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Management of dental injuries by South Indian medical professionals - A hospital based questionnaire design study

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Abstract
Aim: To know the medical professional knowledge in management of dental injuries and appropriate onward referrals.
Purpose: Dento-alveolar fractures, long-term prognosis greatly depend on appropriate early management. Poor treatment outcomes as a result of inadequate or delayed management can be damaging to a patient due to dental aesthetic and functional defects which may also have a psychological impact.
Material and methods: A cross sectional survey using a pre-tested questionnaire given to all the medical professionals who dealt with accident cases was conducted in randomly selected eight hospitals of south Indian district, Guntur.
Results: out of 150 questionnaires given 116 were responded, with a response rate of 77%. Training regarding dental injuries received was 69 (59.5%). The response for avulsed tooth for immediate re-implant was 75 (64.7%).
Conclusions: the results from this study suggest that knowledge of the management of dental injuries among medical professional was inadequate. However, appropriate training can significantly increase their knowledge.

Keywords: emergency treatment, tooth injuries, tooth pushed in or out, tooth avulsed.

1. Introduction
Traumatic dental injuries (TDIs) occur with great frequency in preschool, school age children and young adults comprising 5% of all injuries for which people seek treatment [1, 2]. A twelve year review of the literature reports that 25% of all school children experience dental trauma and 33% of adults have experienced trauma to the permanent dentition with the majority of injuries occurring before age 19 [3]. Luxation injuries are the most common TDIs in the primary dentition, whereas crown fractures are more commonly reported in the permanent dentition [1, 4]. Dental trauma is the most common of all facial injuries, the procedures performed at the time of tooth avulsion and the extra-alveolar time immediately after the accident determines the prognosis of the tooth. In cases in which the above mentioned factors are unfavorable, pulp necrosis and degeneration of the periodontal ligament (PDL) cells can occur, leading to inflammatory root resorption and eventual tooth loss. The maintenance of periodontal disease cell vitality factors successful tooth replantation. However, although it is the treatment of choice, replantation cannot always be performed immediately.
Epidemiological studies have demonstrated that the treatment needs of traumatic dental injuries are not properly met. In Finland, only 25% and in Britain only 10.15% of children who sustained traumatic dental injuries had received treatment [5]. In Jordan, 43% of the children sought dental treatment when late complications were the presenting complaint [6].
The main aim of the current study was to assess the current knowledge of all levels of medical professionals in the management of common dental injuries.

2. Material and Methods
A cross sectional questionnaire designed study was conducted among eight hospitals in the South Indian District, Guntur.

A questionnaire was given personally, and requested to fill it whenever they feel free. Filled questionnaire was collected in the next day. Some were not responding. A study was done over a period of consecutive three-months from December 2013 to February 2014. Prior to the distribution of questionnaires, permission was obtained from the directors of the all eight hospitals.

The data obtained from the completed questionnaires were entered into and analyzed using the Statistical Package for the Social Sciences software, version 20.0 Descriptive statistics and χ^2 tests were used to summarize and analyze the data, respectively. A P-value of 0.05 was considered the threshold for statistical significance. All questions were related to knowledge about permanent tooth avulsion. The first part of questionnaire gathered biographical data and information on training received on the management of dental injuries. The second part investigated knowledge of the management of common dental trauma as well as an appropriate onward referral. The correct answers to the management of dental injuries were determined by using the Essential Update: New American Academy of Pediatrics Dental Trauma guidelines for Non dentists. The American Academy of Pediatrics has released guidelines for non-dentists on the prevention, diagnosis, and treatment of dental trauma.

2.1 Clinical evaluation

Initial evaluation of a patient with dental trauma should include the following: a full physical examination of the head, neck and face assessment of possible injuries to adjacent areas and structures include. 1) CT of the head, neck and maxillofacial bones, 2) intra oral periapical radiography, 3) panoramic radiography of the teeth.

Management: treatment of dental trauma varies according to the type of injury involved. i) Fracture, ii) Avulsion, iii) Luxation (tooth displacement) Tetanus booster and antibiotics should be administered whenever a dental injury is at risk for infection. Arrangement should be made for prompt follow-up with a dentist or an oral and maxilla-facial surgeon.

Principles of management for dental avulsion include the following: An adult tooth that is avulsed should be re-implanted in its socket as soon as possible. If the tooth cannot be re-implanted it should be placed in a protective solution, it should never be allowed to dry. If the tooth has been dry for a significant period, it should be soaked in the appropriate solution (which depends on the length of the dry period).

2.2 Luxation may be classified as follows

Conclusion- mild injury to the periodontal ligament, with some clinical tenderness, but no movement of the tooth

Subluxation- more significant injury to the periodontal ligament, with clinical tenderness and movement of the tooth

Extrusion- partial removal of a tooth from its socket

Lateral luxation- lateral displacement of a tooth at an angle, with possible fracture of the alveolar bone as well intrusion- impaction of a tooth into its socket in the fractured alveolar bone.

Treatment of luxation includes: concussion and subluxation- a soft diet, administration of non-steroidal anti- inflammatory drugs, and referral to a dentist, subluxation is a more significant injury and is more often associated with pulpal necrosis. Extrusion- restoration of the tooth to its original position, splinting. Lateral luxation- repositioning of the tooth, often made more difficult by a fractured alveolar bone, splinting, done by a general practitioner only if the alveolar bone fracture is minimal and done by a dentist or an oral and maxillofacial surgeon if the fracture is more extensive. Intrusion- usually, the general practitioner can provide no emergency treatment; referral to a dentist within 24 hours is indicated [7, 8, 9].

3. Results

Table 1: Distribution of study subjects according to type of practice

Type of practice	Total number of Males (%)	Total number of females (%)	Total
Practitioners	33(51.6%)	30(57.7%)	63(54.3%)
Academicians	16(25.0%)	13(25%)	29(25%)
Both	15(23.4%)	9(17.3%)	24(20.7%)
Total	64(100%)	52(100%)	116(100%)

Pearson Chi-Square =0.721 df =2

Table 2: Distribution of study subjects according to number of accident cases seen per day

Sex	Total cases 1-10	11-20	Total
Male	59(92.2%)	5(7.8%)	64
Female	50(96.2%)	2(3.8%)	52
Total	109(94.0%)	7(6.0%)	116(100%)

Pearson Chi-Square =0.796 df =1

Table 3: Distribution of study subjects according to dental injuries cases seen per day

Sex	No of cases 1-10	No of cases11-20	Total
Male	64(100%)	0	64(100%)
Female	50(96.2%)	2(3.8%)	52(100%)
Total	114(98.3%)	2(1.7%)	116(100%)

Pearson Chi-Square = 2.505, df = 1

Table 4: percentage of medical professionals giving correct and incorrect responses to aspects of the management of the common dental injuries in permanent teeth.

Action taken	Chipped	Loose teeth	Pushed in or out	Avulsion (out of socket)
No treatment needed	5.2% (6)	12.9% (15)	1.7% (2)	4.3% (5)
Treatment needed, refer to dentist	44.0% (51)	57.8% (67)	52.6% (61)	32.8% (38)
Treatment needed, refer to dental hospital	34.5% (40)	21.6% (25)	29.3% (34)	4.87% (52)
Treatment needed, refer to local maxillofacial unit	16.4% (19)	7.8% (9)	16.4% (19)	18.1% (21)
Total	100% (116)	100% (116)	100% (116)	100% (116)

Table 5: Distribution of study subjects according to sex and best storage medium

Sex	Best storage medium				Total
	Milk	Saliva	Normal saline	Betadine	
Male	9 (7.8%)	27 (23.3%)	22 (19.0%)	6 (5.2%)	64 (55.2%)
Female	7 (6.0%)	28 (24.1%)	15 (12.95)	2 (1.7%)	52 (44.8%)
Total	16 (13.8%)	55 (47.4%)	37(31.9%)	8 (6.9%)	116 (100.0%)

Pearson Chi-Square =2.377 df =3

Table 6: Distribution of study subjects according to sex and Time to re implant avulsed teeth

Sex	Time to re implant avulsed teeth				Total
	Within half an hour	Within an hour	Within 2 hours	More than 2 hours	
Male	14 (12.1%)	33 (28.4%)	12 (10.3%)	5 (4.3%)	64 (55.2%)
Female	12 (10.3%)	24 (20.7%)	10 (8.6%)	6 (5.2%)	52 (44.8%)
Total	26 (22.4%)	57 (49.1%)	22 (19.0%)	11 (9.5%)	116 (100%)

Pearson Chi-Square =0.613 df =3

Of the 150 questionnaires sent to medical professionals, 116 were returned with a response rate of 77%. Table 1 showed the distribution of study subjects, out of 116 the males were 64 in number and females were 52 in number. The practitioners constitute 54.3%, the academicians constitute 25% and both were 20.7%. Table 2 showed that total number of accident cases seen per day. Among those 94% expressed that 1-10 cases, they come across in daily practice and the rest were 11-20 cases per day. Table 3 showed that dental injury cases seen per day, with this 98.3% expressed that they come across 1-10 cases and the rest were 11-20 cases per day. Table 4: showed that 44% expressed that for chipped teeth treatment needed, refer to the dentist. For loose teeth 57.8% expressed that treatment needed and referred to a dentist. For pushed in or out teeth majority of i.e.; 52.6% said that treatment needed and referred to a dentist. For avulsed teeth 32.8% responded that treatment needed and referred to a dentist. In the Table-5 majority of them, i.e.; 47.4% expressed that saliva was the best storage media. Very few members, i.e.; 6.9% expressed that betadine was the best storage media. But only 13.8% said that milk was the beast storage medium. In the table 6: time to re implant avulsed teeth was 22.4% expressed that within half an hour was the best time for re implantation. This was most ideal time period. But majority, i.e.; 49.1% expressed that within an hour. Regarding training in the management of injuries 59.9% expressed that they have received the training, among those most of them were during undergraduate course.

4. Discussion

This present study did not demonstrate a strong association between knowledge of management of dental injuries and career grade. The study demonstrated that 64.7% of doctors would re-implant an avulsed tooth and follow this with an appropriate referral. Study done by I.H. Nasr [10] showed that 78% of doctors would re-implant an avulsed tooth and follow this with a referral to an appropriate body [10]. This was higher than our study. Among physicians (24%) in India account for the avulsed tooth, whereas in our study, 100% of medical professionals expressed they could account for avulsed teeth. Studies have advised that appropriate treatment during the initial 30 minutes provides the best prognosis for traumatically avulsed teeth. Out of the 116 that would re-implant, only 26 (22.4%) doctors stated that the tooth should be re-implanted within half an hour following avulsion. The current study revealed that 69 (59.5%) of doctors had no recollection of any training in the management of dental injuries. This was similar to the study done by the I.H. Nase [10] and agrees with Patel and Driscoll's [8] that only 6% of senior house officers recalled that they had training in dental management as part of their undergraduate education. This was much lesser than our study, in this it was 38.8%. Suitable storage media that have been suggested are *via* Span (a cold organ transplant storage medium), Hank's balanced salt solution, milk, saline, saliva, or water. Our study revealed that only 16 (13.8%) of those who would re-implant a tooth thought milk was an appropriate storage medium. As the physicians get an opportunity to attend a case of dental trauma in emergency or private practice, it is vital that they possess sufficient knowledge on primary management of tooth avulsion, before referring to dentists. Only (26) 22.4% of the medical professionals knew about time to re-implantation within half an hour and none knew that the patients' mouth was the best transport medium. 90% of them accepted that they had no knowledge of dental trauma management.

5. Recommendations

1. Before treatment is initiated, an abbreviated medical and dental history should be taken.
2. The face, lips and oral musculature should be thoroughly examined for soft tissue lesions.
3. Traumatized regions should be checked for fractures, abnormal tooth positioned tooth mobility.
4. The patient should be asked about sensitivity to heat or cold.
5. Intra oral dental radiography rather than CT, should be used to images of the injured tooth.
6. Clinicians should know dental trauma classifications and urgent care for concussion, subluxation, lateral luxation, extrusive luxation, intrusive luxation, avulsion, infraction, enamel only (uncomplicated) crown fractures, enamel and dentin (uncomplicated) crown fractures, crown fractures with exposed pulp (complicated), root fractures and alveolar fractures.
7. Clinicians should know the differences between treatments for primary teeth and those for permanent teeth.

6. Conclusion

The results from this study suggest that knowledge of the management of dental injuries among medical professional was inadequate. However, appropriate training can significantly increase their knowledge. Postgraduate training should be provided in the accident and emergency department induction and regularly thereafter to maintain knowledge and to keep up-to-date with current practice.

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