

# CRISIS Criteria for Effective Continuous Education in Traumatic Dental Injuries During Syrian Crisis

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**Abstract:** The ongoing violence, accidents, and increased number of school leavers because of the current situation in Syria have increased the number of cases with traumatic dental injuries (TDI) with no or limited data estimating the exact prevalence of the problem. Delivering immediate and appropriate care might be a challenge for clinicians, and providing the best possible prognosis for the traumatized patient, might be far from optimal, if clinicians are not well prepared to provide the best possible solution. Online continuing education program can be a great approach during crisis to enable health providers to deal properly with TDI patients. A five week-long course that includes four modules which cover etiology, examination and diagnosis, treatment, and prognosis of TDI, was designed. The paper presents the methodology and tools used to implement the TDI course in place. The application of CRISIS model including convenience, relevance, individualization, self-assessment, interest, speculation and systematic criteria was adopted. Pre-course assessment questionnaire was designed to rate the baseline knowledge about TDI and will be sent to registered participants through email. Likert type scale (from 0 = no knowledge to 3 = significant knowledge) were utilized. To assess the baseline knowledge and to measure improvement after reading educational materials of the course, a questionnaire with 40 identical questions was considered for pre-and post evaluation. Impressions towards type, duration, contents, and structure of TDI course will also be determined through post-course assessment with a five-response option (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree). It is hoped that the TDI course would educate health professionals to fulfill the responsibility of the current situation and would improve their skills to provide safe and quality care to patients with TDI.

**Keywords:** CRISIS Criteria, Traumatic Dental Injuries, Continuing Education, Online Dental Course, Syrian Crisis, Damascus University

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## 1. Introduction

The ongoing violence together with increased number of school leavers and the presence of adverse psychological environment because of the current situation in Syria have increased the number of cases with dental traumatic injuries attending dental clinics with no or limited data estimating the exact prevalence of the problem. Documentation of such destruction is beyond any one scientific report [1].

Length of time between accident and treatment is critical for successful outcome [2]. Poor primary management may have lifelong consequences for the young patient [3].

It is essential to provide both expedient and appropriate primary care to patients with traumatic injuries. Treatment decisions should be informed by a sound knowledge of dental injuries and likely prognosis [3]. Treatment should be evidence-based and holistic to achieve the best possible outcomes. Patients with traumatic injuries are likely to be seen by general dental practitioners rather than specialists. Therefore, all health providers should be adequately trained to handle any emergency case related to trauma. Delivering immediate and appropriate care might be a challenge for clinicians, and providing the best possible prognosis for traumatized patient, might be far from optimal if clinicians

are not well prepared to provide the best possible solution for patients.

Internationally, epidemiological data from the 2003 Dental Health Survey of children in the UK identified that only 27% of visibly damaged permanent incisors in 15-year-olds were treated. It was also found that 38% of complicated crown fractures in children referred to a British dental hospital had not received proper emergency care [3]. Postal surveys of British dental practitioners have revealed an inadequate level of knowledge with respect to trauma [3].

In the light of these findings, dental traumatic injuries warrant greater emphasis within continuing education programs. It is vital to design a program that can upgrade the knowledge and skills of health providers through distance learning as face to face training would be difficult due to current circumstances. The aim would be to provide participants with new experience in the field of e-learning recognize and appreciate their efforts in maintaining health care despite the difficult circumstances they face. It will help them to take decisions and solve problems in all aspects related to dental traumatic injuries.

## 2. Methods

### 2.1. Data Source and Course Design

A strategy for online professional education has been suggested in the department of Pediatric Dentistry in the Faculty of Dentistry in Damascus University in order to enable health providers to positively fulfil the responsibility of the current situation in Syria and to deal properly with traumatic injuries. A 5 week-long course that includes four modules which covers etiology of TDI, examination and diagnosis, treatment, and prognosis, were designed and uploaded on a specific website related to authors ([www.mdashash.com](http://www.mdashash.com)). The information of the TDI course presented in the modules was designed by postgraduate students in the department who customized the materials in line with the European Association of Dental Traumatology. Online topics to be covered in TDI course are presented in Table 1. Each module consisted of a group of educational materials that can be accessed by any health professional after his/her registration in the TDI online program (<http://mdashash.com/new-dental/dentaltrauma/index.html>).

Figure 1 shows a screenshot of the TDI program in the registry page. CRISIS tool which was developed by Harden (1982) has been adopted when designing the TDI course [4] (Harden 1982). CRISIS stands for seven criteria which should be met to develop effective continuing medical education program: *convenience, relevance, individualization, self-assessment, interest, speculation and systematic* [4]. The TDI course is convenient and delivered online. Participants can study when and where they wish at a pace best suited to their needs. To demonstrate the *clinical relevance* of the program, the current knowledge and understanding of dental traumatic injuries can be evaluated to identify strength and weakness of the current learning and to enable decision

making about the content and level of educational materials for future improvement. Educational strategies were clearly identified in which the learning can be learner-centred and interactive. The course was designed to accommodate different types of learners, reflect a culture of multi-professional learning and value interdisciplinary learning experiences [5]. Taking into consideration that the needs of general practitioners are different from the needs of the maxillofacial surgeon or pediatric dentist working in intensive care, learning materials that contain traumatic injuries cases relevant to clinical practice and evidence supporting clinical decision are addressing *individualization* to allow individuals to access further information related to their aims. Adopting problem-based learning strategies that target specific groups, can encourage participation in activities and will help participants to be actively engaged in reflecting their performance in scenarios that represent "real life" situations[4],[5]. This would promote the *self – assessment* and would help the participants to identify their deficiencies and compare their performance to standards identified for the best care of traumatic injuries [5],[6]. Respecting the participants' experience and knowledge, they will have opportunities to reflect on their practice to stimulate *interest*. All new free text books and guidelines related to traumatic dental injuries will be continuously uploaded [5], [7], [8].

**Table 1.** Online topics to be covered in TDI course.

Aetiology
Child abuse
Diagnosis and examination
CSF leaking
Basic life support
Glasgow coma scale
Maxillofacial injuries
Radiographic assessment
Treatment
Conservative treatment
Microabrasion
Resin retained bridges
Apexification
Treatment of primary teeth
Treatment of root fracture and splinting techniques
Treatment of luxation
Treatment of avulsion and replantation
Decoronation
Emdogain
Replacement of missing teeth and space maintainers
Treatment of mandibular fracture
Prophylaxis tetanus and mouthwashes
Prognosis
External resorption
Internal resorption

Life-centred orientation to learning as learning experience is organized around life situations to make the process more enjoyable [4]. Taking into consideration "*speculative areas*" in which there is no clear course of action, critically appraising the evidence related to the first line management of traumatic injuries, duration and type of splinting, and the best medium for storing the avulsed teeth, will increase the

learning effectiveness and will add to the interest of the program.

The course is *systematically planned* to make sure that the outcome are realistic measurable and achievable to obtain participant satisfaction [9]. Figure 2 illustrates the entire process employed for TDI course. The created TDI database is tailored according to the requirements and specifications reported by staff members of TDI course. General

information including name, email address, location, gender, age group, type of employment, name of academic organization/ institution, resource of information about the program, time allocated for commitment in the course, degree of study, rate of knowledge about TDI, expectations, English fluency, internet connection rate, willing to be contacted for feedback, and reason for applying for the course, will be collected from each participant.

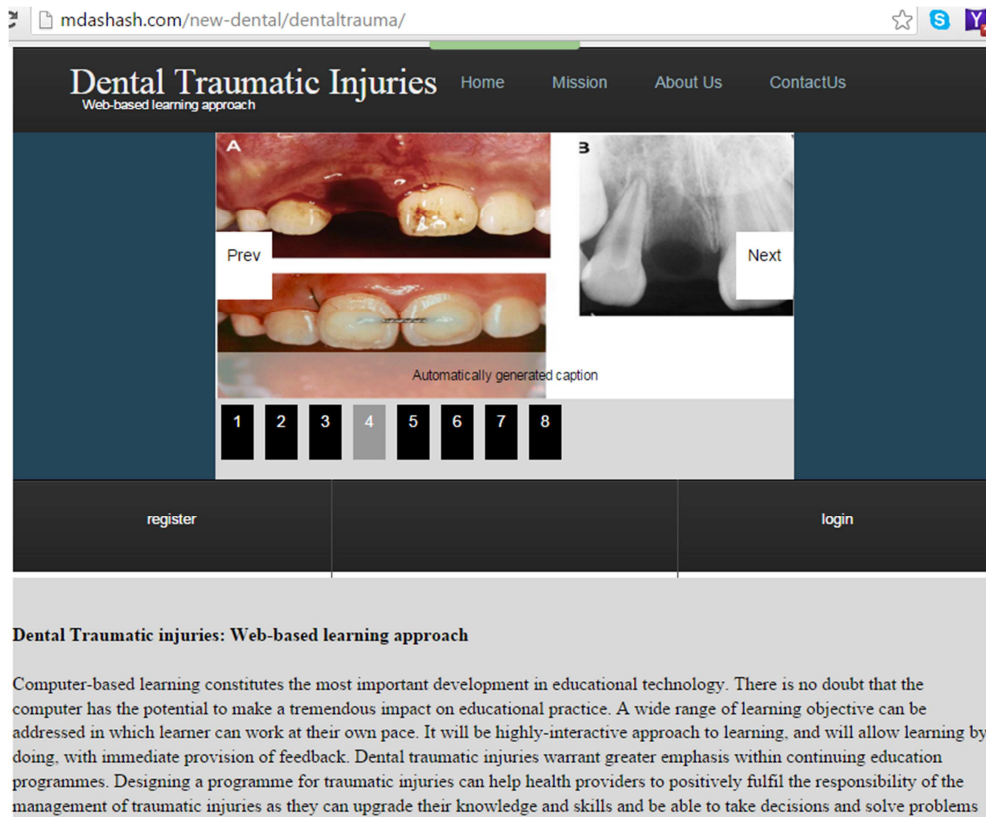
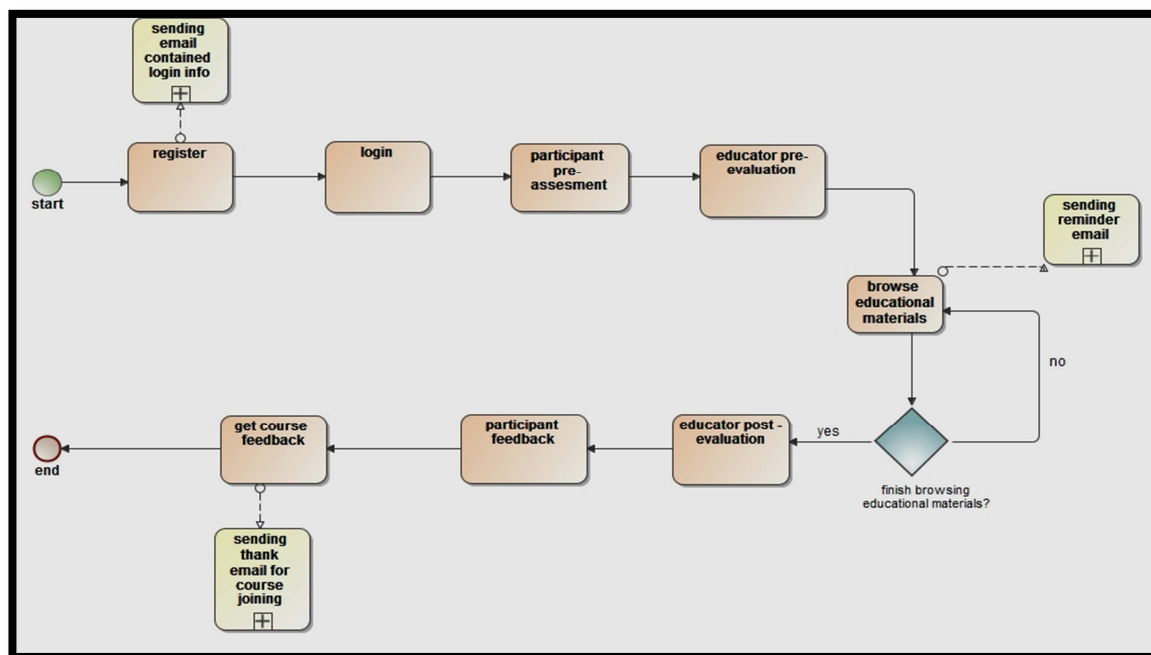
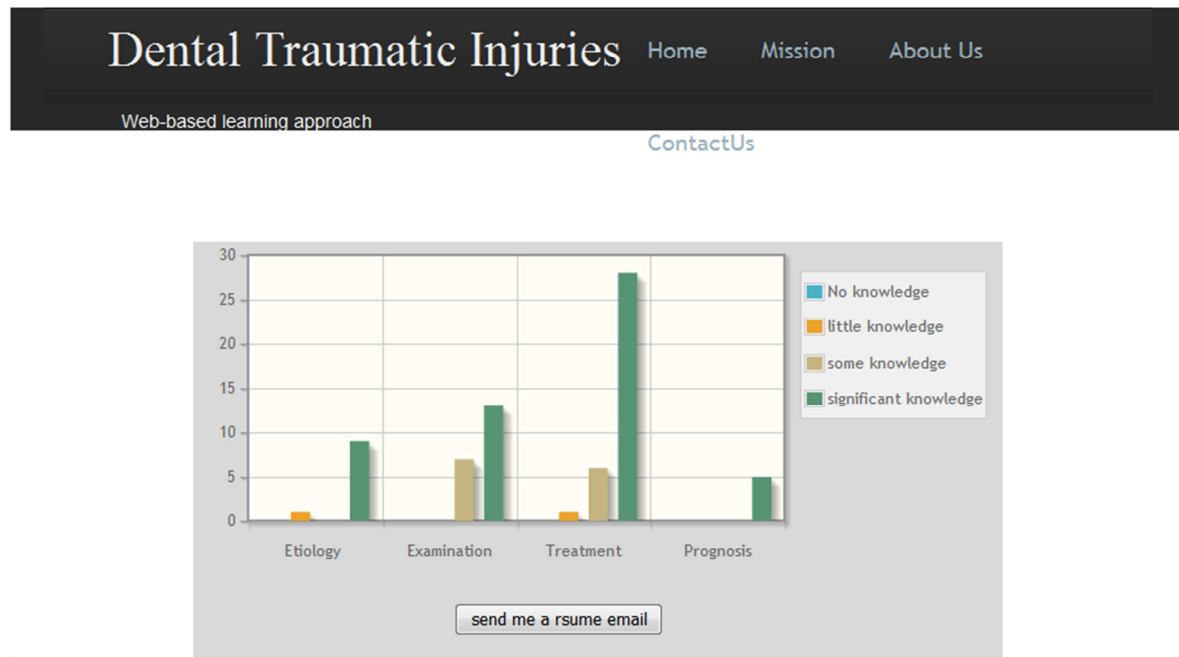


Figure 1. A screenshot of the TDI course in the registry page. The view is realized with Google Chrome.



*Figure 2. A flowchart for the TDI course.**Figure 3. Graph created to users after they rate their knowledge in the four modules (etiology, examination, treatment and prognosis).*

## 2.2. Pre-course Assessment

Pre-course survey included asking the applicants to rate their knowledge about the etiology, diagnosis and examination, treatment, and prognosis were designed and sent to participants after their registration. Likert type scale will be utilized [10] to assess the rate of knowledge (from 0 = no knowledge to 3 = significant knowledge). Figure 3 presents the graph created to users after they rate their knowledge in the four modules. In the etiology section, participants will be asked in 10 questions to rate their knowledge about identifying life threatening injuries, child abuse, dental neglect, injuries related to intubation, identifying high risk patients for dental injuries during intubation, identifying factors affecting prognosis of pulp exposure, identifying consequences of dental injuries of primary teeth on permanent teeth, identifying root abnormalities of permanent teeth because of traumatic injuries, identifying developmental disturbances involving crowns of the permanent teeth, and identifying developmental disturbances.

About 20 questions were formulated to ask participants to rate their knowledge and skills about diagnosis and examination such as identifying brain injury according to Glasgow coma scale, identifying signs and symptoms of CSF leaking, identifying skull fracture, identifying nasal fracture, identifying fracture of zygoma, identifying fracture of midface, identifying pyramidal fracture, identifying craniofacial dysjunction, identifying mandibular fracture, identifying condylar fracture, identifying dental laxative injuries, identifying dental fractures injuries, identifying injuries related to soft tissue, identifying proper X-ray for each traumatic

injury, identifying traumatic injuries on radiograph and interpret results, identifying advantage and disadvantage of different radiographic techniques, identifying diagnostic signs of pulp exposure, identifying diagnostic signs of ankylosed tooth identify signs and symptoms of external resorption and identifying signs and symptoms of internal resorption.

About 35 questions were formulated to ask participants to rate their knowledge and skills about providing emergency care and CPR for child and adult, identifying differences between primary and permanent teeth in treatment modalities, identifying differences between primary and permanent teeth in treatment modalities, identifying dental materials used for pulp therapy, identifying treatment options for traumatized pulp, identifying treatment options for traumatized crown, identifying treatment options for traumatized root, identifying techniques for pulp treatment of traumatized tooth, identifying indications of smart burs, identifying apexogenesis and its indication, identifying apexofication and its indication, identifying new horizons of pulp regeneration, identifying treatment options for all luxative injuries, identifying treatment options of root fracture according to location of fracture, identifying treatment options for external resorption, identifying treatment options for internal resorption, identifying oral health promotion options in dental trauma, identifying treatment options for missing interior teeth because of trauma, provide first aid for avulsed tooth, identifying factors affected treatment options of avulsion, identifying the best storage media for avulsed tooth, identifying type of splinting and their indications, identify duration of splinting

for different dental injuries, perform proper splinting, identifying treatment options of ankylosed tooth, identifying instructions needed for avulsed tooth, identifying indications of microabrasion for white spot lesions, identifying advantages and disadvantages of microabrasion, identifying treatment options for dilacerations, identifying indications for decoronation, perform decoronation techniques, identifying indications of enamel matrix derivative applications, identifying indications of intentional replantation of traumatized tooth, identifying indications of bleaching because of trauma, Perform intra-coronal bleaching of traumatized teeth, and identify indications for tetanus vaccination.

About 5 questions were designed to rate the knowledge of participants about the prognosis of dental injuries such as identifying healing classifications, sequela of pulp exposure, root fracture, and identifying favorable outcomes of replantation.

### **2.3. Pre-and Post Evaluation**

Pre-and post evaluation, will be undertaken in which 40 identical questions will be asked before and after reading the educational modules in order to assess the baseline knowledge, how much and how well the participants have learned the materials and enhanced their knowledge. After pre-evaluation stage, participants can have access to all educational modules. To assess the impact of educational modules on participant' knowledge, Commitment rates of individual participants will be tracked in which the time and the number of times that educational materials were opened and scanned can be recorded.

On completion of all modules participant will be asked again to fill the post-evaluation questionnaire. After completion of each evaluation, participant will be given an individual percentage score and mark for each question. The number of participants completing the post-evaluation and the results will be recorded saved and statistically analyzed in the learning management system. Paired pre-and post-evaluation results will be calculated to measure the difference and determine the statistical significance.

### **2.4. Post-Course Assessment**

On completion of post-evaluation, participants will be asked to provide their opinion about the course. A short Likert-scale questionnaire has already been constructed and will be sent to participant's email after finishing the course. Participants will be asked to identify their opinion towards participating in a TDI course and to elicit their views about the structure, contents and relevant materials of the course and the implementation in future career. They will be asked to rate the importance of the topics of TDI course with a five-response option (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree). An assessment of impressions towards duration and type of training will also be made [11].

## **3. Results and Discussion**

The damage that the Syrian conflict has brought, with no clear end in sight [1], necessitates action to improve knowledge, skills and attitude of health professionals. TDI is a serious health problem that can affect the quality of life due to their psychological, aesthetic, social and therapeutic impacts.

The online education program such as TDI course, which is engaged with emergency situation and human conflicts, has the responsibility to develop the capacity of health professionals to respond to catastrophic events and to minimize the economic, psychological and social damage that may result after trauma. The work presented in this article is one of the solutions that have been proposed for health problems during emergency situations. However, we strongly suggest that other online educational programs which are related to other health problems should be emerged in vulnerable areas.

To our knowledge, the online education programs related to oral health are still limited despite the facts that they have a positive impact on the understanding of health topics [12].

Although TDI course has been developed with particular needs during Syrian crisis, we believe that the course can help other health professionals in the World. TDI course has been online for a short period of time (1 month) and is available for free for any individual or group who would like to improve knowledge and skills in TDI. We plan to publish results and statistics to determine the added value and see the effectiveness of such courses after an adequate usage of TDI program by participants. In addition, the program will continuously be tested and enhanced in which contents coming from other experts, all related information or recent guidelines will regularly be uploaded.

## **4. Conclusions**

Online education programs including TDI course has been of paramount importance as an effort to provide safe and quality care to our patients. It is a promising alternative education for health providers in which traditional training is difficult to be financially covered and organized during the current situation in Syria. CRISIS criteria are valuable for health professionals to achieve effective continuous education as they can access course and participate at their conveniences, in the location of their choice. Given the ongoing destruction in Syria, it is hoped that the online program would help health professionals to provide safe and quality care to our patients with TDI during Syrian crisis.

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