ANNALES
UNIVERSITATIS MARIAE CURIE-SKŁODOWSKA
LUBLIN – POLONIA
VOL. XXIV, N 3, 11 SECTIO DDD 2011

[1]Department of Jaw Orthopedics, Medical University of Lublin, Poland;
[2]Private Practice, Pulawy, Poland,
[3]Department of Oral Surgery Medical University of Lublin, Poland

MARTA KOSECKA[1], EDYTA TOKARSKA[2], MANSUR RAHNAMA[3]

Orthodontic treatment of an impacted dilacerated maxillary central incisor combined with double surgical exposure.

Leczenie ortodontyczno - chirurgiczne zatrzymanego siekacza przyśrodkowego w szczęce z zagięciem koronowo - korzeniowym.

INTRODUCTION

Dilaceration - is the result of abnormal development of germ on its long axis. Irregularity can be placed in crown on the line of cementum and enamel joint, in the long axis of the root or only on the top of the root and it may be the cause of stopped development [2, 13]. This irregularity is connected to dislocation of tooth's clown. Dislocation is mainly found in the direction of vestibule and rarely in the palatal direction. It usually takes place in the early development stage when root's growth is still in perpendicular direction [1].

Dilaceration is present in about 3% of permanent teeth. It appears more often in women than men. It usually regards one side maxillary central incisors on the left. There were also described such abnormalities in the upper deciduous incisors [7], permanent incisors in dental arch [3] and upper canines and premolars [10].

Etiology of dilaceration is not fully explained. The most often cause is deciduous tooth damage [15, 16], which top is located near developing germ of permanent tooth or ectopic development of permanent tooth germ [16]. In result, incisal tip of incisor with the abnormality is placed upwards and palatal surface of the tooth crown is directed towards labial surface [like the hand of the traffic policeman].

Treatment of patients with such an abnormality is always a challenge for the orthodontists because of many difficulties during the treatment.

The article describes the case with horizontally impacted maxillary central incisor which was correctly placed in dental arch thanks to orthodontic treatment and two stages of surgical exposure.

Copyright © 2011 Medical University in Lublin

MATERIALS AND METHODS

The patient aged 9.9 years came to the Department of Maxillofacial Orthopedics of Medical University of Lublin because of the lack of maxillary central incisor. In dental examination there was no damage in upper front deciduous and permanent teeth found.

The patients had first skeletal class. In the inside mouth examination, first class of angle was found in both sides it the area of molar teeth. The decrease of perpendicular and horizontal occlusal plane, the dislocation of upper left incisor to the right, the lack of maxillary central incisor and abnormality in eruption of lateral incisor were also present. The mandible was normal as for the age of 9-10 years. (Fig.1) Orthopantomogram showed: crown-root angulation in the area of maxillary central incisor, its horizontal location and incorrect location of maxillary canine and lateral incisor in the same area. Left head cephalogram and transectal photograph showed crown-root angulation where incisal tip was in upright position and palatal surface of the crown was located towards the labial surface. (Fig.2, 3)

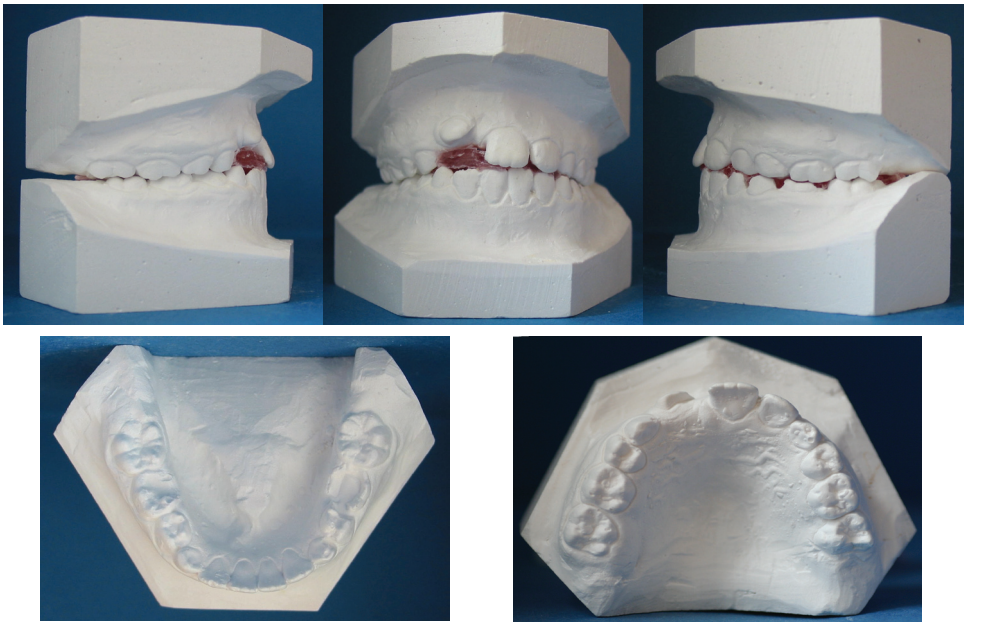

Fig. 1

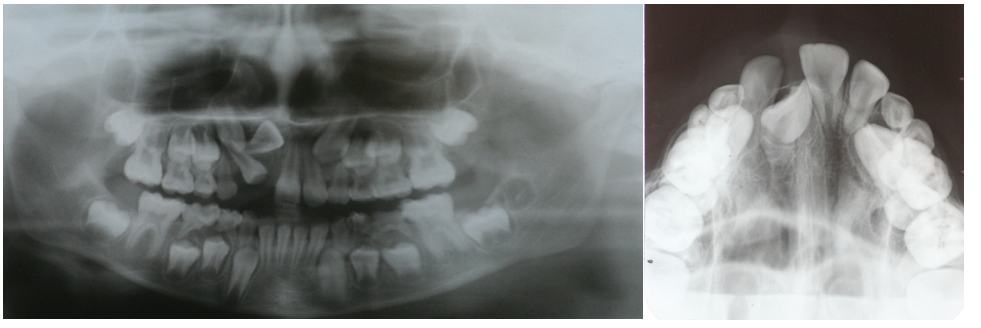

Fig. 2

Fig. 3

There were different possibilities concerned:

- tooth extraction and implantation of missing tooth or other prosthetic filling
- tooth extraction and closing the gap by orthodontic treatment
- surgical tooth surface exposure and orthodontic tooth placement in occlusal plane

Methods of treatment and complications connected to the treatment were thoroughly explained to the parents. They decided to start the treatment to introduce stopped tooth into the dental arch. The plan of orthodontic treatment was to recreate the place with surgical procedure and placing maxillary central incisor with crown-root angulation in the right position.

RESULTS

Bands were placed on the maxillary first permanent molars, and straight wire appliances were placed on three maxillary permanent incisors, and two right deciduous molars.

The initial leveling was performed with a 0.014inch Ni-Ti wire, followed by a 0.016-inch Ni-Ti wire, 0.016-inch stainless steel wire with an open and closed coil spring in the position of the right canine and right incisor. By activating the open coil spring, adequate space for aligning the impacted canine and incisor was obtained. The patient was transferred to the oral surgeon for exposure of the impacted teeth.

Two stages of surgical exposure of crown were recommended for central incisor because of the severe displacement. The first stage was to expose only lingual surface of crown and to bond the attachment. The procedure of bonding the attachment was carried out without problems, and the flap was repositioned and sutured, leaving the elastic thread protruding through the mucosa. Two weeks later, orthodontic traction of the impacted incisor was initiated. A force of 60 to 90 g was applied. After

10 months of traction the canine was in the mouth and the incisor was close to the occlusal plane. (Fig.4) The patient was referred again to oral surgeon to place the attachment on the buccal surface of the crown. (Fig. 5) The total duration of orthodontic treatment, including final alignment, was 36 months. The bands and brackets were removed, and a bonding wire was attached to the upper incisors.

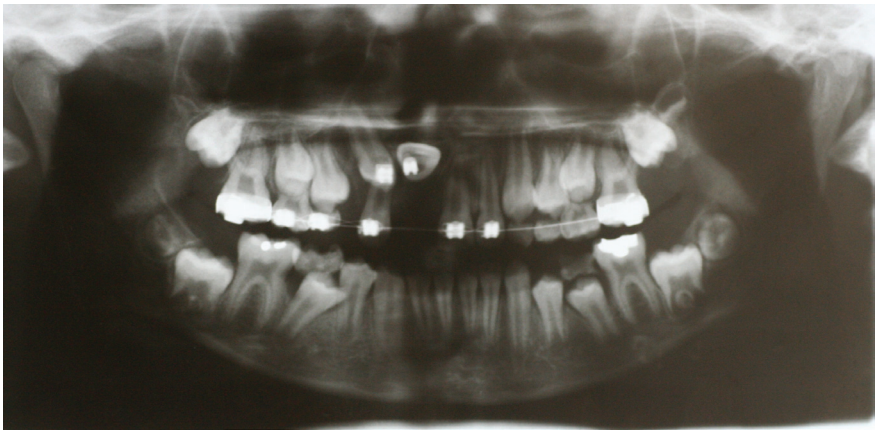

Fig. 4

Fig. 5

The impacted dilacerated maxillary right central incisors were successfully positioned in the dental arch. It was possible by using two stages of crown exposure and continuous orthodontic traction. The post treatment radiograph showed a dilacerated tooth displaced in a good position in the alveolar bone, and a little root resorption of dilacerated teeth. (Fig.6,7)

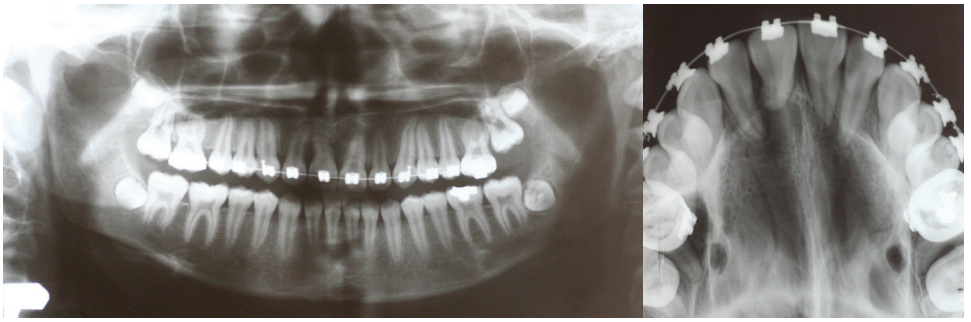

Fig. 6,7

Fig. 7

DISCUSSION

Most authorities agree that there are two possible causes of dilacerations. Ravan [1968] established a casual relationship between traumatic injury to the deciduous dentitio and dilaceratio of the permanent successor. The mechanism by which a blow to a deciduous incisor can be transmitted to the developing permanent tooth germ has been described by [6, 13]. Stewart describes a group of patients in which there was no history of a related traumatic episode and histological examination did not show any signs of a cut mechanical injury [13]. He concluded that dilacerated incisors which palatal surface of the crown was facing forward "like the hand of a traffic policeman" and the incisal tip turned upwards resulted from an ectopic development of the tooth germ.

Many factors, such as the severity of the dilaceration, incisor position or degree of dysmorphology may influence the ability of treatment options when managing unerupted dilacerated incisors. Surgical extraction of the dilacerated incisor is a common practice [4]. However, reports of successfully treated dilacerated impacted maxillary anterior teeth have been published [6-9, 11, 14].

If we want to align the impacted tooth with success we have to determine some factors, like: (1) the position and direction of the impacted tooth (2) the degree of root completion (3) the degree of dilacerations, and (4) the place for impacted tooth. The movement axis of the impacted tooth must be within 90 degrees. However, in our patient the degree of dilaceration was bigger than 90 so the tooth was brought into the arch. It required two stages of crown exposure because the placement of attachment on the lingual surface firstly can prevent greater amounts of bone. Therefore, the attachment needs to be switched from the lingual surface to the labial surface in the second stage of crown exposure. Dilacerated tooth with incomplete root formation should have a better prognosis for orthodontic traction [6], then the longer the tooth is retained the poorer the prognosis for eruption, axial root growth and orthodontic traction.

CONCLUSION

A multidisciplinary team approach is necessary in the management of patients who have unerupted dilacerated incisor and two stages of crown exposure are suggested to prevent a bone destruction during surgical procedure.

REFERENCES

1. Andreasen J.O.: Text book and color atlas of traumatic injures to the teeth. 3rd ed.
2. Copenhagen, Denmark, Munksgaard, 1994. p. 457-94.
3. British Standards Institution. Glossary of terms relating to dentistry. London, United Kingdom, British Standards Institution, 1983.
4. Chadwick S.M., Miller D.: Dilaceratio of a permanent mandibular incisor: a case report. Br J Orthod, 1995, 22, 279-81.
5. Davies P.H.J., Lewis D.H.: Dilaceration-a surgical / orthodontic solution. Br Dental J 1984; 156: 16-8.
6. Graber T.M, Swain .BF.: Orthodontics: current principles and techniques. St; C.V. Louis, C.V. Mosby,1985. p.231-4.
7. Howard R.D.: The congenitally displaced maxillary incisor, a differential diagnosis. Dental practition, 20, 361-371.
8. Kilpatric N.M., Hardman P.J., Welbury R.R.: Dilaceratio of a primary tooth. IntPaediatr Dent, 1991; 1 : 151-3.
9. Lin Y.T.J.: Treatment of an impacted dilacerated maxillary central incisor. Am. J. Orhod. Dentofacial. Orthop. 1999, 115: 406-9.
10. McNamara T., Woolfe S.N., McNamara C.M.: Orthodontic management of a dilacerated maxillary central incisor with an unusual sequel., J. Clin.Orthod., 1998, 32:293-7.
11. Odegard J.: The treatment of a Class I malocclusion with two horizontally impacted maxillary canines., Am J OrthodDentofacialOrthop 1997, 111;357-65.
12. Pavlidis D., Deratsianos N., Jager A.: Treatment of an impacted dilacerated maxillary central incisor., Am J OrthodDentofacialOrthop 2011, 139:378-87.
13. Ravn J.J.: Sequalae of acute mechanical trauma in the primary dentition. A clinical study., J. Dent, 35, 281-289.

14. Shafer W.G., Hine M.K., Levy B.M.: A textbook of oral pathology. 4th ed., Philadelphia: WB Saunders, 1983, p.40.
15. Singh G.P., Sharma V.P.: Eruption of an impacted maxillary cantral incisor with an unusual dilaceration., J ClinOrthod, 2006, 40:353-6.
16. Smith D.M.H., Winter G.B.: Root dilaceration of maxillary incisor., Br Dent J 1981, 150:125-7.
17. Steward D.J.: Dilacerated unerupted maxillary central incisors., Br Dental J, 1978, 145: 229-333.

SUMMARY

The purpose of this case report is to present a correction of a horizontally impacted and dilacerated central incisor through two-stage crown exposure surgery combined with continuos - force orthodontic traction. The tooth was successfully moved into its proper position. The treatment is discussed and the orthodontic implications are considered, with a review of the literature on this topic.

Keywords: impacted teeth, dilacerated root

STRESZCZENIE

Opis przypadku dotyczy leczenia ortodontycznego nieprawidłowo położonego zatrzymanego siekacza przyśrodkowego z zagięciem koronowo - korzeniowym. Ząb został wprowadzony do łuku zębowego przy użyciu aparatu stałego i dwuetapowego zabiegu chirurgicznego odsłonięcia korony zęba z zagięciem koronowo korzeniowym. Artykuł zawiera opis leczenia ortodontycznego i przegląd literatury na ten temat.

Słowa kluczowe: zatrzymane zęby, zagięcie koronowo-korzeniowe.