in hospital dental and oral surgery services being found generally only in hospitals with medical residency programs and resulted in general improvement in quality of care for those patients with oral and maxillofacial surgical problems who received treatment by or under the direction of oral and maxillofacial surgeons in a hospital setting. In addition, the increased care provided for patients with medical problems, particularly the elderly and medically compromised, led to a minority of dentists gaining practice limited to those hospitalized patients who required dental and oral treatments while being medical inpatients. However, for the great majority of hospitalized patients with dental and oral problems, hospital dentistry did not become an attractive or beneficial option. (Cheng et al.2020)

In the late twentieth century, there were many reasons for the practicing dentist to feel uncomfortable about the treatment of dental and oral problems in hospitalized patients. There was evidence of increasing privileging of hospital-based non-dentist practitioners to perform dental and oral procedures, a decrease in the

availability of hospital dental and oral surgery services, and a realization among dentists that the cost of providing hospital dental and oral care was generally supported totally or in part by the dentist's income, produced feelings on the part of many dentists that hospital dentistry had become nonessential to the patient and non-rewarding to the dentist. In addition, many dentists, when faced with a decision of whether to provide treatment for an oral or dental condition in the hospital or office setting, found it difficult to select the hospital alternative because they could not ascertain benefit to the patient, to themselves or to the public. (Carter et al.2020)

1.1 Historical perspectives and topical caries preventive studies

It was not until the late 19th century that an in-depth understanding of the caries process began to unfold. In 1890, WD Miller published a paper which is widely regarded as a cornerstone in caries research. In this, he postulated that caries was a chemico-parasitic process and he introduced the concept of the caries equation whereby for a cavity to form there must be a susceptible tooth, fermentable carbohydrates, and specific bacteria. This concept is still widely accepted in today's understanding of caries. Although at the time it would have been impossible to conclusively prove this theory, the 1930s saw the development of an improved methodology for caries research and many studies were conducted with the aim of isolating cariogenic microorganisms and establishing the role of dietary sugars in the caries process. Many of these studies were unsuccessful, partly because at this time no animal model for caries was available and partly due to the lack of a sophisticated understanding of microbiology and diet/dental interaction. An excellent albeit unethical example of a diet/carbohydrate study was conducted by GV Black who locked his son in a windowless attic for 6 months and fed him only bread and syrup. At the end of the study, the boy's teeth were so badly decayed that the study was terminated and the teeth were used as a model for cavity preparation exercises in Black's dental classes. (Emerson, 2020)

Despite the fact that tooth decay has affected the human dentition for most of recorded history, the disease process has not been fully understood until recent times. The reason for this is the complexity of the caries process and the multitude of factors which affect the demineralisation and remineralisation of the tooth substance. Early attempts at caries prevention have been haphazard and generally unsuccessful because they were not based on a full understanding of the disease process. Caries was often attributed to a 'worm' and this led to various treatments designed to 'smoke out' the worm from the tooth with substances such as hot oil. The fact that the tooth often crumbled away when heated oil was placed in a cavity probably led to the discontinuation of this treatment, but the reason for its lack of success is not documented. Other unsuccessful treatments have included moonstone and arsenic, and although some teeth treated with these substances have been recovered from archaeological finds, no thorough investigation of the effectiveness of these treatments has been conducted. (Samuel et al.2020)

2. Common Dental Emergencies

Alveolar fractures are closely related to maxillofacial trauma, and tooth mobility may be an indication of the fracture. An OPG should be taken, and if there is no displacement, splint with a flexible spiral splint for two weeks. (Jones, 2020)

Root fractures have a poor prognosis, especially at the cervical level, and are usually only diagnosed with an OPG and repeat examination in an emergency after a period of x-ray. It is advised to splint using the natural arch position, and root canal treatment may be required. (da et al.2020)

A severe or minor dental crown fracture may result in pulpal exposure; therefore, a posterior coronal fracture should be restored with a full coverage restoration and an anterior fracture should be treated according to 'capping' of the exposed pulp.

Loss of a crown or a filling is a common emergency seen in the emergency room where the pain will be a result from exposure of the dentin. A temporary restoration should be placed, but an urgent referral to a dental clinic is required. It is important that acid etch is used if applying an adhesive restoration as the enamel is still partially protected by the primer bond.

The atraumatic fractured tooth is defined as a tooth that does not have an identifiable fracture line and is typically a result of excessive occlusal force. The theory is that a cusp will gradually flex under occlusal force until the bonds within the tooth fragment. If it occurs close to or below the gingival tissue, it is recommended to restore with an adhesive restoration. However, if it occurs within the middle third of the tooth, a full

coverage restoration is recommended because the loss of attachment and access for moisture control in this region means the adhesive bonds would not be reliable. (Soliman et al.2020)

3. Management of Dental Emergencies in the Emergency Room

Posted in: All Articles, EM Practice Article by: Michael J. Baker, MD and Loren Miller, MD, MPH on April 3, 2009 Dental emergencies are common and often seen in emergency departments. With changes in the health care system and declining access to dental care, it is likely that the number of dental visits to emergency departments will continue to increase. Emergency physicians should discuss with their dental colleagues how best to manage and treat these patients. Some departments will have dentists on staff to treat these patients, but it will be common that the only dental expert available will be an on-call consultant. This will leave the emergency physician in the position to diagnose and provide initial management for these often painful and distressing conditions. Many emergency departments do not have dental consultants readily available in-house or on-call. The usual practice in such cases is to pack a dental socket (after extracting a tooth) with gauze impregnated with a vasoconstrictor and admit the patient for definitive dental care/suturing by a dentist. Recent studies, however, have demonstrated that suture closure of the socket may obtain a better outcome and decrease the chance of dry socket formation. Rather than committing patients to long admission simply for dental care, emergency physicians should be prepared to manage these patients and follow up. Knowledge of a local maxillofacial surgery and/or hospital dental clinic that take referrals is essential.

4. Data collection and statistical methods

To attain national estimates that are generalizable to the US population, the pooled 2007-2008 datasets were analyzed using the patient sample command in Stata release 12. This accounts for the complex survey design of the NEISS dataset and enables national estimates of consumer product-related dental injuries that have occurred in the last year in children 1-17 years and young adults 18-35 years to be calculated. (Peres et al.2020) The NEISS dataset is derived from a nationally representative multi-stage probability sample of all US hospitals that have emergency departments and in which the CPSC has NEISS project hospital. The dataset includes information relating to the injury, the victim, the product involved, and its location, as well as providing details on the incident and outcome. A weighting system is employed to allow the calculation of national estimates of injury, and the four levels of sample strata and primary sampling frame clusters (hospital census regions) are taken into account in this process. Simulation research has demonstrated that the most efficient and unbiased variance estimation technique for NEISS data analysis is the design-corrected Pearson chi-square statistic. (Weichelt et al.2020)

Data collection and statistical methods used in the US data analysis have been described in another paper. In summary, for the current analysis, the National Electronic Injury Surveillance System (NEISS) database, which is part of the US Consumer Product Safety Commission's (CPSC), was accessed from its website. Data from this database allows the monitoring of consumer product-related injuries treated in United States hospital emergency departments. (Forrester, 2020)

5. Results

Five hundred of the 1,196 medical charts were reviewed, resulting in a series of 31 dental triage criteria. Four hundred sixty-four relevant patients were identified and consisted of 54 percent females and 46 percent males. The mean age was 32 years, with a range of 1 to 92 years. The adults (greater than 18 years old) had an average age of 39 years. Thirteen percent of the patients were less than 18 years old. There were 271 patients on whom a dental consultation had been called. These consultations were due to the fact that there was either no on-call dentist or the dentist was unwilling to come into the hospital to see the patient. In 213 cases, a dentist was called for the patient, and 58 patients were transferred to the dental service. Twenty-one percent of the consultations were called by surgical residents, 31 percent by medical housestaff, 23 percent by emergency room housestaff, and 23 percent by various other services, including medical and surgical. Sixty-eight percent of the consultations were resolved over the telephone, and the dentist did not actually see the patient. There were 193 patients for whom a dental consultation was not called. This may have been due to the fact that the physicians did not think the patient had a significant dental problem or they did not know that a dental service was available. (Swedo, 2020)

6. Discussion

In patients seeking treatment for conditions other than dental pain or infections, the dental emergency is frequently unexpected and initially disruptive to the dentist's usual approach to treatment. This may lead to an unscheduled appointment and clinical work during a time that both the patient and dentist find inconvenient. Faced with a patient in pain and armed with little dental history or diagnostic aids, vital time may be lost locating an available dental appointment or making telephone calls to find out which, if any, local dental colleagues are willing to provide emergency out-of-hours care. In the worst case scenario, the patient may be referred to a general medical colleague lacking in knowledge on how to treat dental pain and infection, and this can lead to inappropriate prescription of antibiotics and analgesics, or even unnecessary dental extraction in a hospital setting. The use of a few simple protocols and a small stock of dental emergency supplies in the form of an 'emergency dental kit' may improve the timeliness and effectiveness of dental care in these situations and add value to the treatment that we are able to provide. Steps should also be taken to assist in the location of a local dental colleague willing to provide emergency treatment and to improve our access to dental diagnostic aids and services during evenings, weekends, and holiday periods. The maintenance of an up-to-date and legible dental record is also important, particularly if the dental emergency is related to a previously treated tooth and the patient is seeking treatment away from their primary dental care provider. (Dziedzic et al.2020)

7. Challenges and Considerations

The second consideration is the traumatic nature of most dental emergencies, whether it be a broken tooth as a result of biting on a hard object, a clip to the face during sport or a motor vehicle accident. Such events often have associated head and orofacial injuries which will need simultaneous management. Dental trauma in children carries a high incidence of associated psychological trauma, which needs to be managed with sympathy and understanding. Thirdly, there is the cost associated with dental treatment. Dental care is often too expensive for those with low income or no insurance, leading them to seek dental care in the public health sector. If these patients attend the emergency department, it is probable that they will be seeking pharmaceutical treatment providing temporary relief, as their intention will be to get onto a dental waiting list.

Emergency room personnel must consider various factors when dealing with a dental emergency; these factors often make providing adequate care a considerable challenge. The first consideration is the (often significant) pain associated with dental conditions and the degree of analgesia that will be needed. Many pharmacies do not stock dental analgesia, considering that the dental sector often prescribes such drugs as itinerant dosing for pain which does not respond to other simple analgesics. By providing simple oral health education, however, ER staff can inform the public on methods of preventing dental disease and reducing the risk of dental emergencies occurring. This would help reduce the burden of dental conditions on emergency departments and on the health sector as a whole, as well as reduce patient suffering. Currently, the only effective pain relief treatment for pulpal and periapical pathologies is removal of the source of pain – that is, the dental nerve.

8. Conclusion

It is evident that there is also a lack of appropriate knowledge on what actually constitutes a dental emergency and the level of care required in the ER, from both medical and dental professionals. Medical professionals tend to see dental emergencies as not urgent and merely toothache, and as cited previously, are unaware of the importance of dental care in such cases. This has also been my own experience in discussing the topic with various medical colleagues. Measures therefore need to be taken to increase awareness amongst both sets of professionals, and guidelines such as the ones expressed in this paper should be made available. (Tewari et al.2020)

Since around the mid-1980s, several papers have been published which have dealt with the problem of dental emergencies in the ER and highlighted the lack of appropriate care received by such patients. Regrettably, it is a phenomenon that still exists today. This is due to the fact that, although now dated, the UK NHS statistics show there was a decline in the number of attending dental patients receiving treatment between 1996/1997

(9 million) and 2000/2001 (6.5 million). The probable cause of this was the cut in funding to NHS dental services, leading to a reduction in the availability and quality of dental care. (Carter et al.2020)
This paper has been an explanation of how best to manage those patients who present to the ER with dental emergencies. It has been focused on raising awareness amongst medical and dental professionals that in such cases it is the dental care that is of the greatest importance and which will resolve the patient's condition fully. The paper has also been aimed at impressing upon ER staff the method by which to manage such cases, ensuring the patients receive the correct level of care and are referred onwards to dental services. (Falahchai et al.2020)

9. Recommendations for oral health protection

Oral health care practitioners working in hospitals and institutions for disabled and elderly people should familiarize themselves with the dental and general health needs of the residents and be proactive in safeguarding their oral health. They should ensure that the oral health of residents is assessed on admission to the institution and monitored regularly thereafter, and that oral health care plans are developed for those with complex needs. Staff responsible for the general health care of residents should be educated in the importance of oral health in maintaining general health, in the oral/systemic relationships, and in the impact of medication and general health status on oral health. Staff from hospital and community services, as well as carers and patients themselves, can benefit from education on preventing oral disease and maintaining oral health, delivered through training programs and information resources. (Sifuentes and Lapane2020)
Schools, hospitals, and institutions for disabled and elderly people should include in their health policies activities that can safeguard the oral health of those for whom they have responsibility.

REFERENCES:

1. Bhavsar, P. H. (2020). Assessment of Intravenous Antibiotic Management of Patients Admitted with Facial Cellulitis Related Odontogenic Infections and Length of Hospital Stay. [HTML]
2. Cheng, F. C., Chang, J. Y. F., Lin, T. C., Tsai, P. F., Chang, Y. T., & Chiang, C. P. (2020). The status of hospital dentistry in Taiwan in October 2019. Journal of dental sciences, 15(4), 505-512. sciencedirect.com
3. Carter, E., Currie, C. C., Asuni, A., Goldsmith, R., Toon, G., Horridge, C., ... & Holliday, R. (2020). The first six weeks-setting up a UK urgent dental care centre during the COVID-19 pandemic. British Dental Journal, 228(11), 842-848. nature.com
4. Emerson, R. W. (2020). TEXAS INTELLECTUAL PROPERTY LAW JOURNAL. [HTML]
5. Samuel, S. R., Acharya, S., & Rao, J. C. (2020). School Interventions–based Prevention of Early-Childhood Caries among 3–5-year-old children from very low socioeconomic status: Two-year randomized trial. Journal of public health dentistry, 80(1), 51-60. [HTML]
6. Jones, L. C. (2020). Dental trauma. Oral and Maxillofacial Surgery Clinics. [HTML]
7. da Silva, P. B., Duarte, S. F., Alcalde, M. P., Duarte, M. A. H., Vivan, R. R., da Rosa, R. A., ... & do Nascimento, A. L. (2020). Influence of cervical preflaring and root canal preparation on the fracture resistance of endodontically treated teeth. BMC Oral Health, 20, 1-7. springer.com
8. Soliman, S., Lang, L. M., Hahn, B., Reich, S., Schlagenhauf, U., Krastl, G., & Krug, R. (2020). Long-term outcome of adhesive fragment reattachment in crown-root fractured teeth. Dental Traumatology, 36(4), 417-426. wiley.com
9. Peres, K. G., Thomson, W. M., Chaffee, B. W., Peres, M. A., Birungi, N., Do, L. G., ... & Rugg-Gunn, A. J. (2020). Oral health birth cohort studies: achievements, challenges, and potential. Journal of dental research, 99(12), 1321-1331. nih.gov
10. Weichelt, B., Gorucu, S., Jennissen, C., Denning, G., & Oesch, S. (2020). Assessing the emergent public health concern of all-terrain vehicle injuries in rural and agricultural environments: initial review of available national datasets in the United States. JMIR public health and surveillance, 6(2), e15477. jmir.org
11. Forrester, M. B. (2020). Computer and electronic duster spray inhalation (huffing) injuries managed at emergency departments. The American Journal of Drug and Alcohol Abuse. [HTML]

12. Swedo, E. (2020). … in US emergency department visits related to suspected or confirmed child abuse and neglect among children and adolescents aged 18 years before and …. MMWR. Morbidity and Mortality Weekly Report. cdc.gov
13. Dziedzic, A., Tanasiewicz, M., Abed, H., Dickinson, C., & Picciani, B. (2020, October). Are special care dentistry services prepared for a global disruption in healthcare? A call for a wider promotion of dental conscious sedation training. In Healthcare (Vol. 8, No. 4, p. 419). MDPI. mdpi.com
14. Tewari, N., Goel, S., Rahul, M., Mathur, V. P., Ritwik, P., Haldar, P., ... & Pandey, R. M. (2020). Global status of knowledge for prevention and emergency management of traumatic dental injuries among school teachers: A systematic review and meta-analysis. Dental traumatology, 36(6), 568-583. [HTML]
15. Falahchai, M., Babaee Hemmati, Y., & Hasanzade, M. (2020). Dental care management during the COVID-19 outbreak. Special Care in Dentistry, 40(6), 539-548. nih.gov
16. Sifuentes, A. M. F., & Lapane, K. L. (2020). Oral health in nursing homes: what we know and what we need to know. The journal of nursing home research sciences, 6, 1. nih.gov