

The attitudes and awareness of emergency department (ED) physicians towards the management of common dentofacial emergencies

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Abstract – *Objective:* Dentofacial emergencies are a common presentation to the emergency department (ED) but there is little recent data on physicians' knowledge, confidence and attitudes in handling these cases. *Method:* A questionnaire was administered to 103 ED physicians. The sample was primarily drawn from London hospitals as well as a smaller contribution from around the UK and included physicians with a range of experience and at different grades. *Results:* The majority of the 102 participants (76.5%) did not receive any formal training in managing dentofacial emergencies. The percentage of participants who were happy to manage common dentofacial emergencies is as follows: dental trauma (20.4%); major facial trauma (39.8%); interpreting facial X-rays (68.0%); and facial suturing (85.4%). When questioned 12.1% of the participants felt that ED physicians should be responsible for managing dental emergencies compared to 22.4% who felt that ED physicians should manage maxillofacial emergencies. Only 3.9% of the participants would opt to be treated by an ED doctor in the event of them presenting to the ED with a dental injury. The remaining 72.5% would prefer to be seen by a maxillofacial surgeon, 23.5% by a dentist and none of the participants opted to be seen by the emergency nurse practitioner. *Conclusion:* ED physicians do not feel confident in managing some dentofacial emergencies. This may be attributed to a lack of training in this area as well as exposure to these types of emergencies. There is a need for greater awareness, validated guidelines and training resources for ED physicians to treat dentofacial emergencies as well as more research in this field of emergency medicine.

Dental and maxillofacial emergencies comprise a broad spectrum of clinical presentations, which include dental trauma, pain, lost restorations, postoperative complications, infections and dental haemorrhage. Maxillofacial emergencies in addition include trauma to the facial skeleton as well as major infections involving the soft tissue structures of the head and neck. In practice, the boundary between what can be classified as a 'dental' or a 'maxillofacial emergency' is often blurred and it may be useful to combine these emergencies under a unified description of 'dentofacial emergencies' which encompasses those emergencies relating to the dentition as well as the jaws and surrounding structures. Dentofacial emergencies commonly present to the emergency department (ED). Although data on the attendance of patients with these emergencies are meagre, studies have shown that these emergencies represent between 0.3% and 4.0% of the overall patient workload in the ED (1–4).

Dentofacial emergencies present unique challenges to emergency physicians. Firstly, the majority of UK ED physicians have little or no formal training in clinical dentistry. As a result, many ED physicians may lack the knowledge or necessary skills to manage these patients safely. A study involving senior house officers from across the UK found that 52% had no previous training in examining the oral cavity and only 6% had any formal training in clinical dentistry as medical undergraduates (1). Secondly, excluding specific exemptions relating to age, pregnancy and employment status National Health Service (NHS) dentistry is not totally free in the UK and patients may often present to the ED with dental complaints rather than seeing their own dentist because of financial constraints and a lack of access to NHS dental services (5).

Despite a significant number of patients attending the ED with dental complaints, there is little recent UK data

on the knowledge base of non-dentally trained staff in their ability to manage dentofacial emergencies. A limited number of studies have shown that ED staff lacked training in the management of dental trauma and had low levels of knowledge in managing dental trauma (1, 6). Previous studies of the management of dental trauma by non-dentally trained personnel in various countries show that there is a wide variation in knowledge of ED physicians concerning the management of dental trauma (6–12) with numerous studies showing knowledge rates of 10% or less (7, 8, 10).

Aims

The aims of this study were to explore the attitudes and confidence of emergency physicians their management of four common dentofacial emergencies and to highlight any barriers ED physicians have in managing these types of emergencies.

Participants

Excluding pilot data, there were 103 participants who were recruited on two occasions; 2007 and 2010. The majority of the participants (89.3%) were recruited from three large university teaching hospitals across Greater London whereas the remaining 10.7% were from across the UK. The first group sampled in 2007 included 45 London-based emergency physicians who verbally consented to participate in the study. An additional 58 participants were similarly recruited by the investigators (CT, TH, HA, TJ) during a 2-week period in 2010 (Group 2). None of the physicians who were approached by the investigators refused to participate in the study. Forty seven (81%) of these were working in three large emergency departments in Greater London. The remaining 11 (19%) were emergency medicine trainees from across the UK who were recruited from an emergency medicine conference held in July 2010. As we wished to examine exposure and perceptions of junior trainees, senior trainees and consultants, non-probability quota sampling was used to ensure that a range of participants were included. It has been argued that for relatively small sample sizes, the bias from quota sampling is less hazardous than the lack of precision introduced by small probability samples (13).

Participants had a range of experience, with approximately one-third of the sample at each level of seniority from consultant level to junior trainee level.

Methods (questionnaire design)

The original questionnaire was developed and piloted to 10 volunteers and revised before being completed by the first group of participants in 2007 (Group 1). It examined the participants' demographics, level of experience in emergency medicine and level of exposure and training in managing dentofacial emergencies. Self-reported confidence in managing a range of dentofacial emergencies was assessed using a three point scale (3 = manages the emergency confidently without supervision, 2 = attempts under supervision or 1 = not attempt at all).

Further questions elicited their views on which speciality should be responsible for managing dentofacial emergencies in the ED, and which speciality they would like to be treated by if they presented to the ED with a traumatic dental injury. The questionnaire completed by the group recruited in 2010 contained some additional questions that were not asked in the original survey. The modified questionnaire used with Group 2 was piloted in a similar fashion. Additional questions explored the participants' opinions about which dental/maxillofacial emergencies they felt required attendance at the ED and how long it was reasonable for patients with each condition to wait. The questionnaire also asked what training resources ED staff felt would be useful in the management of dentofacial emergencies. The study was classified as a service evaluation by the National Ethics Research Service and therefore did not require ethical review.

Results

The data were entered on to an Excel database and analysed using a standard statistical package (PASW Statistics 18; SPSS Inc., Chicago, IL, USA).

Participants

Participant grade and relevant experience is shown in Table 1. A chi-square test showed no significant difference in grade between participants across the two data collection periods ($\chi^2 = 3.46$, NS). The two groups were similar in levels of seniority and experience, but frequencies were too small for statistical analysis. For the purpose of analysis, we treat the two groups as one cohort for the most part; the results for the second group will be discussed separately where appropriate.

Level of training received (N = 103)

The results showed that the majority of the cohort 78 (75.7%) had only received informal training on managing dentofacial emergencies. Only 11 (10.7%) had received any formal training and 12 (11.7%) participants had not received any training at all on managing these emergencies.

Table 1. Participants' experience in emergency medicine (N = 103)

Length of experience	Grade of EM doctor		
	Consultant	Senior trainee	Junior trainee
<6 months	0	3 (2.9%)	23 (22.3%)
6 months–1 year	0	0	4 (3.9%)
1–5 years	3 (2.9%)	22 (21.4%)	1 (1.0%)
5–10 years	11 (10.7%)	3 (2.9%)	0
>10 years	13 (12.6%)	0	0
Missing	6 (5.8%)	10 (9.7%)	4 (3.9%)
Total	33 (32.0%)	38 (36.9%)	32 (31.1%)

Exposure to maxillofacial emergencies

The amount of exposure participants had to common maxillofacial emergencies over a 3-month period is shown in Table 2.

Non-parametric Kruskal–Wallis tests showed higher exposure in senior ED trainees and consultants to dental avulsion injuries ($\chi^2 = 26.7$, $P < 0.001$), interpreting facial X-rays ($\chi^2 = 12.6$, $P < 0.01$) and managing facial trauma ($\chi^2 = 19.2$, $P < 0.001$). These significant differences are accounted for by lack of exposure in junior grades, with senior grades and consultants experiencing similar levels of exposure. There was no significant difference across grades for exposure to facial suturing ($\chi^2 = 3.4$, NS).

Level of confidence in managing common dentofacial procedure

Participants were asked to grade their confidence in the management of four common dentofacial emergencies. These results are shown in Table 3.

As can be seen from Table 3, there is variability in the confidence ED physicians express at managing aspects of four common dentofacial emergencies. Lowest confidence was reported for managing dental avulsion injuries followed by major facial trauma and interpreting facial X-rays. Highest confidence was reported for facial suturing. The confidence in managing the four conditions was closely related to grade/seniority with a Kruskal–Wallis test showing significant results for all four conditions: facial suturing ($\chi^2 = 5.3$, $P < 0.05$); X-

Table 3. ED physicians self-reported levels of confidence in managing common dentofacial emergencies ($N = 103$)

Type of emergency				
Level of confidence	Manage dental avulsion injury	Interpreting facial X-rays	Manage major facial trauma	Suture facial lacerations
ED consultants $n = 33$				
Frequency (%)				
Confident	12 (36.4)	29 (87.9)	24 (72.7)	30 (90.9)
Attempt under supervision	16 (48.5)	2 (6.1)	8 (24.2)	2 (6.1)
Not attempt	5 (15.2)	1 (3.0)	1 (3.0)	1 (3.0)
Missing	0	1 (3.0)	0	0
ED senior trainees $n = 38$				
Frequency (%)				
Confident	7 (18.4)	30 (78.9)	16 (42.1)	35 (92.1)
Attempt under supervision	16 (42.1)	5 (13.2)	16 (42.1)	2 (5.3)
Not attempt	15 (39.5)	2 (5.3)	4 (10.5)	1 (2.6)
Missing	0	1 (2.6)	2 (5.3)	0
ED junior trainees $n = 32$				
Frequency %				
Confident	2 (6.3)	11 (34.4)	1 (3.1)	23 (71.9)
Attempt under supervision	10 (31.3)	20 (62.5)	19 (59.4)	6 (18.8)
Not attempt	20 (62.5)	1 (3.1)	12 (37.5)	2 (1.9)
Missing	0	0	0	1 (3.1)

ray interpretation ($\chi^2 = 24.6$, $P < 0.001$); avulsion injuries ($\chi^2 = 17.6$, $P < 0.001$); and major facial trauma ($\chi^2 = 35.7$, $P < 0.001$). Confidence levels were significantly related to exposure levels for each of the four emergencies: dental avulsion injuries ($\chi^2 = 9.4$, $P < 0.01$); interpreting facial X-rays ($\chi^2 = 24.6$, $P < 0.001$); managing major facial trauma ($\chi^2 = 41.4$, $P < 0.001$); and facial suturing ($\chi^2 = 10.9$, $P < 0.01$).

Table 2. Amount of exposure to common maxillofacial emergencies over a 3-month period ($N = 103$)

Type of emergency				
No of cases experienced over a 3-month period	Manage dental avulsion injury	Interpreting facial X-rays	Manage major facial trauma	Suture a facial laceration
ED consultants $n = 33$				
Frequency (%)				
0	14 (42.4)	2 (6.1)	7 (21.2)	8 (24.2)
1–10	15 (45.5)	11 (33.3)	11 (33.3)	9 (27.3)
11–20	3 (9.1)	4 (12.1)	0	1 (3.0)
>20	0	14 (42.4)	13 (39.4)	11 (33.3)
Missing	1 (3.0)	2 (6.1)	2 (6.1)	4 (12.1)
Senior ED trainees $n = 38$				
Frequency (%)				
0	17 (44.7)	1 (2.6)	12 (31.6)	2 (5.3)
1–10	16 (42.1)	12 (31.6)	14 (36.8)	18 (47.4)
11–20	2 (5.3)	5 (13.2)	0	3 (7.9)
>20	1 (2.6)	18 (47.4)	11 (28.9)	14 (36.8)
Missing	2 (5.3)	2 (5.3)	1 (2.6)	1 (2.6)
Junior ED trainees $n = 32$				
Frequency (%)				
0	32 (100)	6 (18.8)	22 (68.8)	7 (21.9)
1–10	0	17 (53.1)	8 (25.0)	15 (46.9)
11–20	0	4 (12.5)	2 (6.3)	3 (9.4)
>20	0	5 (15.6)	0	7 (21.9)

Choice of service provision

Only 3.9% of the ED physicians ($N = 103$) would choose to be treated by another ED doctor if they presented to ED with a traumatic dental injury, and none preferred to be treated by an emergency nurse practitioner. In comparison, 72.5% opted to be treated by a maxillofacial surgeon and the remaining 23.5% by a dentist. Group 2 ($n = 58$) was asked to select the grade of doctor they wanted to be treated by and it was not surprising that 51.8% chose to be treated by a maxillofacial consultant and 28.6% by a maxillofacial registrar whereas only 5.4% chose to be treated by a junior member of the maxillofacial team.

Group 2 ($n = 58$) was asked their opinion regarding which of four specialities should take the key responsibility for managing dentofacial emergencies presenting to the ED. For maxillofacial emergencies, the preference was for a maxillofacial specialist (67%) before an ED physician (22%), then dentist (7%) with fewest opting to be seen by the ED nurse practitioner (2%). For dental emergencies, the preference was for a dentist (52%) before a maxillofacial specialist (26%) then an ED physician

Table 4. Participants' views on emergencies and suggested waiting times ($n = 58$)

Type of emergency	Appropriate attendance to ED	Mean wait in minutes, if ED attendance was deemed appropriate	Mean wait in minutes, if ED attendance deemed inappropriate	T-test for differences in mean waiting times in relation to the appropriateness of presentation	
	Frequency (%)	Mean (SD)	Mean (SD)	<i>t</i>	<i>P</i>
Soft tissue laceration	53 (91.4)	118.3 (68.9)	180 (n/a)	0.89	NS
Facial trauma	52 (89.7)	104.2 (75.5)	150 (42.4)	0.85	NS
Postoperative complication	50 (86.2)	83.1 (67.7)	140 (91.7)	1.37	NS
Tooth avulsion	50 (86.2)	76.7 (84.5)	200 (69.3)	2.46	$P < 0.05$
Dental abscess	44 (75.8)	108.2 (78.6)	180 (69.3)	1.7	NS
Dental bleed	21 (36.2)	108.8 (87.6)	166 (79.3)	1.9	NS
Toothache	18 (31.0)	93.8 (73.1)	181.9 (67.9)	3.36	$P < 0.01$
Lost filling	7 (12.0)	120 (49.0)	190 (62.6)	2.09	$P < 0.05$
Mouth ulcer	5 (8.6)	162 (83.8)	180 (58.0)	0.55	NS

(12%) with fewest opting for ED nurse practitioner (2%), showing that in general, a low proportion of ED physicians felt that ED staff should be responsible for managing either dental or maxillofacial emergencies. Excluding preference for emergency nurse practitioners where absolute numbers are small ($n = 1$ in each case), a chi-square test showed a significant association whereby dentists were preferred for managing dental emergencies and maxillofacial specialists for maxillofacial emergencies ($\chi^2 = 29.7$, $P < 0.001$).

Participants' perceptions of emergencies ($n = 58$)

Group 2 participants were asked to comment on whether they felt a selection of common dentofacial emergencies required attendance at the ED. They were also asked about their perceptions on an appropriate wait for each of the emergencies (Table 4).

Table 4 shows generally high levels of agreement for emergency perception, with over 75% agreeing that soft tissue lacerations, facial trauma, postoperative complications, dental avulsion injuries and dental abscesses are all appropriate emergencies and over 88% agreeing that lost fillings and mouth ulcers are all inappropriate presentations to the ED. Most disagreement occurred for dental bleeds (64% 'no') and toothaches (69% 'no'). Mean waiting time data showed that when respondents viewed a certain condition as a genuine emergency, they gave a lower threshold for acceptable waiting times prior to treatment. Independent *t* tests showed a significant difference in perceived acceptable waiting times for three types of conditions (dental avulsion injuries, toothaches and lost fillings). Results for other conditions were in the same direction but were not significant because of the overall consensus among the respondents about what should be viewed as an emergency (e.g. 91% viewed facial lacerations as an emergency). Chi-square tests showed that neither prior exposure to trauma/dental avulsion injuries (nor confidence in approaching these conditions with/without supervision) was predictive of perception of whether it was viewed as a genuine emergency.

Access to maxillofacial support ($N = 103$)

Forty-seven participants (45.6%) had no access to onsite maxillofacial support but had access to a local unit that could provide 24 h telephone advice or accept referrals. Four (3.9%) had access to onsite support between the hours of 9 am and 5 pm. Forty-three (41.7%) had access to 24 h maxillofacial support on site and there was missing data for nine of the respondents. There was no significant relationship between the presence or absence of onsite maxillofacial support and the confidence levels for managing each of the four emergencies. Those who reported not having maxillofacial support on site reported a greater degree of exposure to facial suturing ($\chi^2 = 8.59$, $P < 0.05$). However, there was no relationship between the type of cover and the perception of what constitutes a genuine emergency or on proposed waiting times for the emergencies.

Participant's choice of learning resources ($n = 58$)

When questioned about their preferred learning resources, 42 (72.4%) of those who responded indicated a preference for practical hands on courses for managing dentofacial emergencies. Twelve participants (20.7%) preferred to have secondments attached to a maxillofacial unit. Only three (5.2%) preferred videos demonstrating practical skills, and one (1.7%) of the participants preferred to learn more about managing these emergencies from approved guidelines.

Discussion

Main findings

The findings of this study are in accord with those of previous studies showing that ED physicians have low levels of knowledge in managing common dentofacial emergencies 1, 6. Several reasons may contribute to this. Lack of formal postgraduate training was identified as a key factor in our study with only 10.8% of the cohort having received any formal training in dealing with these

emergencies. This effect is amplified as clinical dentistry is not taught to medical undergraduates in the UK. The higher confidence seen in managing facial lacerations and interpreting facial X-rays could be partly attributed to generic skills in which most ED physicians would have some training and experience. However, managing dental or facial trauma requires specific training and knowledge of clinical dentistry. The apparent low levels of confidence may also be due to the lack of exposure of ED physicians to some dentofacial emergencies, which may not commonly present to the ED. However, it is important to be aware that confidence levels may not necessarily equate to actual competence and though the confidence level might be high, the skill still may be performed poorly or *vice versa*. It is difficult to extrapolate what impact the degree of confidence has on the clinical outcome for dentofacial emergencies.

The study found that ED physicians did not regard toothaches, dental bleeds and lost fillings as appropriate presentations to the ED. On the other hand, dental abscesses, postoperative dental complications, facial trauma, facial lacerations and avulsed teeth were all felt to be genuine emergencies. There was also a wide variation in the proposed waiting time for each emergency with participants giving longer waiting times for those emergencies they did not regard as requiring ED presentation.

The UK national clinical guidelines for paediatric dentistry recommend a maximum time of 1 h from the time of injury for avulsed teeth to be replanted to get the maximum prognosis for survival of the tooth (14). However, other studies have shown a worsening prognosis after a period where the tooth is out of the mouth for more than 20–30 min (15, 16). In relation to dental avulsion injuries, this study found that 69% of the participants would have seen the emergency within the hour recommended by these guidelines.

There are no comparative data in the literature on what constitutes a genuine dental emergency or how long dental emergencies should wait before receiving definitive care. A proposed model for managing dental emergencies in primary dental care recommended that dental bleeds, facial swellings around the eye or compromising the airway or facial trauma should be seen by a dentist within 4 h. In contrast, toothaches were recommended to be seen by a dentist within 24 h (17). Currently, EDs in the UK have a national waiting time target of 4 h. This is the maximum time patients can spend in the ED before either being discharged or admitted as an inpatient or for observation. This target is independent of the nature of the emergency and so all dentofacial emergencies would have to be seen in this time frame irrespective of the severity of the emergency. The results of this study suggest that patients with dentofacial emergencies would be seen significantly more quickly in the ED than if they tried to access treatment in primary dental care. This may encourage patients with dental emergencies to attend the ED in preference to waiting up to 24 h to see their own dentist.

The study also showed that the confidence levels of ED practitioners in managing dental trauma are not too dissimilar to their GDP colleagues. A survey of 417

GDPs in the northeast of England found that the confidence level in managing an avulsed tooth was high in only 46% of the respondents with 31.8% being unsure and 22.2% not being confident (18). Other investigators have also demonstrated low levels of knowledge in managing acute dental trauma (19–22). Although these studies are not directly comparable because of the differences in terms of the extent of treatment, dentists and ED physicians can provide for patients with traumatic dental injuries, it is evident that issues relating to confidence in managing these emergencies crosses professional boundaries.

This study clearly identifies a gap in ED physicians' knowledge despite these emergencies contributing a significant amount to the ED workload. This knowledge gap may partly be due to the exclusion of clinical dentistry from the mainstream medical curriculum and a feeling that dental emergencies are not the responsibility of the ED team. This is further compounded by the lack of validated training resources for ED physicians. Although there are no data to suggest that dentofacial emergencies that are managed by maxillofacial specialists have a better outcome than those managed by non-specialists, it is not unreasonable to suggest that patients with dentofacial emergencies may receive suboptimal standards of care in an ED where there is no access to onsite specialist dental or maxillofacial support.

Limitations

The study was based on a limited number of participants who were selected from a small number of EDs in the Greater London area over a period of 3 years. The results may not necessarily reflect the practices and opinions of ED physicians across the UK. However, the study was exploratory in nature and did identify the existence of challenges in providing dental care in the ED. The collection of data over a period of time as two separate groups is a potential limitation but the groups were comparable in terms of grade and experience, justifying treating them as one sample. Furthermore, as the questionnaire was a subjective assessment of the views of the participants, this may introduce a source of error.

Policy implications

The findings have important policy implications, particularly about access to dental care and appropriate support for the services that receive these patients. Despite the emergence of out-of-hours emergency dental services (23) access is limited, there is concern that EDs have become the surrogate service for patients who cannot either register with an NHS dentist or get access to NHS dentistry outside normal working hours. This is further compounded by the belief that some dental complaints are considered to be inappropriate ED presentations.

Attempts to distinguish urgent dentofacial emergencies from those that are non-urgent may be helpful but this process has complex clinical, ethical and legal issues. There is an urgent need of agreed national standards or guidelines, which would ensure standardised quality of care for patients presenting to the ED with dental

complaints. These may include a maximum wait time for time critical emergencies, standardised care referral pathways for patients requiring a maxillofacial opinion and fast tracking of patients with dental emergencies to primary care dental services. At present, there is no clear ownership of dentofacial emergencies and further research is required to critically examine how some of the knowledge gaps and barriers for providing quality treatment to patients with dentofacial emergencies can be addressed.

Conclusions

There is a lack of knowledge and confidence amongst ED physicians in the management of some common dentofacial emergencies, which is the likely result of lack of exposure and training. This may result in patients with dentofacial emergencies having a poor standard of care in ED units, which have no onsite maxillofacial support. Although it would be preferable for all patients with dentofacial emergencies to be seen by a specialist who has dental training, it would not be cost effective to offer this service on a 24/7 basis. Furthermore, as there is limited access to NHS dentists between the hours of 11 pm and 8 am and at weekends, the management of dentofacial emergencies currently rests primarily with emergency physicians who as this study demonstrates do not feel adequately trained to manage these types of emergencies. The authors feel that it may be more cost effective to provide ED physicians with the basic skills to manage these emergencies than to develop round the clock specialist dental care across the UK. We also feel that there is an urgent need for a review of the issues regarding the resources, manpower and training of both medical and dental staff to manage common dental emergencies and further research in this area.

Competing interests

None.

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