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# EDEN BAYSAL DENTAL TRAUMA INDEX MANUAL

Including Modified Version  
With Figures

Prof.Dr. Ece EDEN  
Ege University, School of Dentistry,  
Department of Pedodontics  
Izmir- Turkey

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## PREFACE

Dental injuries are one of the most important issues that require urgent intervention in dentistry. There are many classifications related to dental trauma in the dental literature. However, these classifications do not ensure that the injury is categorized properly. On the other hand, an index that is defined and used as a sign or measure of an entity may be used to record many variables related to health and dentistry. Interestingly, although many indices were used for dental caries or periodontal health, there was no index about dental trauma.

In November 2018, after my lecture on the subject, 4th grade student Mehmet Baysal came to me with questions that he had about this topic. After a thorough evaluation of the literature, we discussed how we can improve the recordings and structured an index. Then we worked on the validity of this index which was approved by many well-known dental traumatologists.

Eden Baysal Dental Trauma Index has become the first index developed on dental trauma and we used our last names to name it. This manual aims to describe the index and guide the practitioners, researchers and policy makers on its use.

Ece Eden  
İzmir 2020

## EDEN BAYSAL DENTAL TRAUMA INDEX

### Definition

'Eden Baysal Dental Trauma Index' is a five-digit index that defines the type of the injury of the hard-dental tissues (crown in relation with the pulp and root), periodontal ligament, alveolar process and also records the maturity of apex. FDI tooth code should be used in parenthesis to indicate the injured tooth.

Following FDI tooth code in paranthesis, the index contains five digits. It can be used in both dentitions.

The index intends to be used in recording the dental trauma cases as well as giving suggestions on treatment since the maturity of apex is one of the most important factor in treatment decision.

The index is suitable for electronic data collection and its simplicity provides easy handling. The computer registered index can easily be transferred to excel sheets and evaluated statistically. It gives us the possibility to record 1008 different scenarios.

A study that used e-Delphi consensus method was conducted for the face and content validity of the index and published (1). Well-known 15 experts from Australia, Brazil, Chile, Denmark, France, Sweden, Ireland, Japan, Turkey, UK and USA on dental traumatology has worked on the validation process. Then 10 researchers from Egypt, Indonesia, Kenya, Turkey and USA reported feedback on the validated index. It is important to note that the researchers that were included in the study were not only from different countries that almost represented the world but were from different specialities as well since the topic is of interest to all practitioners especilly to pediatric dentists, endodontists, dental surgeons and periodontologists.

The experts agreed on the definition of the index after one round and reached an agreement for the statements and wording of the codes in the second round with providing feedback on its user friendly nature. This was the introduction of the index to dental community (1).

The index intends to record traumatic dental injuries of affected tooth and provides information for treatment planning and may report data of the multiple injuries. Soft tissue injuries can also be included as superscript numbers but this is named as 'Modified Eden Baysal Dental Trauma Index' since the soft tissue injuries should be recorded on patient base. Both injuries of the gingiva and skin can be recorded. It is possible to record 259 056 different scenarios with this modification and the article is under construction.

This manual will provide fundamental information about the index and its modified version and aims to help dental professionals to use it effectively.

## How to use 'Eden Baysal Dental Trauma Index'?

The affected tooth with the injury is indicated by the two-digit FDI numbering system in parenthesis. Therefore, the index can easily be used for both primary and permanent dentitions.

FDI coding as seen below is used to represent the tooth involved:

Permanent dentition

<u>18-17-16-15-14-13-12-11</u>	<u>21-22-23-24-25-26-27-28</u>
48-47-46-45-44-43-42-41	31-32-33-34-35-36-37-38

Primary dentition

<u>55-54-53-52-51</u>	<u>61-62-63-64-65</u>
85-84-83-82-81	71-72-73-74-75

The index contains five digits following FDI tooth code. The first two digits contain numbers starting from 0, the third digit contains capital letters, the fourth digit contains lower case first letters and the fifth digit contains plus or minus sign. Intraoral and radiographic findings are used to record the cases with the index. The coding of the traumatic injury is divided into 3 groups as injuries of the crown (1<sup>st</sup> digit), injuries of the root (2<sup>nd</sup> digit) and the luxation injuries (3<sup>rd</sup> digit).

The reader is referred to Andreasen Classification for definition of each traumatic injury that is used in the index with codes (2).

The 1<sup>st</sup> digit after the FDI tooth code stands for hard dental tissue injuries affecting the crown with information on its relation with the pulp and root. Intraoral clinical evaluation is used to gather information for proper coding. Numbers are used to categorize the injury in hierarchical order in relation to severity. The codes are as follows:

0= none

1= enamel fracture

2= enamel and dentin fracture= Uncomplicated crown fracture

3= enamel and dentin fracture including the pulp= Complicated crown fracture

4= enamel- dentin- cement fracture= Uncomplicated crown-root fracture

5= enamel- dentin- cement fracture including the pulp= Complicated crown-root fracture

2<sup>nd</sup> digit stands for hard dental tissue injury of the root indicating the location of the fracture line. Numbers are used to categorize the injury in hierarchical nature in relation to its position. The position of the fracture line in relation to the gingival margin defines the severity of the injury and impaired prognosis. In case of an oblique root fracture affecting more than one location on the root, the position of the fracture line close to the cervical region is recorded. The codes used in the second digit are as follows:

0= none

1= apical 1/3 root fracture

2= middle 1/3 root fracture

3= cervical 1/3 root fracture

3<sup>rd</sup> digit stands for periodontal ligament injuries (Luxation injuries). The type of the periodontal ligament injury that is present is indicated by its first letter written in capitals. First letters of the luxation injuries are used as follows:

N= None

C= Concussion

S= Subluxation

E= Extrusive Luxation- Extrusion

L= Lateral Luxation

I= Intrusive Luxation- Intrusion

A= Avulsion

4<sup>th</sup> digit stands for maturity of the apex. Radiographic evaluation reveals the characteristics of the apex in both dentitions. In an immature apex, the root has thinner dentin walls, it may be short and the apical foramen is large. In a mature apex, the apical end of the root is completely formed and the periodontal membrane has a uniform width around the root and the apex. In primary dentition, physiological root resorption may be present. Therefore, 3 codes are used in this digit. Lower case first letters of the words defining the characteristics of the apex are used as below:

i = immature apex

m= mature apex

r= resorbed apex (physiological)

5<sup>th</sup> digit indicates presence or absence of a fracture of the alveolar process and expressed by plus (+) or minus (-) sign, respectively. It is important to note that the fracture should be related with the alveolar process only. The definition of the codes for this digit are as follows:

Plus sign (+) = Presence of a fracture of the alveolar process

Minus sign (-) = None-detectable alveolar process fracture

Proper treatment plan for a trauma patient is dependent on several factors that can be obtained with convenient diagnosis. The information gathered from the examination of affected dental tissues after a traumatic injury determine the treatment plan and long term prognosis.

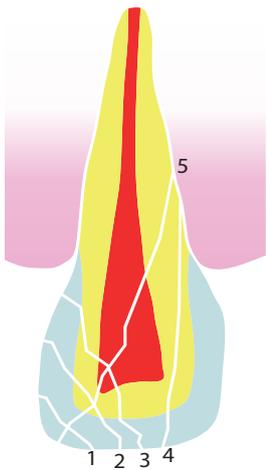
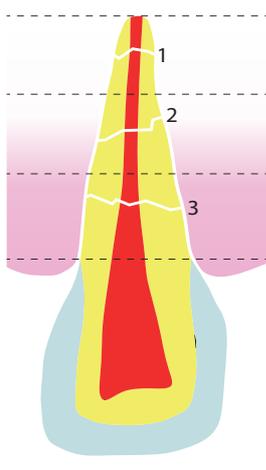
Examination of a trauma patient includes firstly a through patient history that is followed by extraoral and intraoral evaluations. Intraoral examination of the patient will provide information on the injury of the crown in relation with the pulp and cement which can be coded as the first digit. Radiographical evaluation including orthopantomograph,

periapical and/or occlusal radiographs will further the assessment of the affected tissues. Periapical radiograph will give information on the injury of the root, the maturity of the apex. The accompanying bone injury may be detected by orthopantomograph. Cone beam tomography may be used in complicated cases. The findings of the radiographical evaluation will be used in the following digits (digits 2, 3, 4 and 5) of the index respectively.

Table 1 shows the summary of the codes used in 'Eden Baysal Dental Trauma Index.' This simple table can be included in the patient record form to remind the clinician about the index codes and may enable the recording.

The coding used in the index is suitable for computer registration as well. This can be implemented as a drop down menu for each digit for ease of use.

**Table 1:** Summary of codes used in 'Eden Baysal Dental Trauma Index' (Illustrated by Alara Ayraç)

Number of tooth (FDI)	1 <sup>st</sup> digit Crown Fracture	2 <sup>nd</sup> digit Root Fracture	3 <sup>rd</sup> digit Luxation Injury	4 <sup>th</sup> digit Maturity of Apex	5 <sup>th</sup> digit Alveolar process injury
	0 =none	0 =none	CAPITAL FIRST LETTERS	small first letters	+ or -
			<p>N= None</p> <p>C= Concussion</p> <p>S= Subluxation</p> <p>E= Extrusive Luxation</p> <p>L= Lateral Luxation</p> <p>I= Intrusive Luxation</p> <p>A= Avulsion</p>	<p>i = immature apex</p> <p>m = mature apex</p> <p>r= resorbed apex</p>	<p>(+ sign) alveolar process injury</p> <p>(- sign) No alveolar process injury</p>

## How to use 'Modified Eden Baysal Dental Trauma Index'?

Dental trauma not only affects the teeth and the neighboring dental hard tissues but may also damage the soft tissues extra- and/or intra- orally. The skin on the face and the lips may suffer from the impact. Gingiva, lingual or labial frenulum and the tongue may be injured with or without an accompanying hard dental tissue injury. Soft tissue injuries usually do not affect the prognosis of the injured tooth/teeth. Appropriate emergency treatment of the soft tissues on the first arrival to the health center is mostly adequate.

'Modified Eden Baysal Dental Trauma Index ' aims to record the soft tissue injuries on a patient base together with the information of injured tooth or teeth and alveolar process. Extraoral, intraoral and radiographic findings of the patient are used to record the cases with the modified version of the index. The characteristics of the injuries of the face or the gingiva are coded without indicating the location or the severity.

Soft tissue injuries affecting skin, lip and/or gingiva are recorded for each patient by adding superscript numbers outside the brackets containing the records of injured teeth and alveolar process recorded by 'Eden Baysal Dental Trauma Index'. Multiple soft tissue injuries should be written in ascending order separated by commas as superscript numbers.

Superscript numbers from 0 to 8 are used to record soft tissue injuries affecting skin, lip and/or gingiva following 5 digits of Eden Baysal Dental Trauma Index in brackets. When multiple teeth are affected in a patient, all traumatized teeth will be recorded by 'Eden Baysal Dental Trauma Index' in brackets separated by commas and soft tissue codes will be added as superscript numbers after the bracket. When there is more than one type of soft tissue injury, the superscript numbers should be written in ascending order separated by commas.

Four different types of soft tissue injuries are coded for both skin/lip and gingiva/tongue. The total of nine codes starts with '0' indicated no injury and followed by

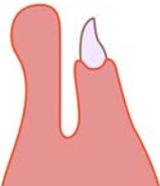
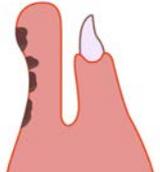
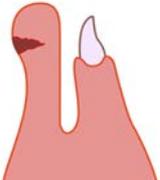
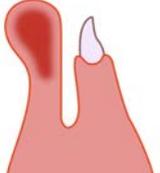
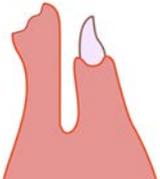
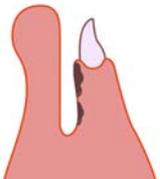
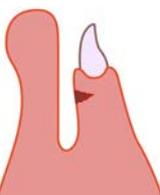
extroral soft tissue injuries (1 to 4). The codes from 5 to 8 are used to record the intra-oral soft tissue injuries affecting gingiva, frenulum or the tongue.

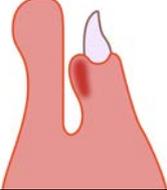
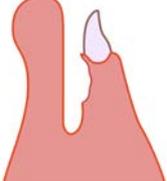
The codes used to record soft tissue injuries as superscript numbers for Modified Eden Baysal Dental Trauma Index are as follows:

- 0= none
- 1= Skin / Lip abrasion
- 2= Skin / Lip laceration
- 3= Skin / Lip contusion
- 4= Skin / Lip avulsion
- 5= Gingival abrasion
- 6= Gingival laceration
- 7= Gingival contusion
- 8= Gingival avulsion

Table 2 shows the soft tissue codes for 'Modified Eden Baysal Dental Trauma Index.' with illustrations.

**Table 2:** Summary of codes for soft tissue injuries used in ‘Modified Eden Baysal Dental Trauma Index’ (Illustrated by Cem Eden)

Modified Eden Baysal Dental Trauma Index Codes	Illustrations
<p><b>Code 0</b>            [(.).....]<sup>0</sup>            None</p>	
<p><b>Code 1</b>            [(.).....]<sup>1</sup>            Skin / Lip abrasion</p>	
<p><b>Code 2</b>            [(.).....]<sup>2</sup>            Skin / Lip laceration</p>	
<p><b>Code 3</b>            [(.).....]<sup>3</sup>            Skin / Lip contusion</p>	
<p><b>Code 4</b>            [(.).....]<sup>4</sup>            Skin / Lip avulsion</p>	
<p><b>Code 5</b>            [(.).....]<sup>5</sup>            Gingival abrasion</p>	
<p><b>Code 6</b>            [(.).....]<sup>6</sup>            Gingival laceration</p>	

Modified Eden Baysal Dental Trauma Index Codes (continued)	Illustrations
<p><b>Code 7</b> [ (.) . . . . . ]<sup>7</sup> Gingival contusion</p>	 <p>The illustration shows a cross-section of a tooth and its supporting structures. The gingiva is depicted in a reddish-pink color. A small, dark red, oval-shaped area is shown on the gingiva adjacent to the tooth, representing a contusion.</p>
<p><b>Code 8</b> [ (.) . . . . . ]<sup>8</sup> Gingival avulsion</p>	 <p>The illustration shows a cross-section of a tooth and its supporting structures. The gingiva is depicted in a reddish-pink color. A portion of the gingiva is shown missing from the site adjacent to the tooth, representing an avulsion.</p>

## Clinical Cases

Table 3a and 3b presents clinical cases and the use of 'Modified Eden Baysal Dental Trauma Index' that also includes 'Eden Baysal Dental Trauma Index.'

### Case 1:

Fourteen months old male patient with injured primary right lateral incisor had applied to the clinic with otherwise healthy medical history. Parents reported that the child had fallen down two days ago and one of the front teeth on the right side had moved below the gingiva. Extraoral evaluation revealed no soft tissue injuries related to the skin or the lip. Intraoral soft tissues were intact as well. Periapical radiograph showed an erupting primary canine and an intruded primary right lateral incisor with an open apex.

Here is the reording of the injured tooth with 'Eden Baysal Dental Trauma Index.' Primary right lateral incisor is coded as 52 according to FDI numbering system. The crown and the root of the affected tooth is intact, therefore the first and the second digits should be coded with '0.' The tooth has an intrusive luxation so the third digit will contain the capital first letter of the word 'Intrusive luxation' which is 'I'. The apex of the tooth was immature so the fourth digit will be the first digit of the word 'immature' in small letters as 'i'. The radiographic evaluation showed no concomitant bone injury and this is indicated by a minus sign as the 5<sup>th</sup> digit. Therefore, the coding of the injured teeth with Eden Baysal Dental Trauma Index is: (52) 0 0 I i –

Since there is no soft tissue injury, 'Modified Eden Baysal Dental Trauma Index' is as follows:

**[ 52) 0 0 I i – ]<sup>0</sup>**

## Case 2:

Twelve year old male patient had applied to the clinic after a traffic accident. He had been treated in the emergency clinic of a hospital for soft tissue injuries before attending the dental clinic. He had unremarkable medical history.

Extraoral evaluation revealed sutured laceration of the lower lip. Gingival contusion and abrasion was detected at the neighboring soft tissues of the injured permanent right incisors. Intraorally, right lateral incisor was showing extrusive luxation and the permanent right central incisor was mobile with uncomplicated crown fracture whereas enamel fracture was present on permanent left central incisor. Periapical radiograph showed root fracture of the permanent right central incisor and an erupting permanent right canine.

Here is the recording of the injured teeth with 'Eden Baysal Dental Trauma Index.' The injured teeth were 12, 11, and 21 according to FDI numbering system.

The crown and the root of 12 was intact, therefore the first and the second digits should be coded with '0.' On the otherhand, the tooth has an extrusive luxation so the third digit will contain the capital first letter of the word 'Extrusive luxation' which is 'E'. The apex of the tooth was mature so the fourth digit will be the first digit of the word 'mature' in small letters as 'm'. The radiographic evaluation showed no concomitant bone injury and this is indicated by a minus sign as the 5<sup>th</sup> digit. Therefore, the coding of the injured teeth with Eden Baysal Dental Trauma Index is: (12) 0 0 E m –

Uncomplicated crown fracture was observed in 11 and coded with '2' as the first digit. The periapical radiograph showed root fracture located at the apical third of the root and coded with '1' as the second digit. There was no bodily movement of the tooth so the third digit will contain the capital first letter of the word 'None' which is 'N'. The apex of the tooth was mature so the fourth digit will be the first digit of the word 'mature' in small letters as 'm'. The radiographic evaluation showed no concomitant bone injury and this is indicated

by a minus sign as the 5<sup>th</sup> digit. Therefore, the coding of the injured teeth with Eden Baysal Dental Trauma Index is: (11) 2 1 N m –

Enamel fracture was seen on 21 and coded as '1' for the first digit. The root of 21 was intact, therefore the second digit should be coded with '0.' There was no luxation injury so the third digit will contain the capital first letter of the word 'None' which is 'N'. The apex of the tooth was mature so the fourth digit will be the first digit of the word 'mature' in small letters as 'm'. The radiographic evaluation showed no concomitant bone injury and this is indicated by a minus sign as the 5<sup>th</sup> digit. Therefore, the coding of the injured teeth with Eden Baysal Dental Trauma Index is: (21) 1 0 N m –

For soft tissue injuries, the laceration of the lip will be coded with '2' and the gingival abrasion and contusion is coded '5' and '7' respectively. Therefore, 'Modified Eden Baysal Dental Trauma Index' for this case is as follows:

**[(12) 0 0 E m -, (11) 2 1 N m -, (21) 1 0 N m -] <sup>2,5,7</sup>**

### Case 3:

Eight year old female patient attended to the dental clinic two hours after a bicycle accident with avulsed central incisors. She had skin abrasion on her face and contusion on her upper lip. Intraoral evaluation revealed no soft tissue injury. Both of the avulsed teeth were brought to the clinic and their crowns and roots were intact with immature apicies. Radiographic evaluation affirm that there was no fracture affecting the bone.

Here is the recording of the injured teeth with 'Eden Baysal Dental Trauma Index.' The injured teeth were 11 and 21 according to FDI numbering system.

The crown and the root of both teeth were intact, therefore the first and the second digits should be coded with '0.' Both of the teeth had avulsed so the third digit will contain the capital first letter of the word 'Avulsion' which is 'A' for both. The apex of the teeth were immature so the fourth digit will be the first digit of the word 'immature' in small letters as 'i'. The radiographic evaluation showed no concomitant bone injury and this is indicated by a minus sign as the 5<sup>th</sup> digit. Therefore, the coding of the injured teeth with Eden Baysal Dental Trauma Index is: (11) 0 0 A i - and (21) 0 0 A i -

The abrasion on her face will be coded as '1' and the contusion of the lip will be coded with '3'. Therefore, 'Modified Eden Baysal Dental Trauma Index' for this case is as follows:

**[(11) 0 0 A i -, (21) 0 0 A i -] <sup>1,3</sup>**

**Table 3 a:** Clinical examples on how to use the ‘Eden Baysal Dental Trauma Index’ and ‘Modified Eden Baysal Dental Trauma Index’

Extraoral = view / information Intraoral View	Radiograph	Andreasen Classification	Eden Baysal Dental Trauma Index
<p style="text-align: center;"><b>CASE 1</b></p>  <p style="text-align: center;"><b>No soft tissue Injuries</b></p>		<p>52 Intrusive luxation</p>	<p>(52) 0 0 I i -</p>
<p><b>Case 1: Modified Eden Baysal Dental Trauma Index= [(52) 0 0 I i -]<sup>0</sup></b></p>			
<p style="text-align: center;"><b>CASE 2</b></p>  <p style="text-align: center;"><b>Lip Laceration Gingival Abrasion and Contusion</b></p>		<p>12 Extrusive luxation</p> <p>11 Enamel-dentin crown fracture and Apical root fracture</p> <p>21 Enamel fracture</p>	<p>(12) 0 0 E m -</p> <p>(11) 2 1 N m -</p> <p>(21) 1 0 N m -</p>
<p><b>Case 2:</b></p> <p><b>Modified Eden Baysal Dental Trauma Index=</b></p> <p><b>[(12) 0 0 E m -, (11) 2 1 N m -, (21) 1 0 N m -]<sup>2,5,7</sup></b></p>			

**Table 3 b:** Clinical examples on how to use the ‘Eden Baysal Dental Trauma Index’ and ‘Modified Eden Baysal Dental Trauma Index’

Extraoral view / information Intraoral View	Radiograph	Andreasen Classification	Eden Baysal Dental Trauma Index
<p style="text-align: center;"><b>CASE 3</b></p>  <p style="text-align: center;">Skin- Lip Abrasion Lip contusion</p> 	 	11 Avulsion	(11) 0 0 A i -
		21 Avulsion	(21) 0 0 A i -

**Case 3: Modified Eden Baysal Dental Trauma Index=**  
**[(11) 0 0 A i -, (21) 0 0 A i -] <sup>1,3</sup>**

## Who should use the index?

The index is suitable for computer registration and provides online recordings. This gives the opportunity to collect data from different centers, cities and countries easily. International Association of Dental Traumatology has recently included Eden Baysal Dental Trauma Index for recording dental injuries in 'Dental Trauma Guide' which is an evidence based treatment guide (Figure 1).

**DENTAL TRAUMA GUIDE**  
- evidence based treatment guide -

ACCOUNT LOGOUT

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### Patient examination

#### Examination of a patient with a traumatic dental injury

A rational examination procedure is essential in order to establish a complete and correct diagnosis of all soft and hard tissue injuries.

**Take a short medical and dental history**

The medical history should include the patient's general health, allergies and that may influence treatment. Be alert to other injuries and symptoms which can indicate more serious injury. It is also of value to ask what has been done before the patient reached the clinic, such as any treatment carried out elsewhere and how avulsed teeth have been stored. The dental history should indicate previous dental traumas, information which may explain radiographic findings such as pulp canal obliteration or apical pathology.

**Questions relating to the injury**

- **Where did the injury occur?** This information may have legal implication for the patient and may on occasion indicate the possibility of contamination.
- **How did the injury occur?** This may lead to identification of the impact zones, i.e. a chin injury is often combined with crown or crown-root fractures in premolar and molar regions.
- **When did the injury occur?** This information may be essential in relation to many injury types. In relation to a tooth avulsion the extent of time and the extraoral storage condition becomes very decisive for later treatment.
- **Was there a period of unconsciousness?** If so, for how long? Amnesia, nausea and vomiting are all signs of brain damage and require medical attention.
- **Is there any disturbance in the bite?** An affirmative answer may indicate a luxation injury with displacement, an alveolar or jaw fracture or a fracture of the condylar region.
- **Is there any reaction in the teeth to cold and/or heat exposure?** A positive finding indicates exposed dentin and/or pulp.

**Clinical examination**

A systematic approach is recommended. The general principle with oral injuries to 'examine from outside to inside and treat from inside to outside' is helpful for a systematic approach. Hence suturing of lip lacerations should be carried out after intraoral injuries of urgent character have been treated. Otherwise it may be difficult to enter the oral cavity once edema has started to develop.

- Clean the face and the oral cavity with water or saline  
If there are soft tissue wounds, a mild detergent should be used. This cleaning will make the patient feel more comfortable and facilitate extraoral and oral examination.
- Examine the face, lips and oral muscles for soft tissue lesions.
- Palpate the facial skeleton for signs of fractures.
- Inspect the dental trauma region for fractures, abnormal tooth position, tooth mobility and abnormal response to percussion. Furthermore, registration of direction of displacement in case of luxation injuries. In case of fractures their extent and involvement of dentin, pulp and the relation to the gingival sulcus area is noted.
- Pulp testing (usually electrometric) completes the clinical examination.

**Radiographic examination of soft tissue lesions**

In the presence of a penetrating lip lesion, a soft tissue radiograph is indicated in order to locate any foreign bodies. It should be noted that the oral orbicular muscles close tightly around foreign bodies in the lip, making them impossible to palpate; they can only be identified radiographically. This is accomplished by placing a dental film between the lips and the dental arch and using the lowest exposure time. If this exposure reveals foreign bodies (a radiographic examination will normally demonstrate foreign bodies such as tooth fragments, composite filling material, metal, gravel, whereas organic materials such as cloth and wood cannot be seen), a lateral radiograph can be added (at 50% normal exposure time) to visualize the foreign bodies in relation to the cutaneous and mucosal surfaces of the lips. With the combined information from the clinical and radiographic examinations, diagnosis, prognosis and treatment planning can be accomplished.

Supplemental radiographs such as panoramic (OPG) views and Cone beam CT can be of value and considered when indicated and available.

**Photographic registration**

Finally, photographic registration of the trauma is recommended as it offers an exact documentation of the extent of injury and can be used later in treatment planning, legal claims or clinical research. Note that a patient consent is required before taking such photographs and when considering using them for other purposes such as research and publication.

**Diagnosis**

The information obtained from clinical and radiographic examination will lead to the correct diagnosis including both fractures and luxation injuries (combination injuries). To help the newcomers in dental traumatology the *Trauma Pathfinder* can guide the practitioner via a series of 'yes' and 'no' questions to a correct diagnosis.

Recently, a new index based on 5 digits has been developed which comprise all important information which can be easily computerized. This index enables combination injuries to be registered at the same time (Eden Baysal index). Standardized registration will facilitate comparison of data and outcome between different centers worldwide enabling larger materials for research.

1st digit Crown fracture	2nd digit Root fracture	3rd digit Luxation injury	4th digit Maturity and shape of apex	5th digit Alveolar process fracture
No. of tooth (PDC)	0 to 5	0 to 3	Capital first letters	Small first letters
0 = none	0 = None	N = None	I = Immature	I = digit Alveolar process fracture
	1 = Concussion	C = Concussion	M = mature	M = digit Alveolar process fracture
	2 = Subluxation	S = Subluxation	++ = avulsed	
	E = Extrusive Luxation	E = Extrusive Luxation		
	L = Lateral Luxation	L = Lateral Luxation		
	I = Intrusive Luxation	I = Intrusive Luxation		
	A = Avulsion	A = Avulsion		

**Eden-Baysal Index**

Examples of use of the index:

Left central incisor with extrusive luxation can be described with the 5-digit code: **(21)00E+**

Right lateral incisor with crown root fracture with pulp exposure and immature root development: **(12)5N-**

Left central incisor with crown fracture with pulp exposure and lateral luxation with alveolar process fracture will get the code: **(11)30Lm+**

Lateral incisor with crown fracture in dentin without pulp exposure and root fracture in apical third of the root with mature apex: **(12)21N-**

**Using the Dental Trauma Guide for treatment advice and prognosis estimation**

The combined clinical and radiographic examination has now classified the injured tooth into the proper category (fractures and/or luxation). In case of a combined fracture-luxation injury, primarily enter the actual luxation injury where an alternative "route" will indicate the relevant luxation-fracture combination and its treatment and prognosis.

**Recommended reading**

1. ANDREASEN FM, ANDREASEN JO. Diagnosis of luxation injuries: the importance of standardized clinical, radiographic and photographic techniques in clinical investigations. *Endod Dent Traumatol* 1985;5:160-169.
2. BAKLAND LK, ANDREASEN JO. Examination of the dentally traumatized patient.  *Calif Dent Ass J* 1996;24:35-44.
3. ANDREASEN FM, ANDREASEN JO, TSUKIBOSHI M, COHENCA N. Examination and Diagnosis of Dental Injuries. In: Andreason JO, Andreason FM, Andersson L, (eds.). *Textbook and Color Atlas of Traumatic Injuries to the Teeth* (5th ed.). Oxford, Blackwell 2019, pp. 295-326.
4. EDEN E, BAYSAL M, ANDERSSON L. Eden Baysal Dental Trauma Index: Face and content validation. *Dent Traumatol*. 2020;36:117-123.

Home / Patient examination

Figure 1: Dental Trauma Guide (<https://dentaltraumaguide.org/patient-examination/>)

The index can be used in routine clinical patient recordings as well as epidemiological studies. The information obtained may be used in treatment planning by dental professionals and for future health care planning by stakeholders and governments for the community.

## Important Considerations

\* The index can be included on computer or as a form that can be filled manually. Figure 2 shows an example of a form in Turkish that contains the index codes as a table to enable ease of use.

\* Training of the personal is necessary before collecting data on recording trauma cases in dental clinics.

\* A training program is necessary for the study team and inter and intra- examiner reliability should be calculated. A Kappa equal to +0.65 or better should be achieved.

\* If one is uncertain about the codes to select, the severe code that will affect the treatment plan should be chosen. For example, if you are unsure about the location of the root fracture, since the fracture line close to the gingival margin has a lower success rate and the patient will need an intense treatment protocol with longer splinting time, it is advised to choose the severe code.

\* If there is more than one code at the same digit, always record the most severe code that will affect the treatment. For example, if there is enamel fracture (code 1) on the mesial incisal edge of a permanent first incisor and complicated crown-root fracture (code 5) on the distal part of the tooth, one must record 5 as the first digit.

\* Third digit that records the luxation injuries only include bodily movement of the tooth in the socket, not the movement of the tooth fragment. But a study may plan to include luxation injuries related to root fragments and this should be clearly stated in the study protocol. For example, extrusion of the broken tooth fragment is probable finding of the dislocation and is not coded as the 3<sup>rd</sup> digit but if preferred the index has the potential to record that data as well.

**Barkod :**

**Hastanın :**

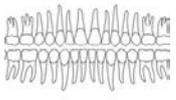
Adı : \_\_\_\_\_  
Soyadı : \_\_\_\_\_  
Yaşı : \_\_\_\_\_  
Cinsiyeti : **E** **K**

**Adli vaka kaydı yapıldı mı ?**

Evet  Hayır

Yaralanma Tarihi : \_\_\_\_\_ Muayene Tarihi : \_\_\_\_\_  
Yaralanma Saati : \_\_\_\_\_ Muayene Saati : \_\_\_\_\_

**Yaralanma ile ilgili bilgileri Tablo 1'e göre kodlayınız.**

	Diş No	Kron Kırığı	Kök Kırığı	Lüksasyon	Kök Gelişimi	Alveol Kemikçi
 <p>Kırık hatlarını şekil üzerinde gösteriniz.</p>						

**Tablo 1\***

Kron Kırığı	Kök Kırığı	Lüksasyon Yaralanması	Kök Gelişimi	Alveol Kemikte Kırık
<b>0</b> Yok	<b>0</b> Yok	<b>Y</b> Yok	<b>(i)</b> immatür	<b>(+)</b> Var
<b>1</b> Mine Kırığı	<b>1</b> Apikal Üçlü	<b>K</b> Konkuzyon	<b>(m)</b> matür	<b>(-)</b> Yok
<b>2</b> Mine + Dentin Kırığı	<b>2</b> Orta Üçlü	<b>S</b> Süblüksasyon	<b>(r)</b> rezorpsiyon	
<b>3</b> Komplike Kron Kırığı	<b>3</b> Servikal Üçlü	<b>E</b> Ekstrüzyon		
<b>4</b> Kron - Kök Kırığı		<b>L</b> Lateral Lüksasyon		
<b>5</b> Komplike Kron Kök Kırığı		<b>I</b> İntrüzyon		
		<b>A</b> Avülsiyon		

**Figure 2:** Dental Trauma Form in Turkish that includes 'Eden Baysal Dental Trauma Index' as a table for easy use

## Presenting results with the index

The dental literature reports the prevalence of dental injuries according to the classifications and the most used classification is the Andreasen's classification. Eden Baysal Dental Trauma Index also records the injuries according to this classification and will easily provide data on prevalence for each trauma type for dental hard tissues and the neighboring soft tissues. In addition to the prevalence of each trauma type, multiple injuries can also be reported with the index.

The relation with the maturity of the apex and the injury type can be calculated. The correlation among the injury type and the accompanying bone fracture can also be reported.

The long term outcomes of the treatments that are recorded with the index can be reported in relation with the treatment type, accompanying injuries and according to the maturity of the apex.

## REFERENCES

1. Eden E, Baysal M, Andersson L. Eden Baysal Dental Trauma Index: Face and content validation. *Dent Traumatol.* 2020 Apr;36(2):117-123.
2. Andreasen JO, Andreasen FM, Andersson L, Editors Textbook and Color Atlas of Traumatic Injuries to the teeth, 5<sup>th</sup> Edition, Oxford, UK; Wiley Blackwell 2018.

## **CONTACT INFORMATION**

**Prof.Dr. Ece EDEN**

**Ege University  
School of Dentistry  
Department of Pedodontics**

**35100 Bornova-İzmir  
Turkey**

**[ece.eden@ege.edu.tr](mailto:ece.eden@ege.edu.tr)**

**[eceeden@yahoo.com](mailto:eceeden@yahoo.com)**