تروماهای دندانی

دکتر بهرام صمدی راد

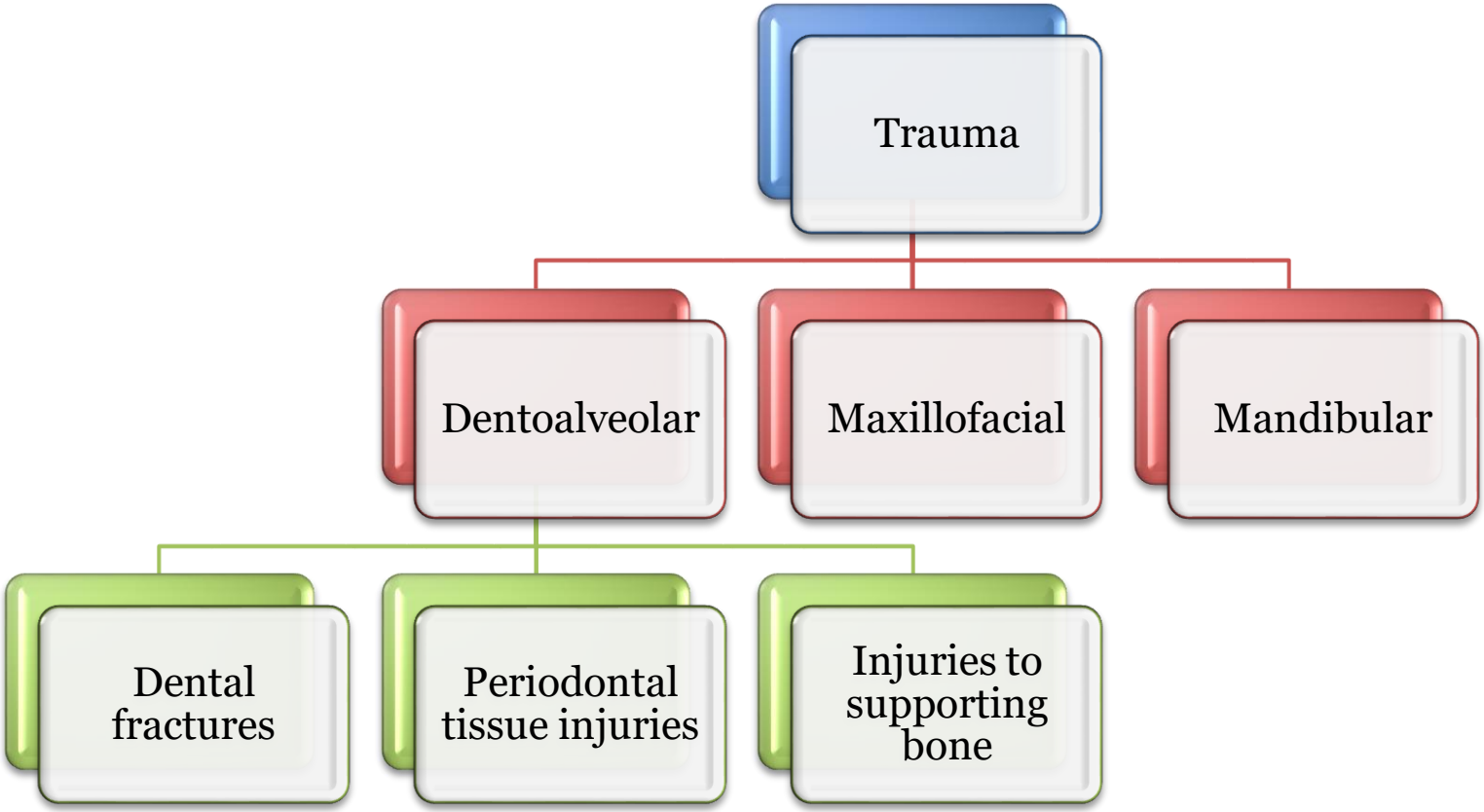
متخصص پزشکی قانونی

دانشیار سازمان پزشکی قانونی کشور

Orofacial trauma and traumatic dental injuries (TDI) are serious public health problems due to their :

I. high prevalence
II. Severe morbidity
III. High costs of treatment
IV. Long-term sequelae

Classification :



Traumatic dental injuries (TDIs) occur frequently in children and young adults, comprising 5% of all injuries.

Twenty-five percent of all school children experience dental trauma and 33% of adults have experienced trauma to the permanent dentition, with the majority of the injuries occurring before age 19.

The main causes for dental trauma in children are falls and injuries sustained during play

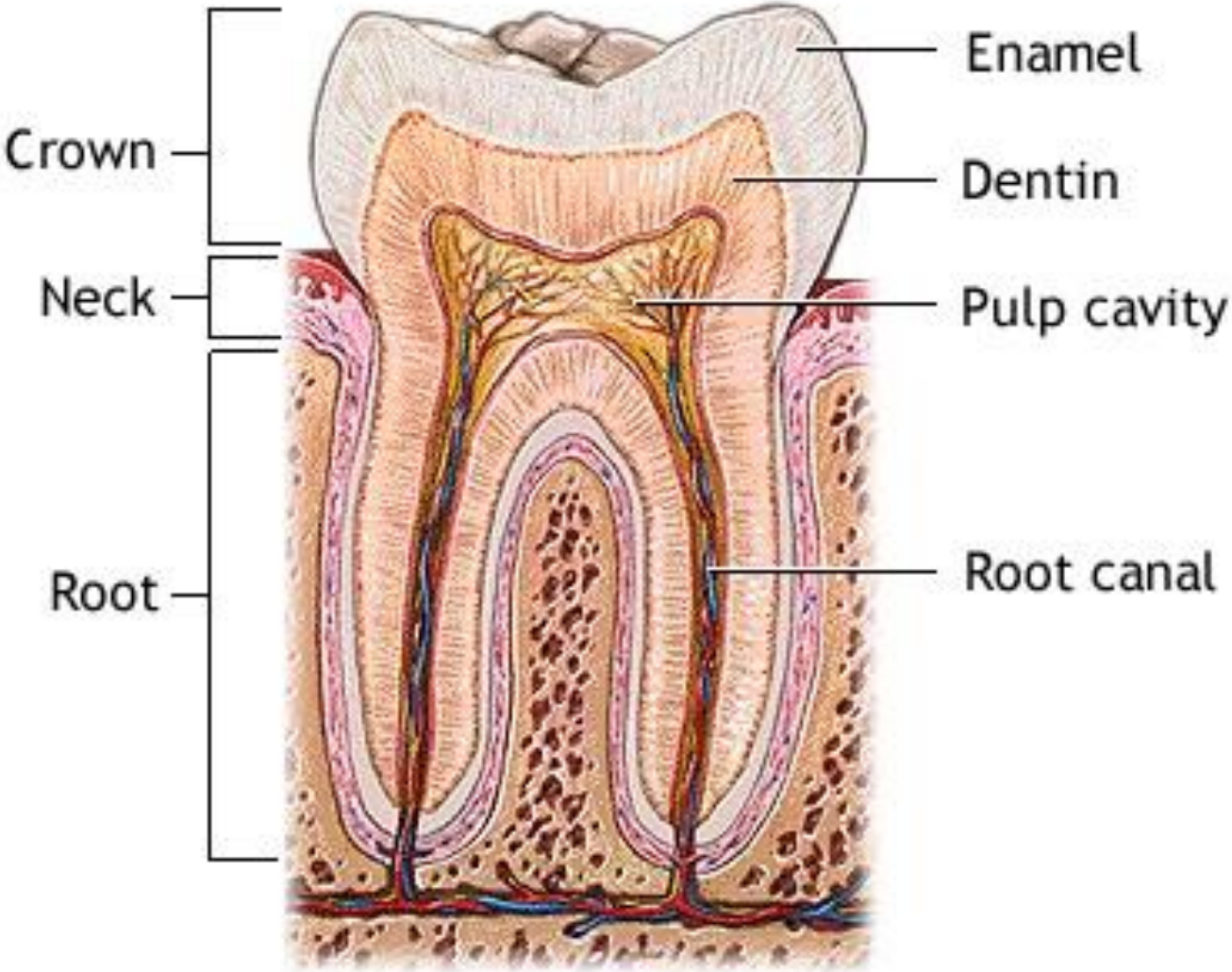
In adolescents and adults, more complex traumas may occur caused by sport, accidents, fights, and road traffic accidents

اتیولوژی :

I. صمات ناشی از اقدامات پزشکی
II. زمین خوردن
III. کودک آزاری جسمانی
IV. صدمات ناشی از دوچرخه سواری
V. ورزشها
VI. اسب سواری
VII. صمات ناشی از تصادفات اتومبیل
VIII. منازعات
IX. شکنجه
X. صرع
XI. صدما ت مربوط به استفاده از مواد مخدر
XII. Dentinogenesis Imperfecta

As the etiology of TDI is different, the impact of trauma will manifest itself differently in children and adults.

Equally important is the difference in the tooth and bone structure between a child and an adult, which plays a vital role in the mechanism and nature of the energy transmission following an impact to a tooth


Crown
Neck
Root
Enamel
Dentin
Pulp cavity
Root canal

Studies from Europe have shown higher frequencies of crown–root fractures, root fractures, and lateral luxation among adults as compared to adolescents and children

- ✓ Luxation injuries are the most common TDIs in the primary dentition
- ✓ whereas Crown fractures are more commonly reported for the permanent teeth.

Proper diagnosis, treatment planning and follow-up are important to assure a favorable outcome.

مکانیسم صدمات دندانی :

- ترومای مستقیم
- ترومای غیر مستقیم

عوامل تعیین کننده تاثیر ضربه و و وسعت صدمات حاصله :

I. انرژی ضربه

II. نرمی و حالت ارتجاعی جسم ضربه زننده

III. شکل جسم ضربه زننده

IV. جهت وارد آمدن ضربه به دندان

صدمات وارد بر انساج سخت دندانی و پالپ بر اساس طبقه بندی WHO :

I. شکستگی ناکامل یا ترک مینا بدون از دست رفتن نسج دندان

Enamel infraction

II. شکستگی همراه با از دست دادن نسج دندانی محدود به مینا

(Uncomplicated crown fracture) Enamel fracture

III. شکستگی همراه با از دست رفتن نسج دندان محدود به مینا و عاج بدون درگیری پالپ

(Uncomplicated crown fracture) Enamel dentine fracture

IV. شکستگی شامل مینا و عاج همراه با اکسپوز پالپ

Complicated crown fracture

V. شکستگی شامل مینا و عاج ، سمنتوم بدون اکسپوژر پالپ

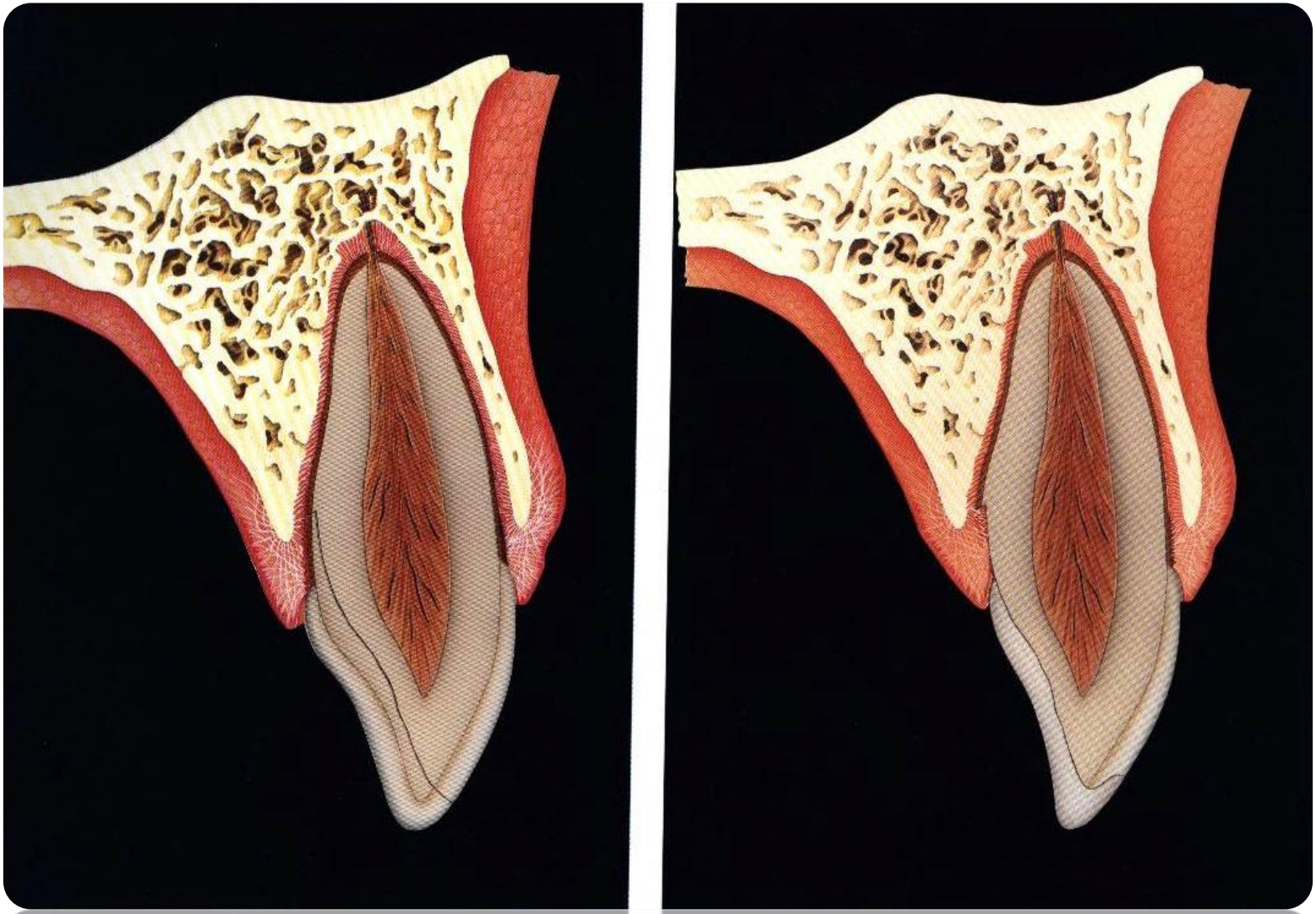
Uncomplicated crown-root fracture

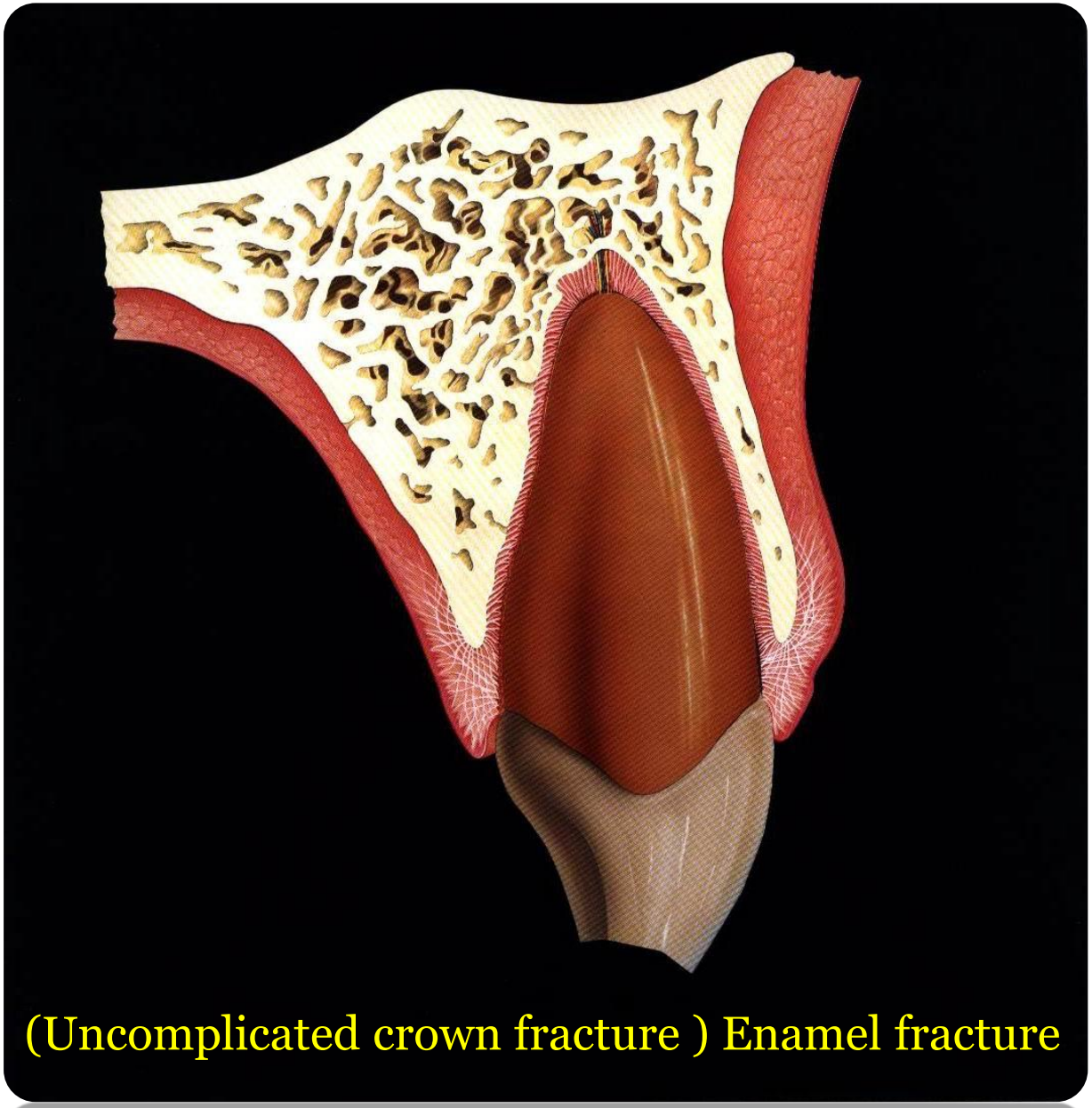
VI. شکستگی شامل مینا و عاج ، سمنتوم همراه با اکسپوژر پالپ

Complicated crown-root fracture

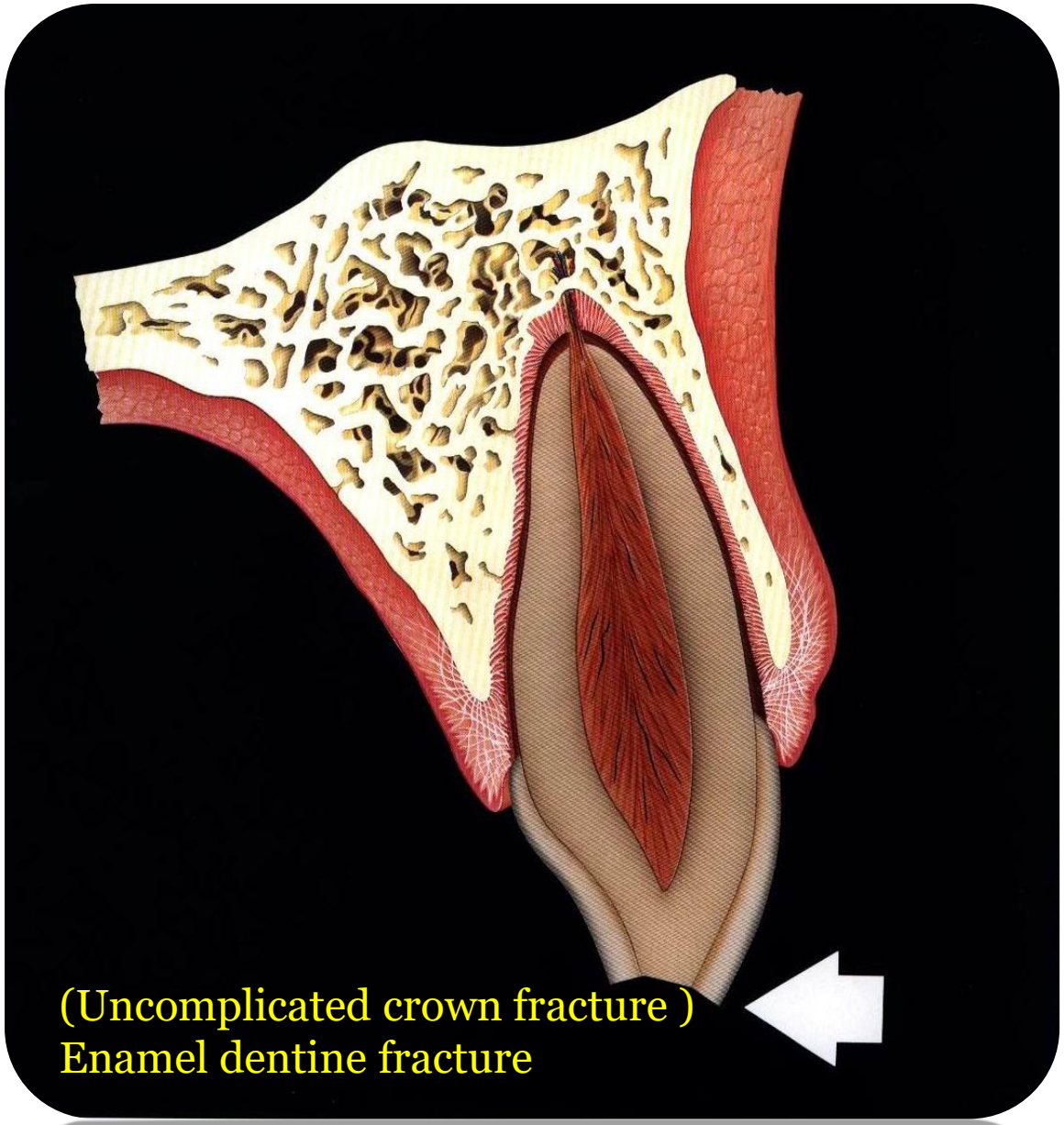
VII. شکستگی شامل مینا و عاج ، سمنتوم

Root fracture





(Uncomplicated crown fracture) Enamel fracture


(Uncomplicated crown fracture)
Enamel dentine fracture

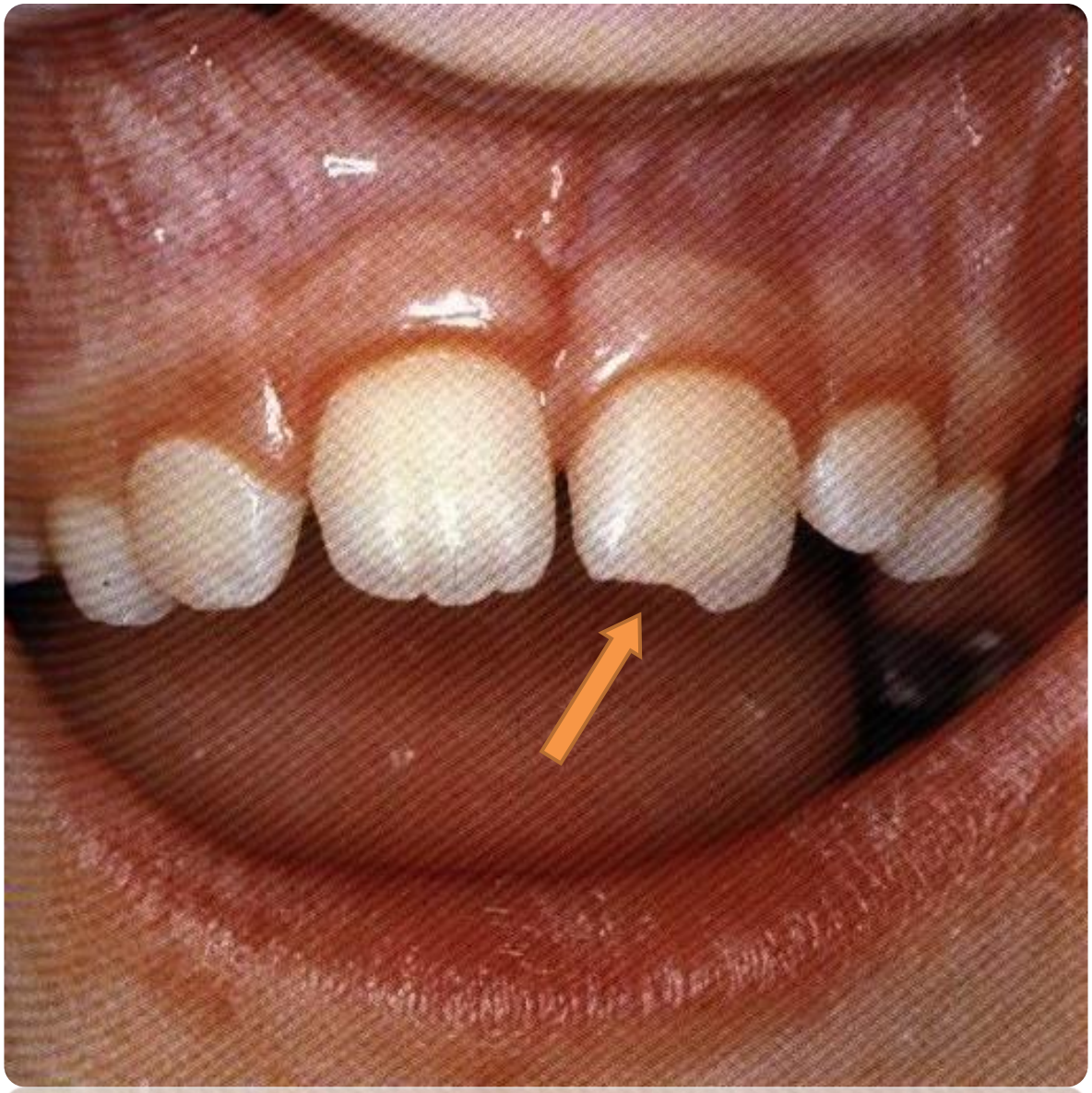


Fig. 2.3. **Treatment of an uncomplicated crown fracture with composite resin and the acid-etch technique**

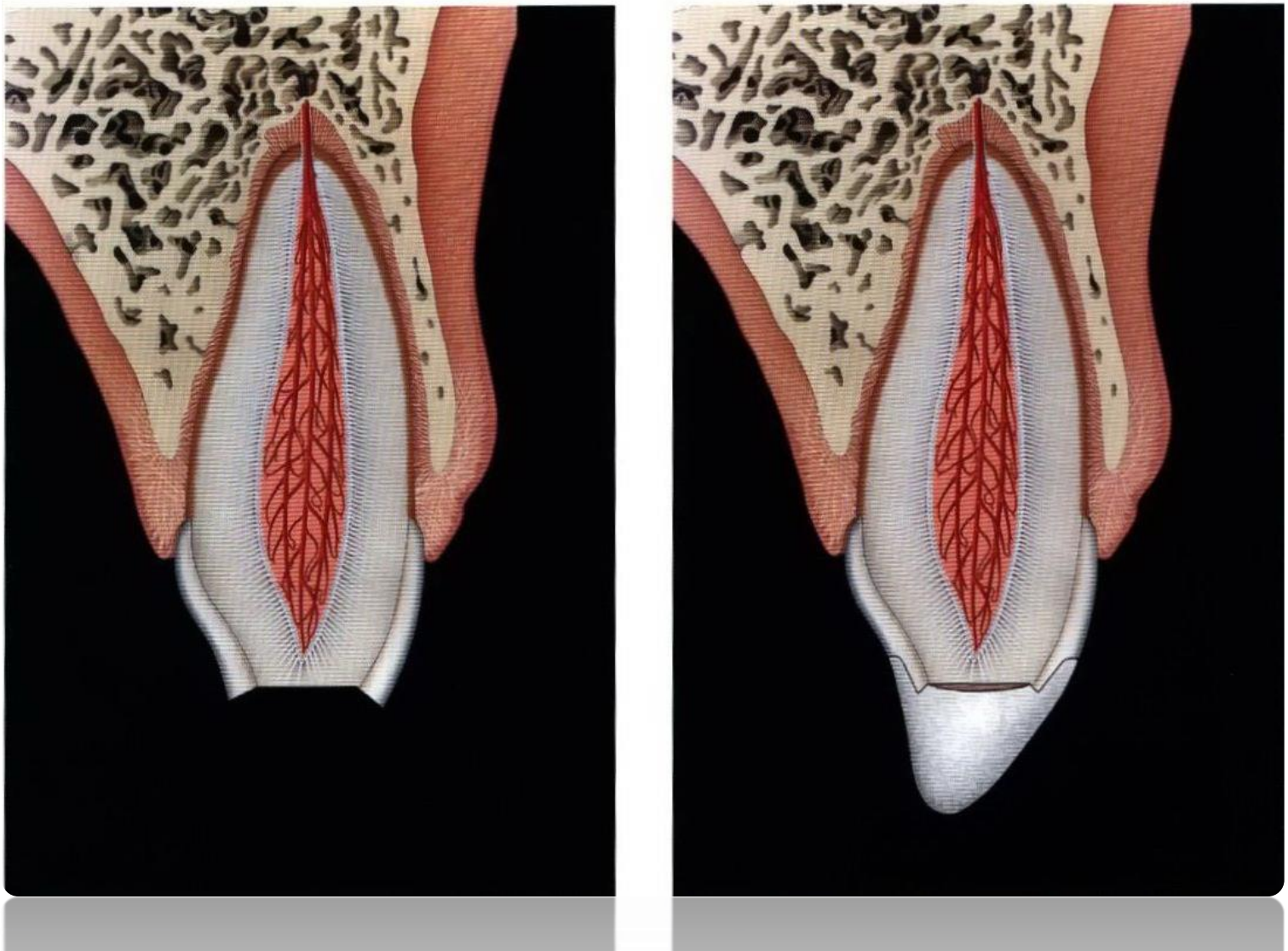
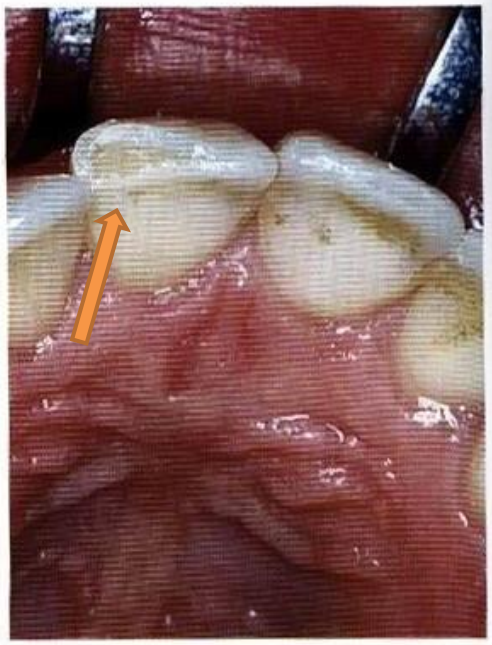
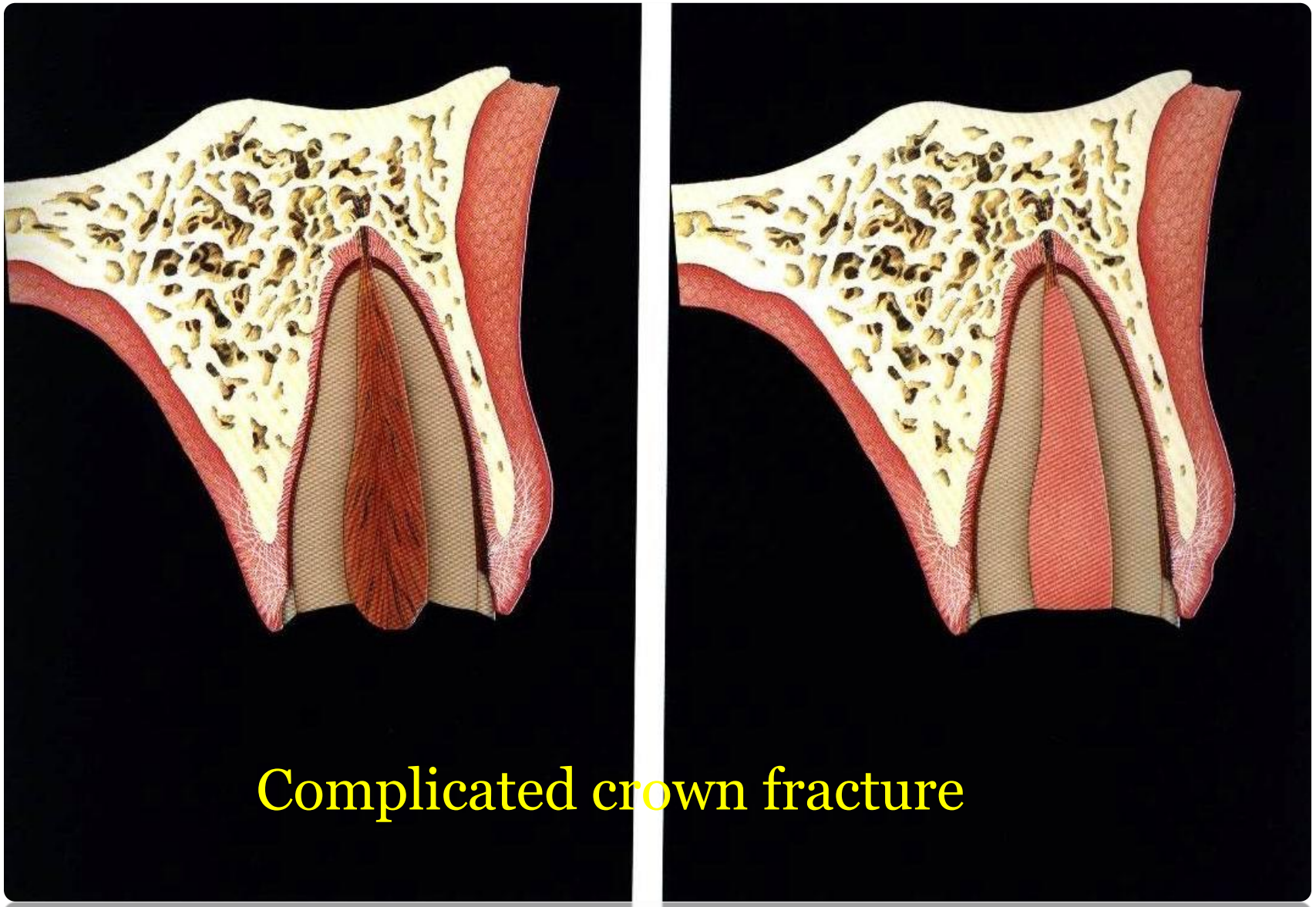


Fig. 2.4. **Treatment of uncomplicated crown fracture with composite resin and acid-etch technique**
Uncomplicated crown fracture in a 19-year-old girl.

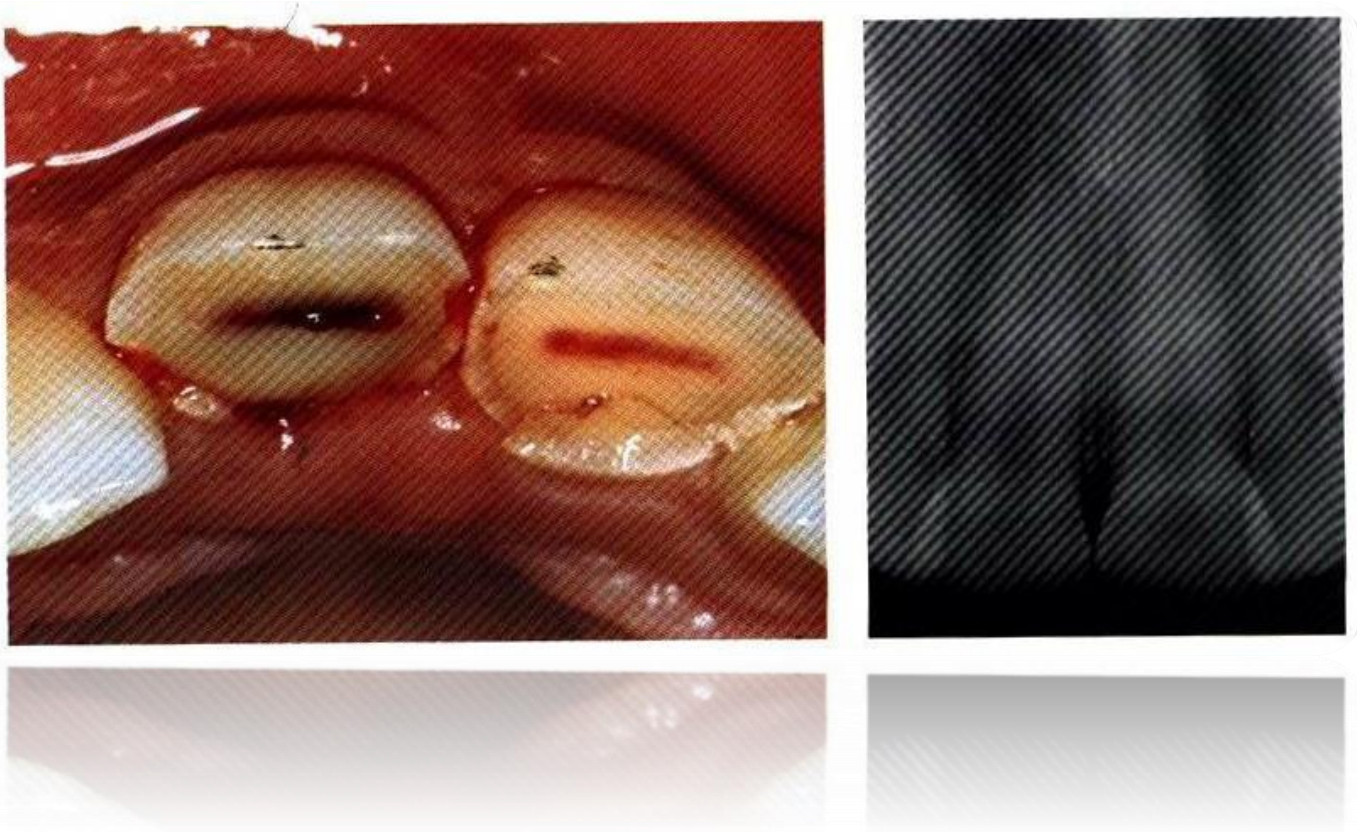




Complicated crown fracture

Fig. 2.8. Evaluation of pulpal integrity following crown fracture

The right central incisor was slightly loosened but not displaced at the time of injury (subluxation). The left central incisor was tender to percussion (concussion). The cyanotic, exposed pulp of the subluxated incisor reflects a compromised circulation following trauma. The exposed pulp of the left central incisor reflects intact circulation.



Clinical condition
A large pulp exposure is found.

Fig. 2.14. **Pulpal healing after uncomplicated crown fractures in teeth with open apices according to type of luxation injury** (after Andreasen & Andreasen 1989).

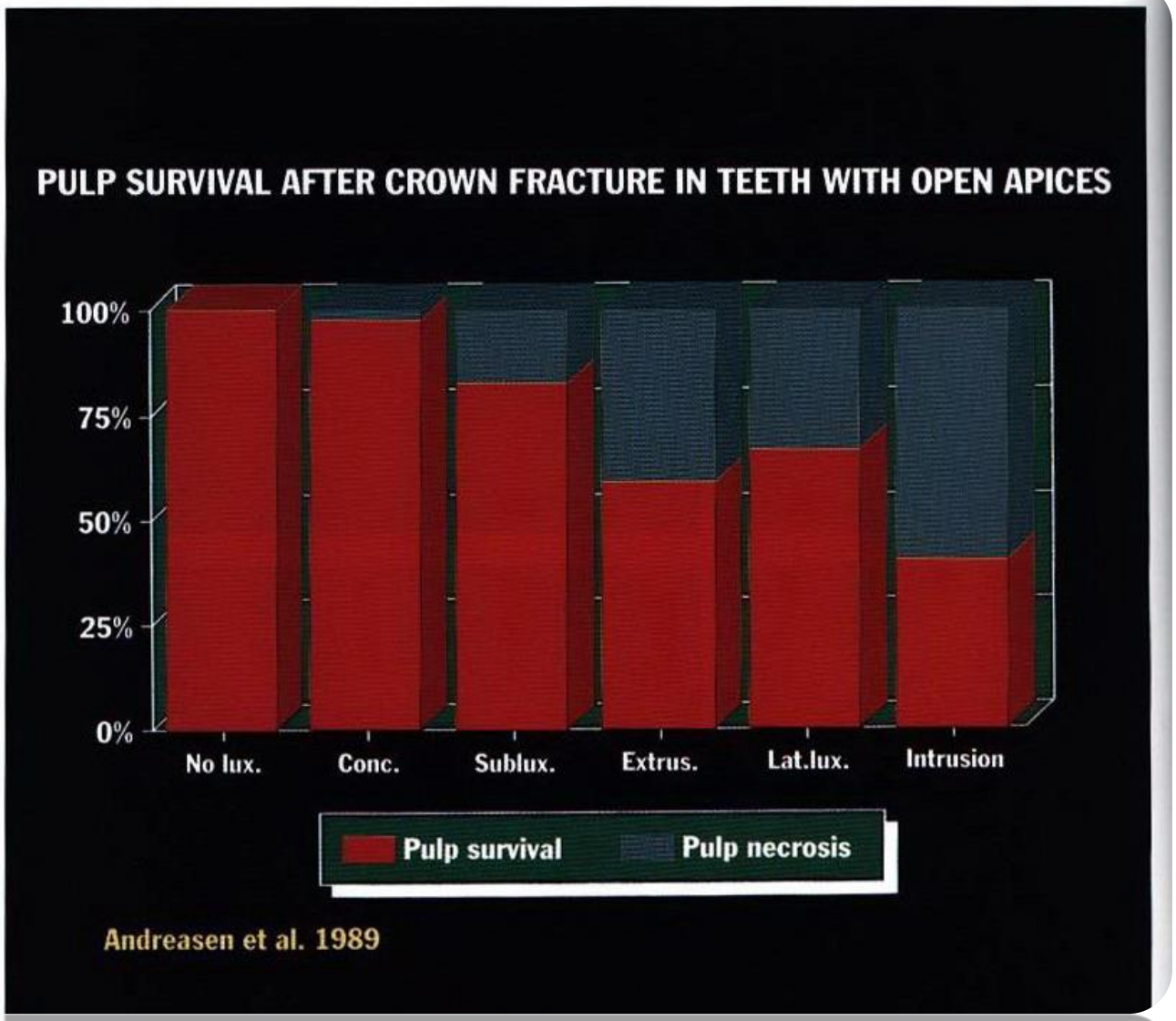


Fig. 2.15. **Pulpal healing after uncomplicated crown fractures in teeth with closed apices according to type of luxation injury** (after Andreasen & Andreasen 1989).

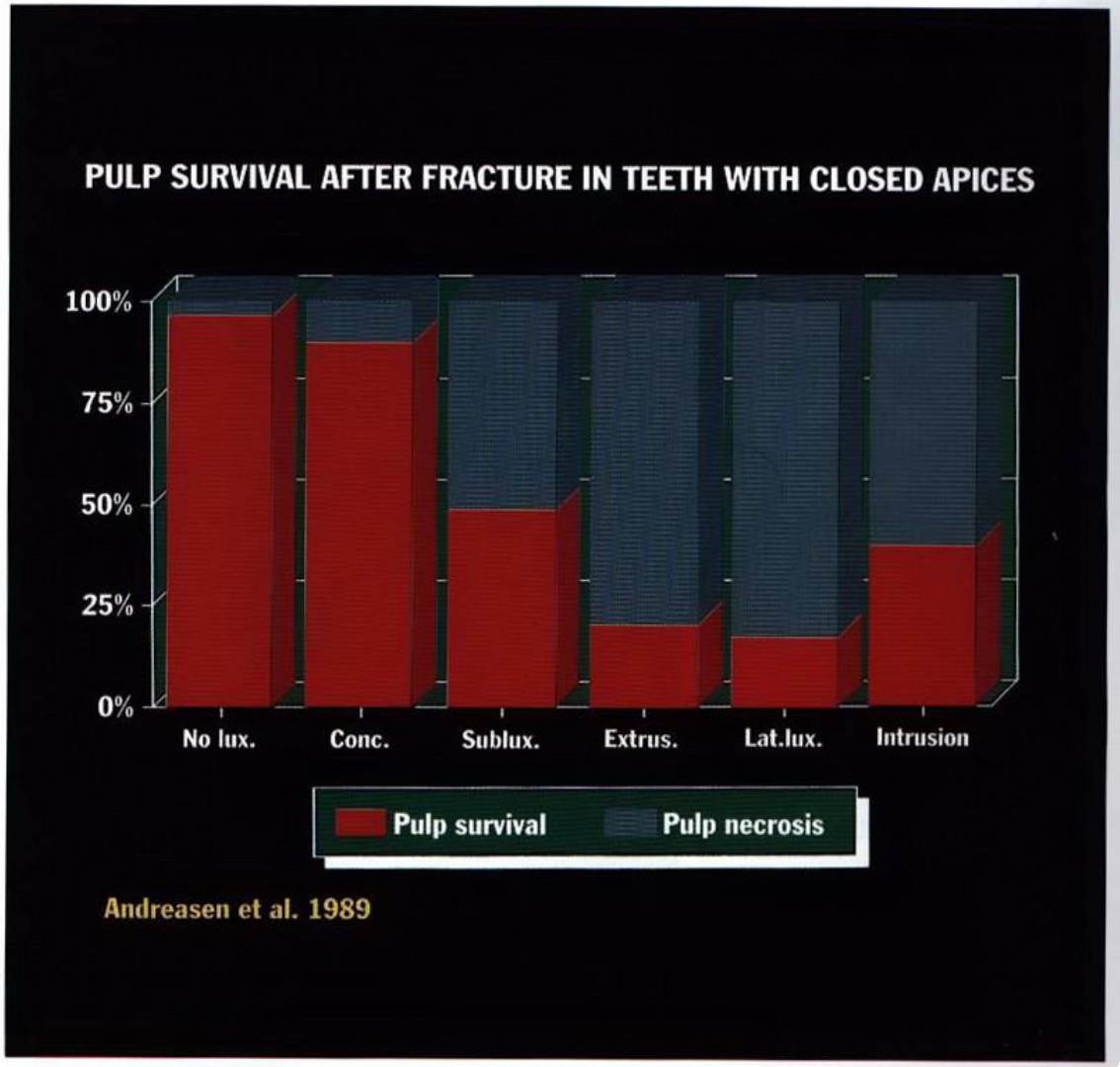


Fig. 3.2. **Clinical and radiographic diagnosis of a crown-root fracture**
The coronal fragment is mobile. The radiographs are not able to reveal the apical limit of the fracture.

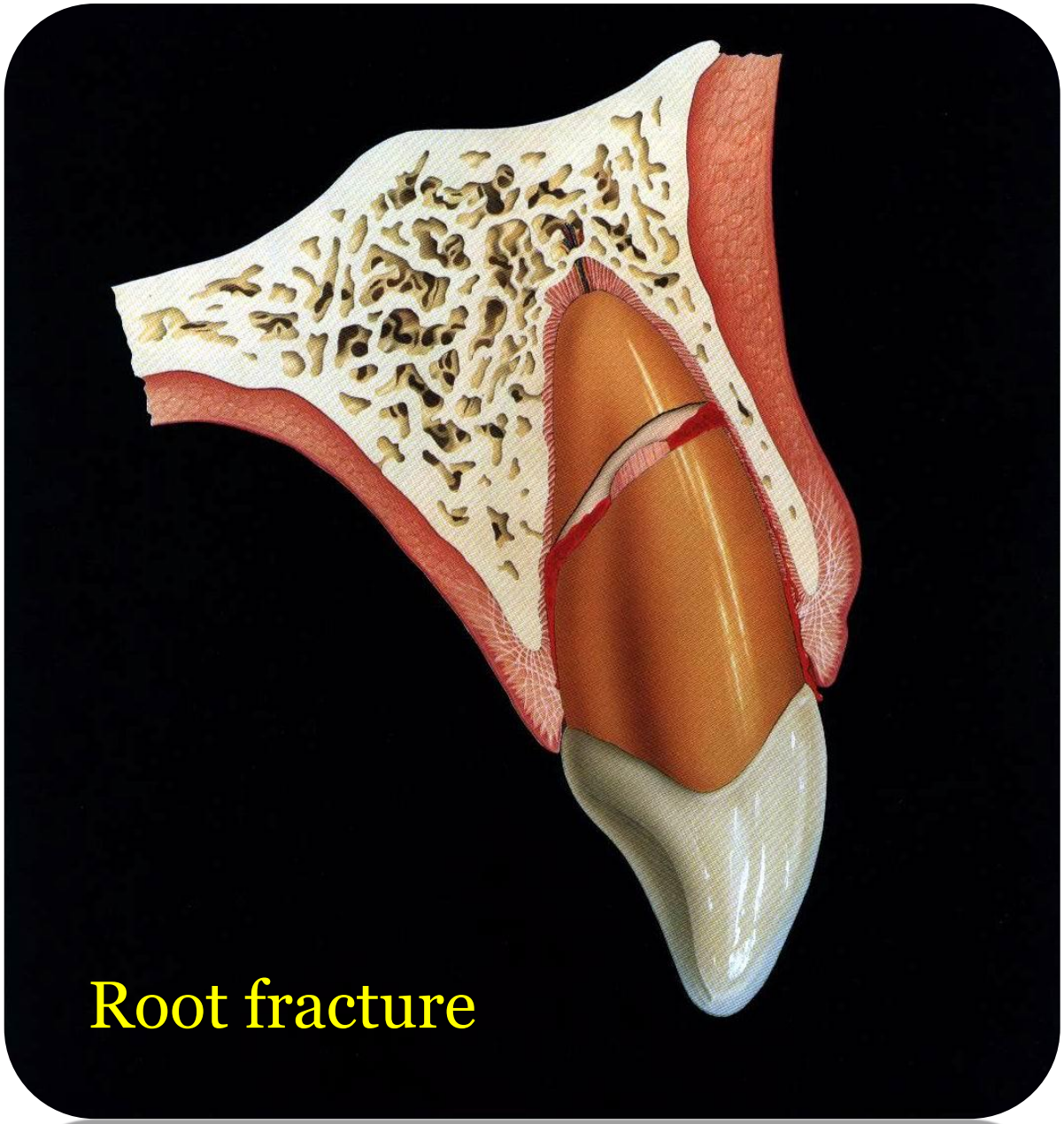
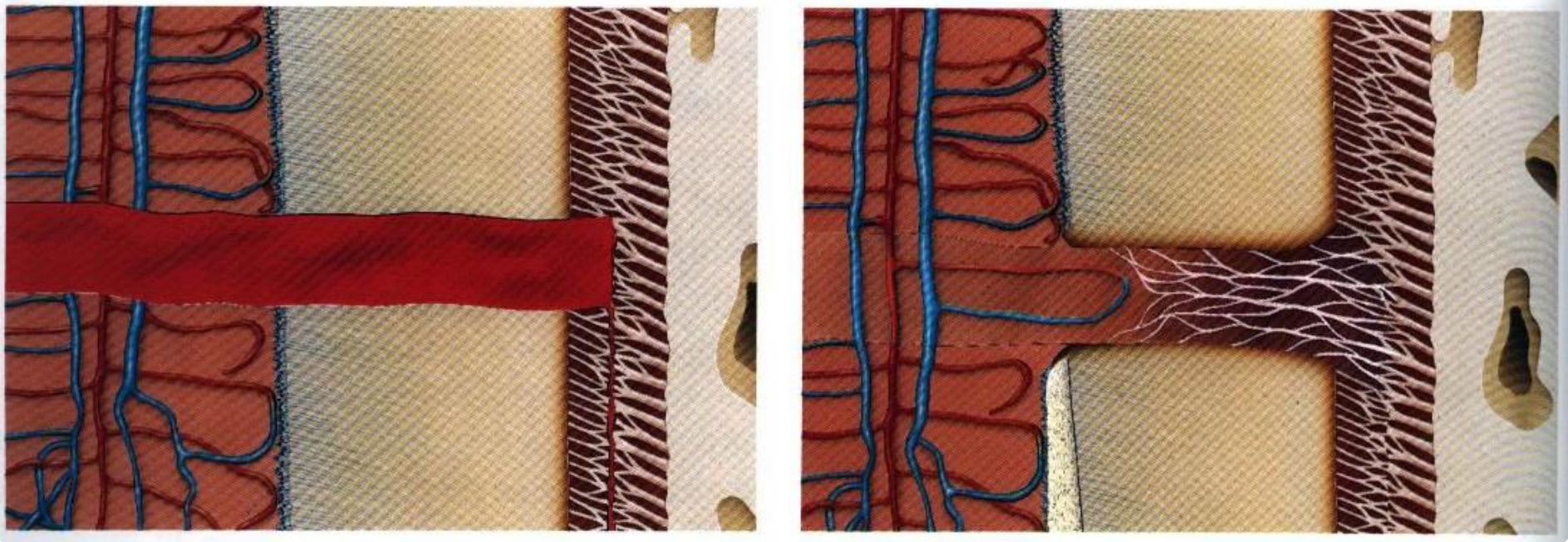

Root fracture

Fig. 4.3. **Connective tissue healing after root fracture**
The pulp is ruptured or severely stretched at the level of the fracture. Healing is dominated by ingrowth of cells originating from the periodontal ligament and results in interposition of connective tissue between the two fragments.



صدمات وارده بر انساج پریودونشیوم :

I. Concussion

صدمه انساج نگهدارنده دندان بدون لقی غیرعادی و یا جابجایی دندان ولی حساسیت واضح به دق

II. (Loosing) Subluxation

صدمه انساج نگهدارنده دندان با لقی غیرعادی ولی بدون جابجایی دندان ولی حساسیت واضح به دق

(تغییر مکان دندان)

III. Extrusive Luxation (Peripheral dislocation, Partial avulsion)

جابجایی دندان به طرف خارج از حفره

IV. Lateral Luxation

جابجایی دندان در جهت غیر از محور طولی همراه با خرد شدن یا شکستگی حفره آلوئول

V. Intrusive Luxation (Central dislocation)

جابجایی دندان به داخل استخوان آلوئول همراه با خردشدن یا شکستگی حفره آلوئول

VI. Avulsion (Exarticulation)

بیرون افتادن کامل دندان از حفره

Fig. 4.6. **Treatment of a laterally luxated root fracture** This 13-year-old boy received a horizontal blow to the left maxillary central incisor.

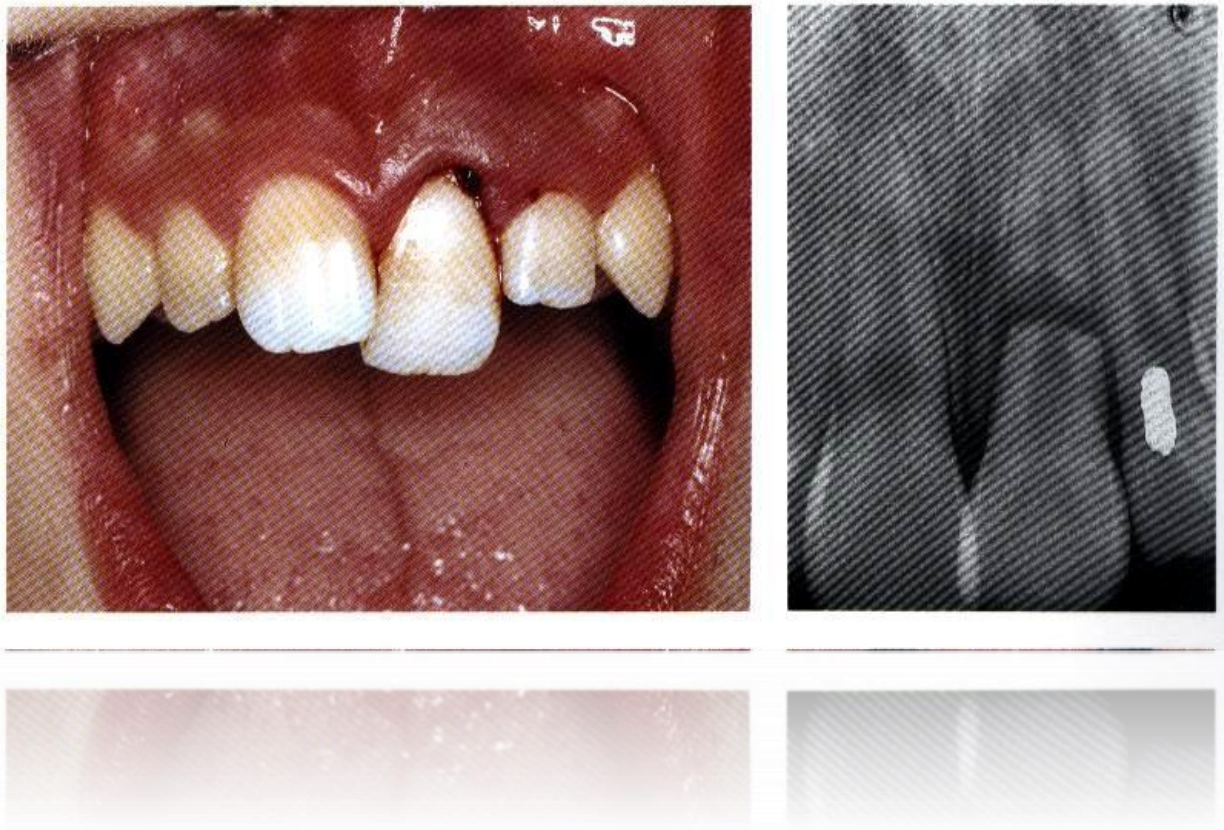
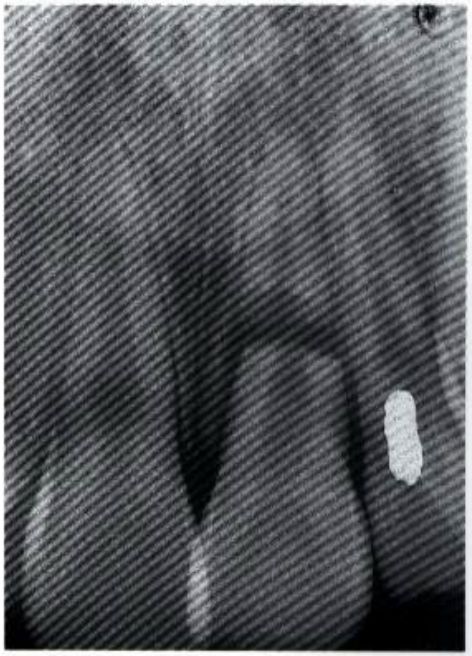


Fig. 4.6. **Treatment of a laterally luxated root fracture** This 13-year-old boy received a horizontal blow to the left maxillary central incisor.



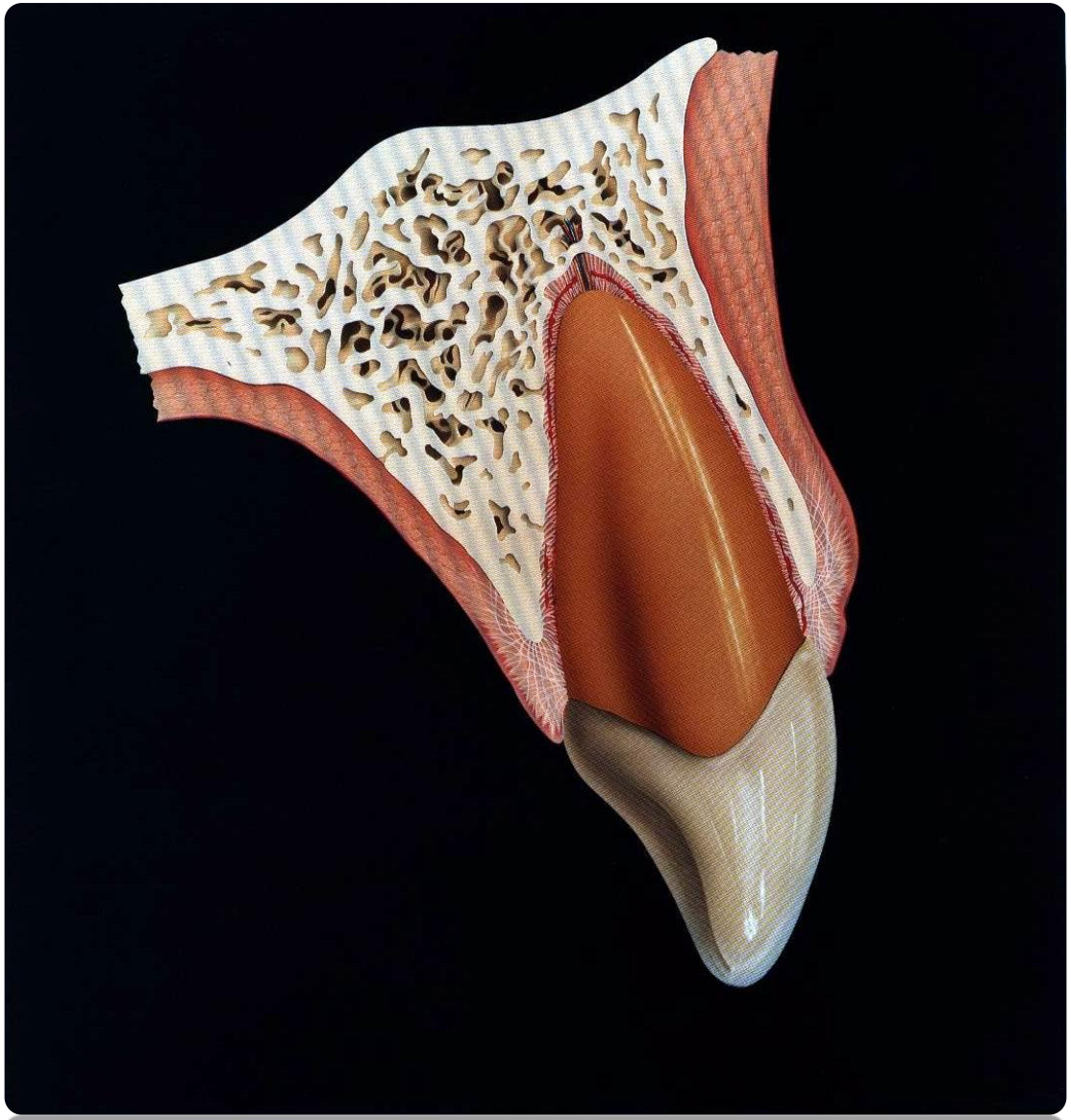
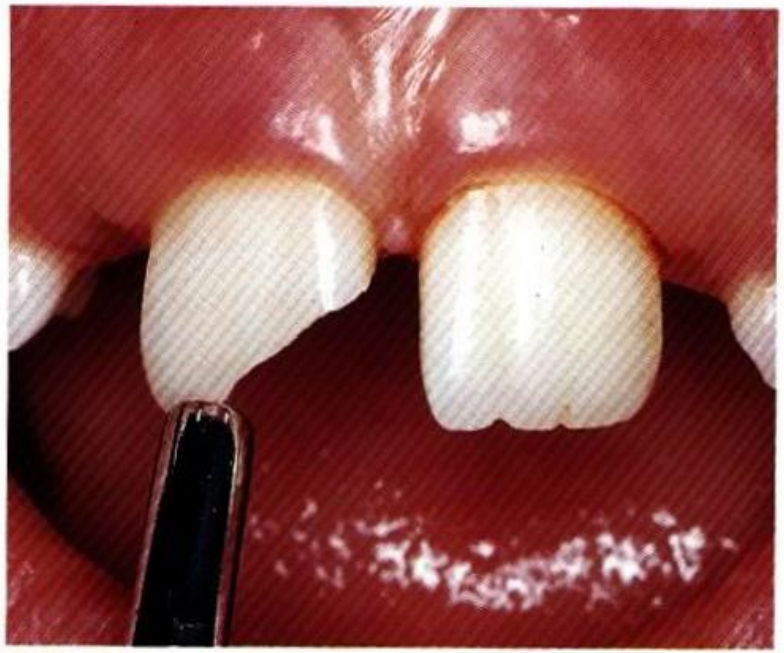
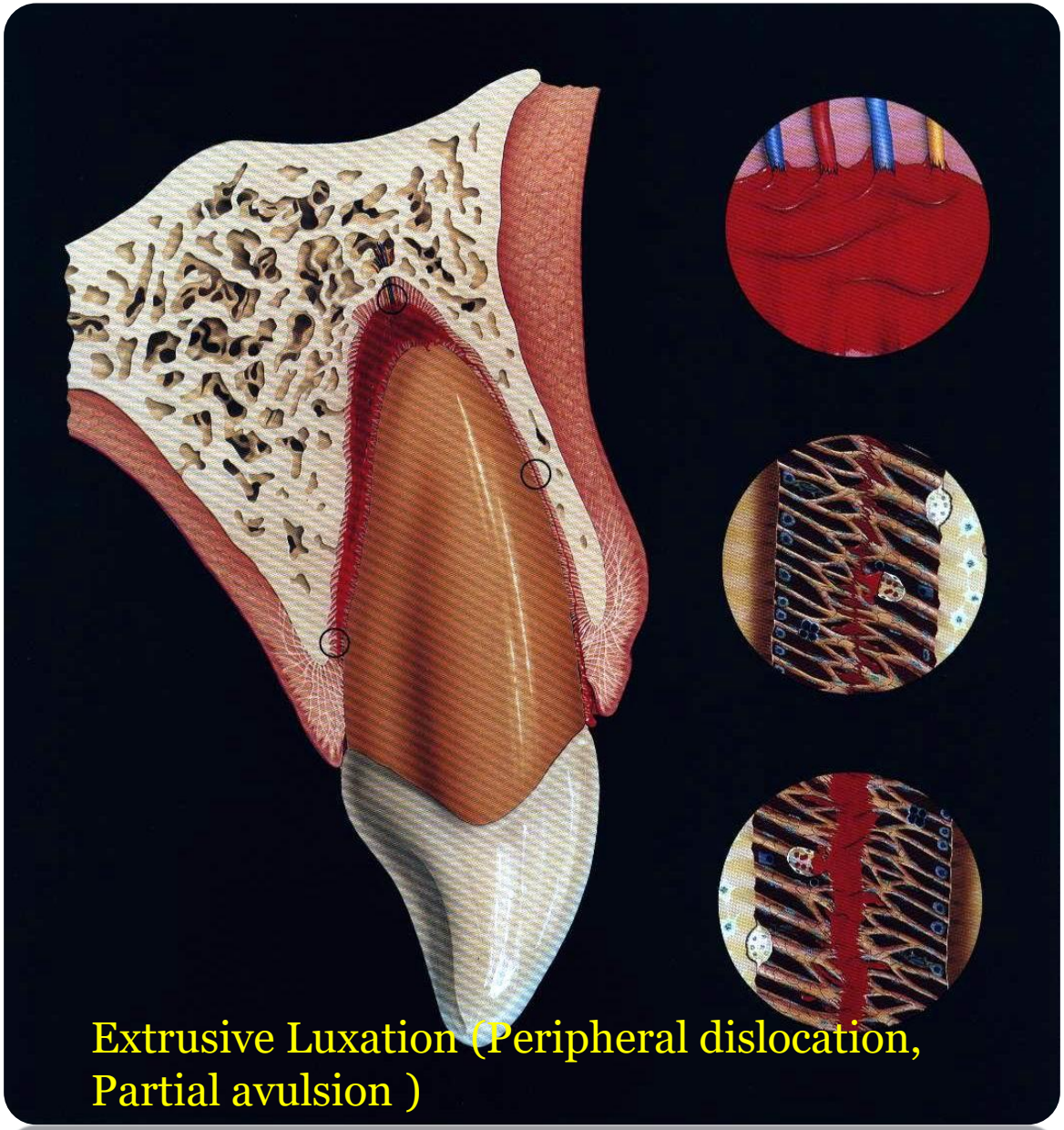
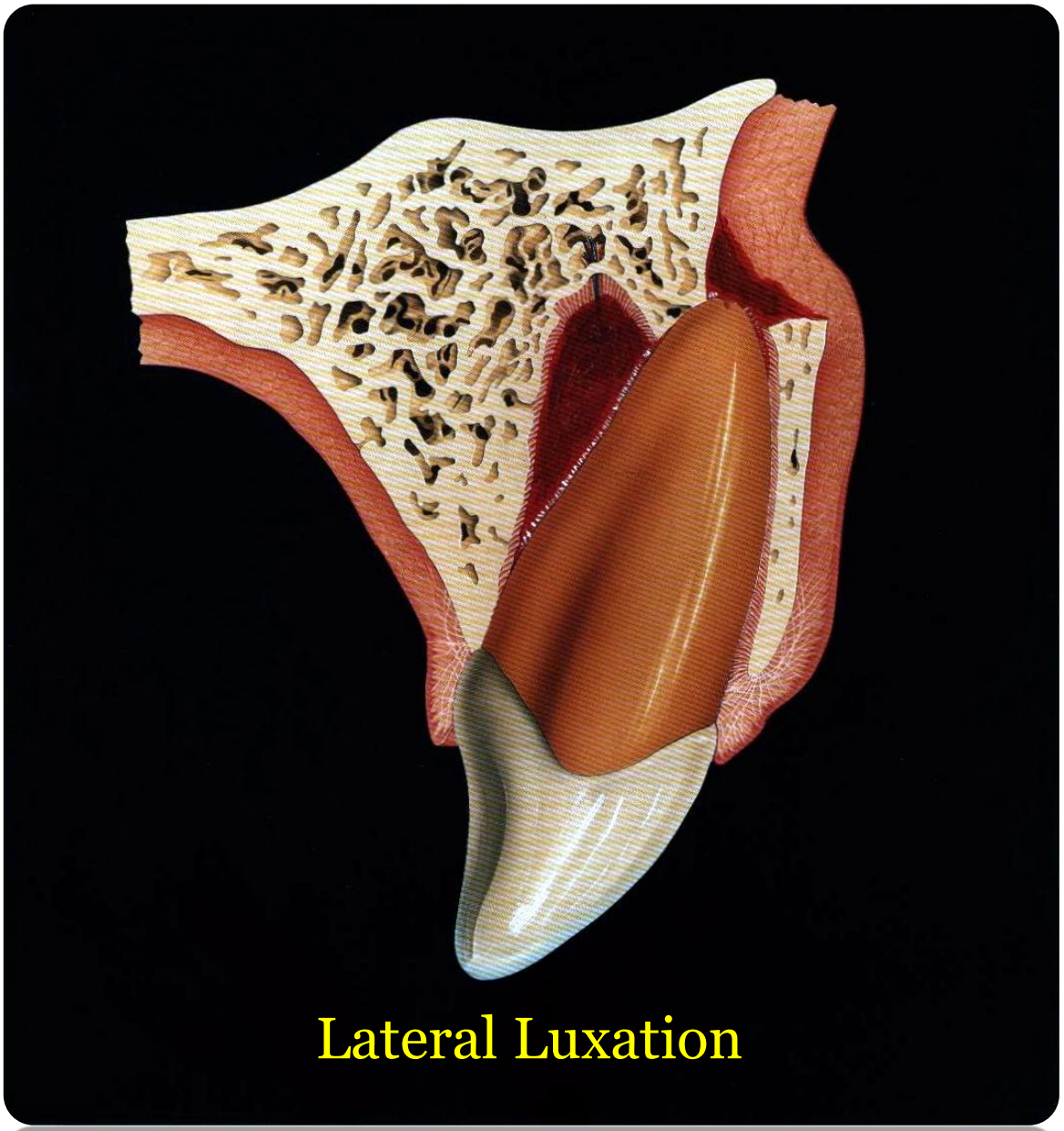


Fig. 5.3. **Clinical and radiographic features of concussion and subluxation**
The right and left maxillary central incisors have received a blow and are tender to percussion. The right central incisor is firm in its socket (concussion). While the left central incisor is loose with bleeding from the gingival sulcus (subluxation).





Extrusive Luxation (Peripheral dislocation, Partial avulsion)



Lateral Luxation

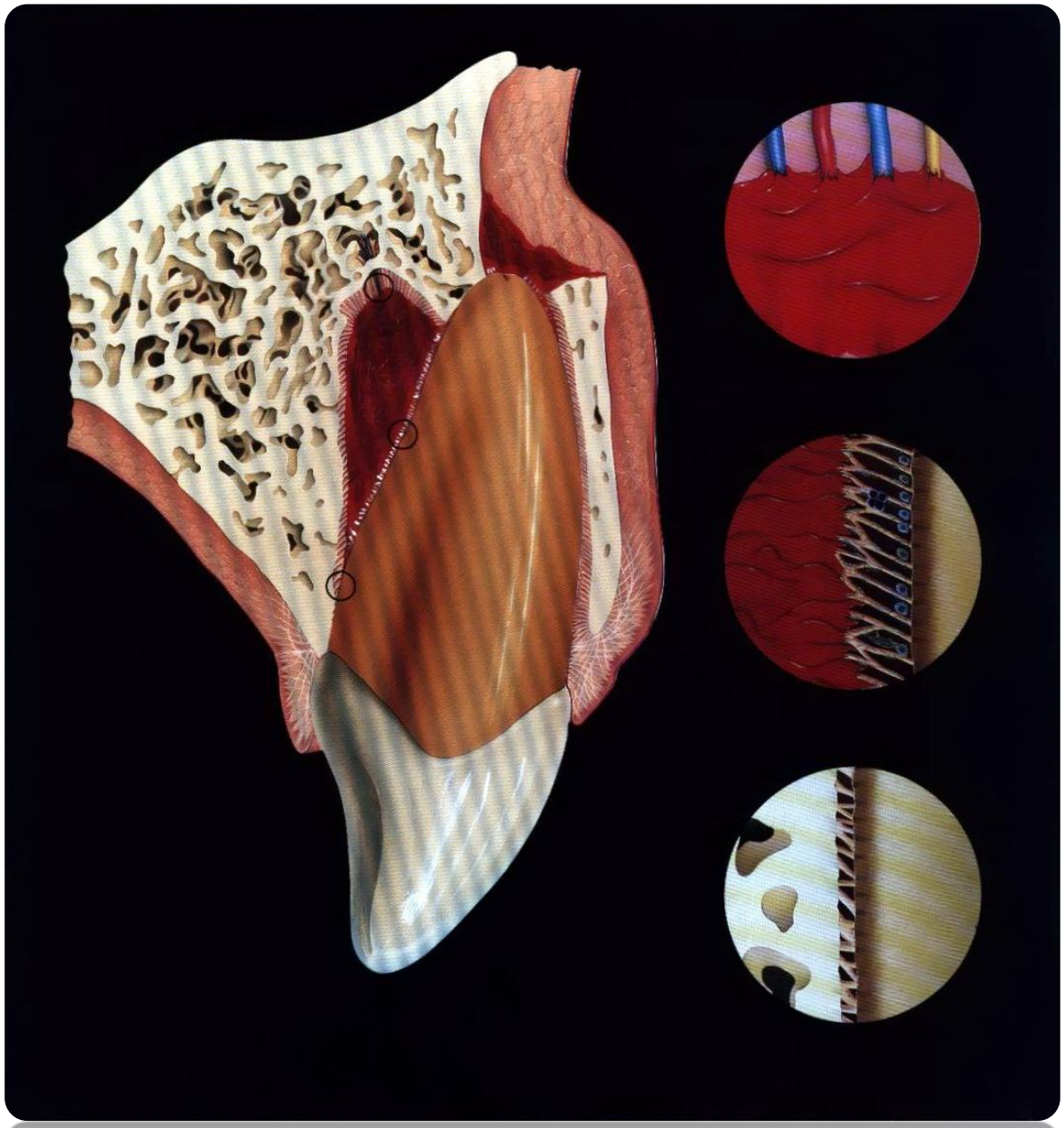
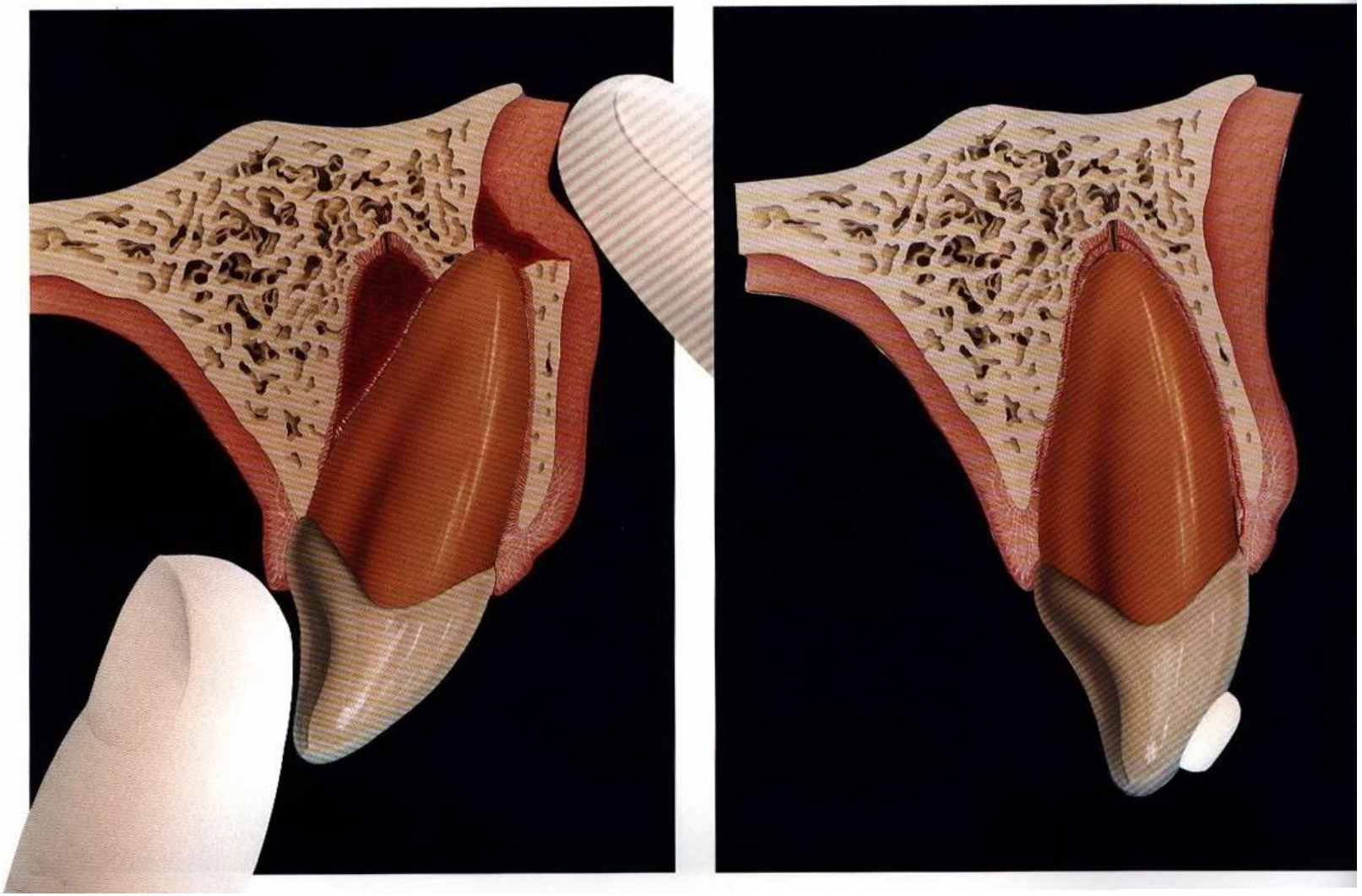
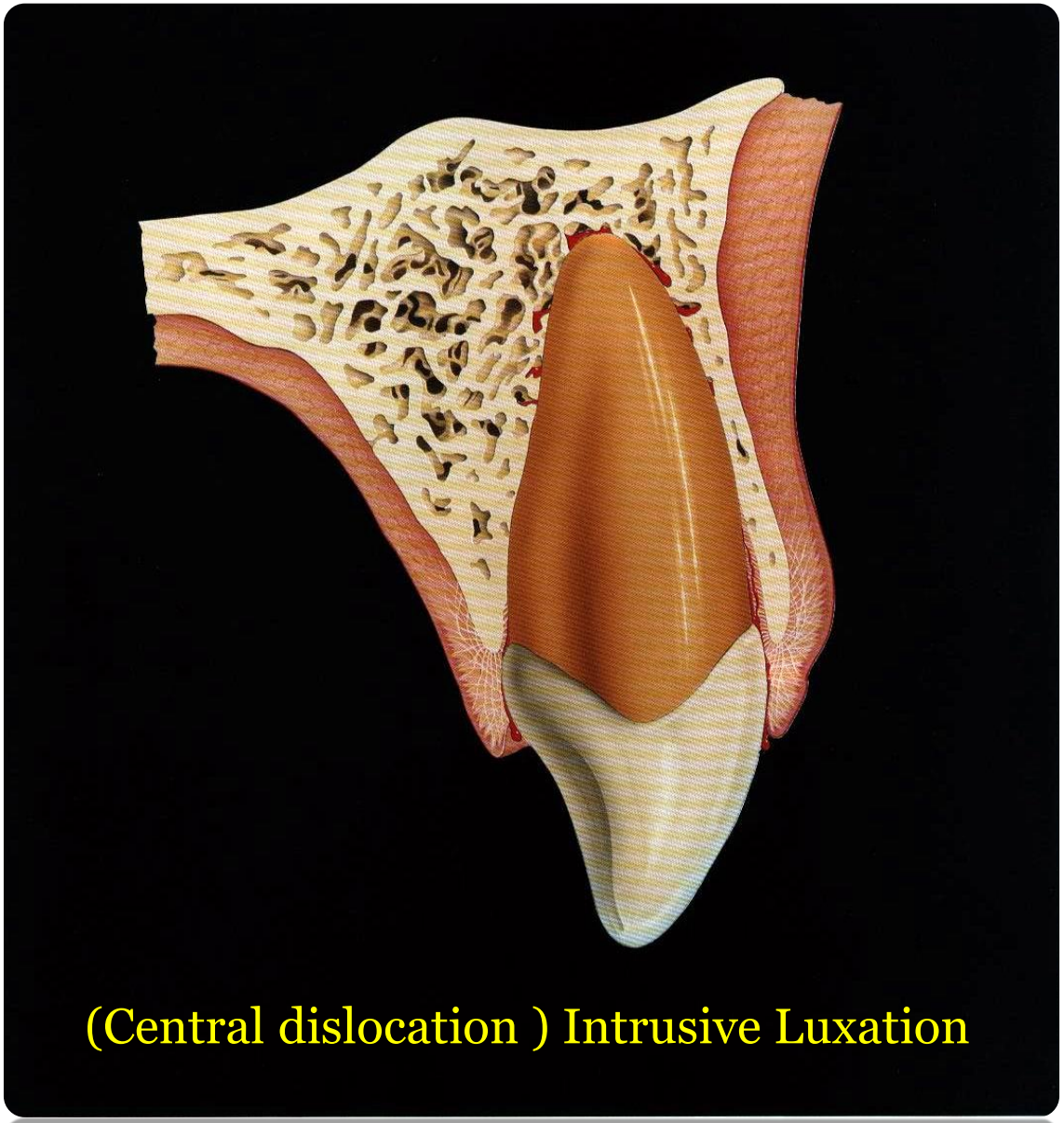


Fig. 6.7. **Treatment principles for lateral luxation: repositioning and splinting**





(Central dislocation) Intrusive Luxation

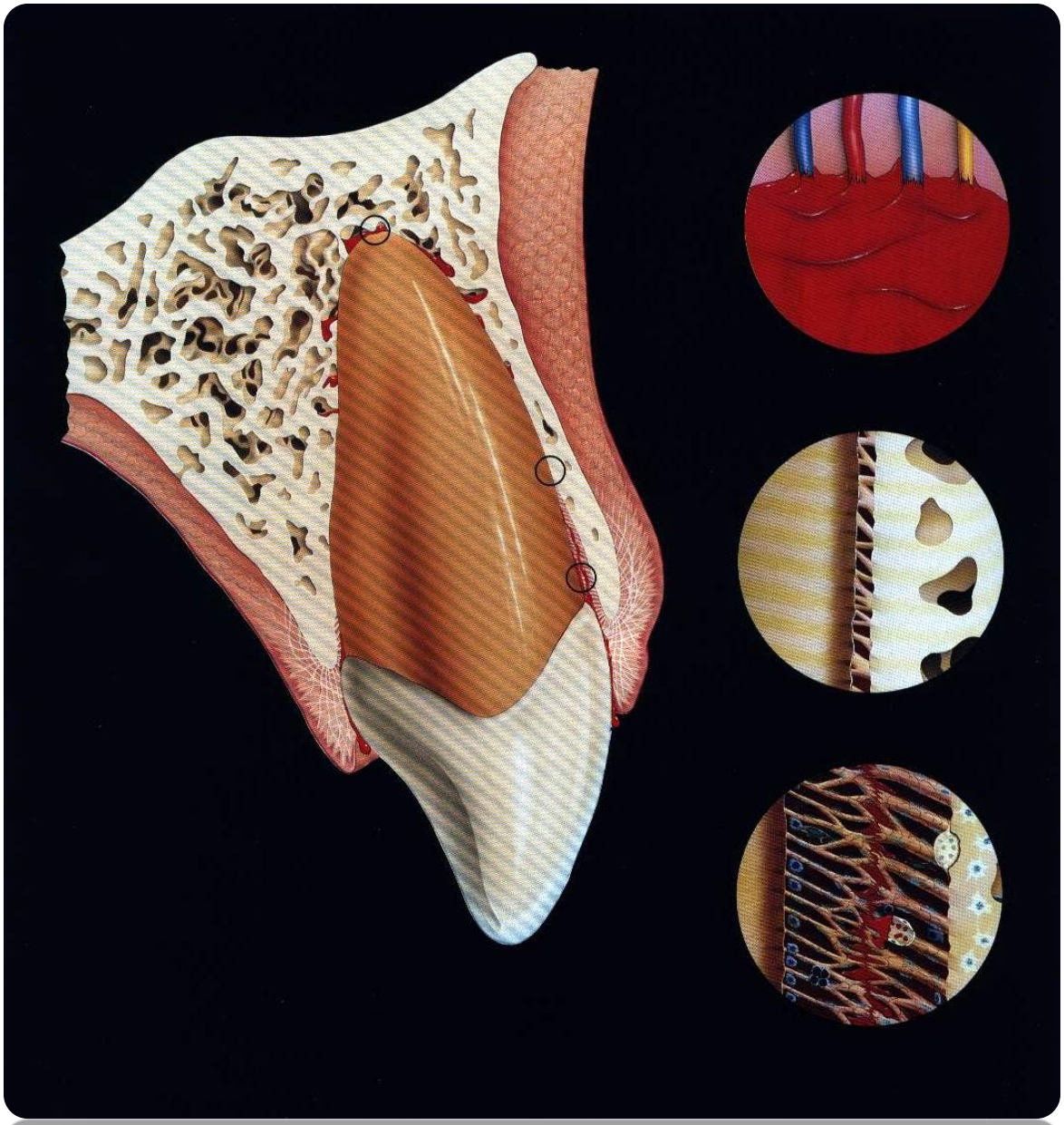
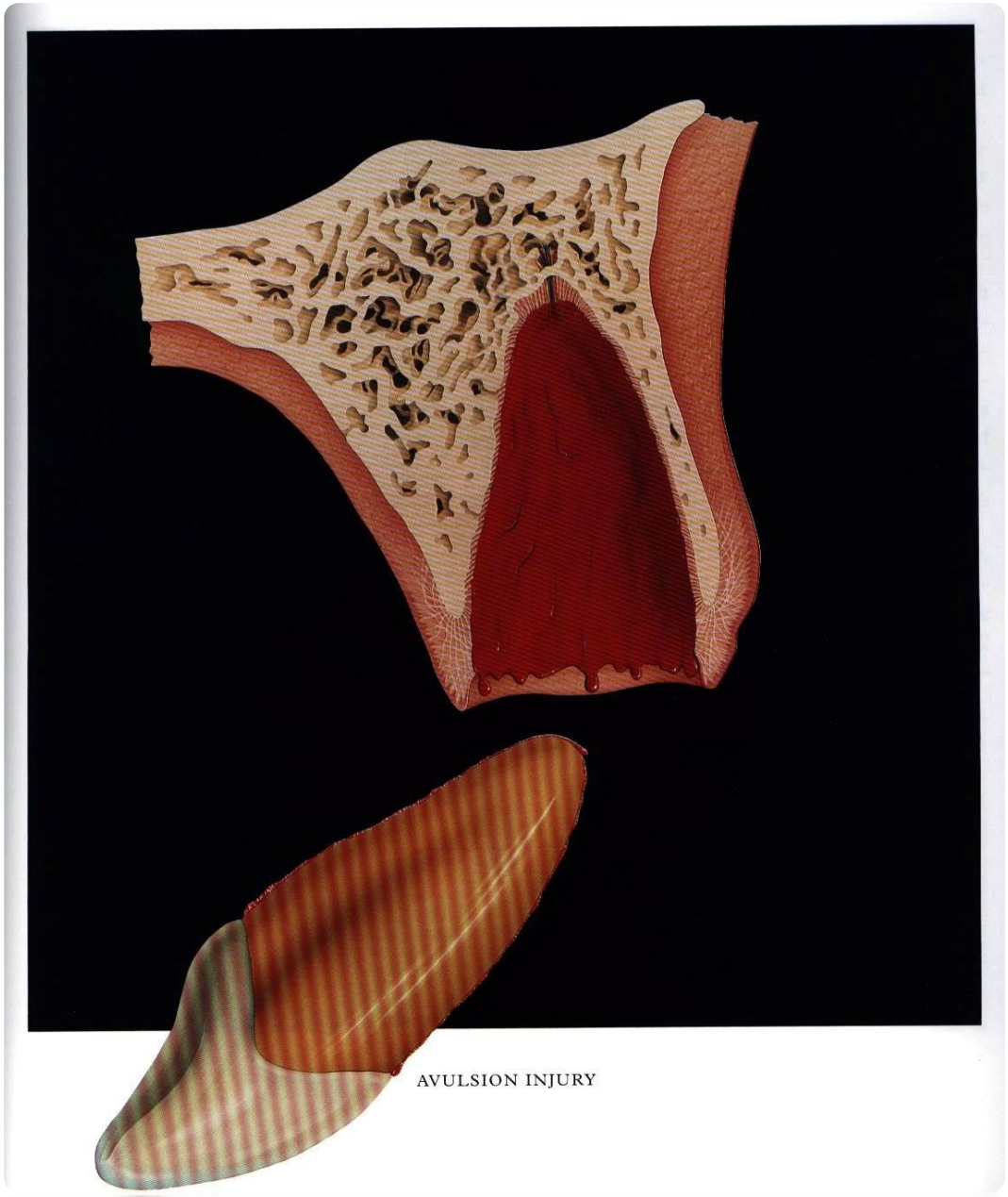


Fig. 7.2. **Intrusion of a tooth with completed root formation**
The difference in the level of the incisal edge, as well as the apical shift of the cemento-enamel junction indicates intrusion.



AVULSION INJURY

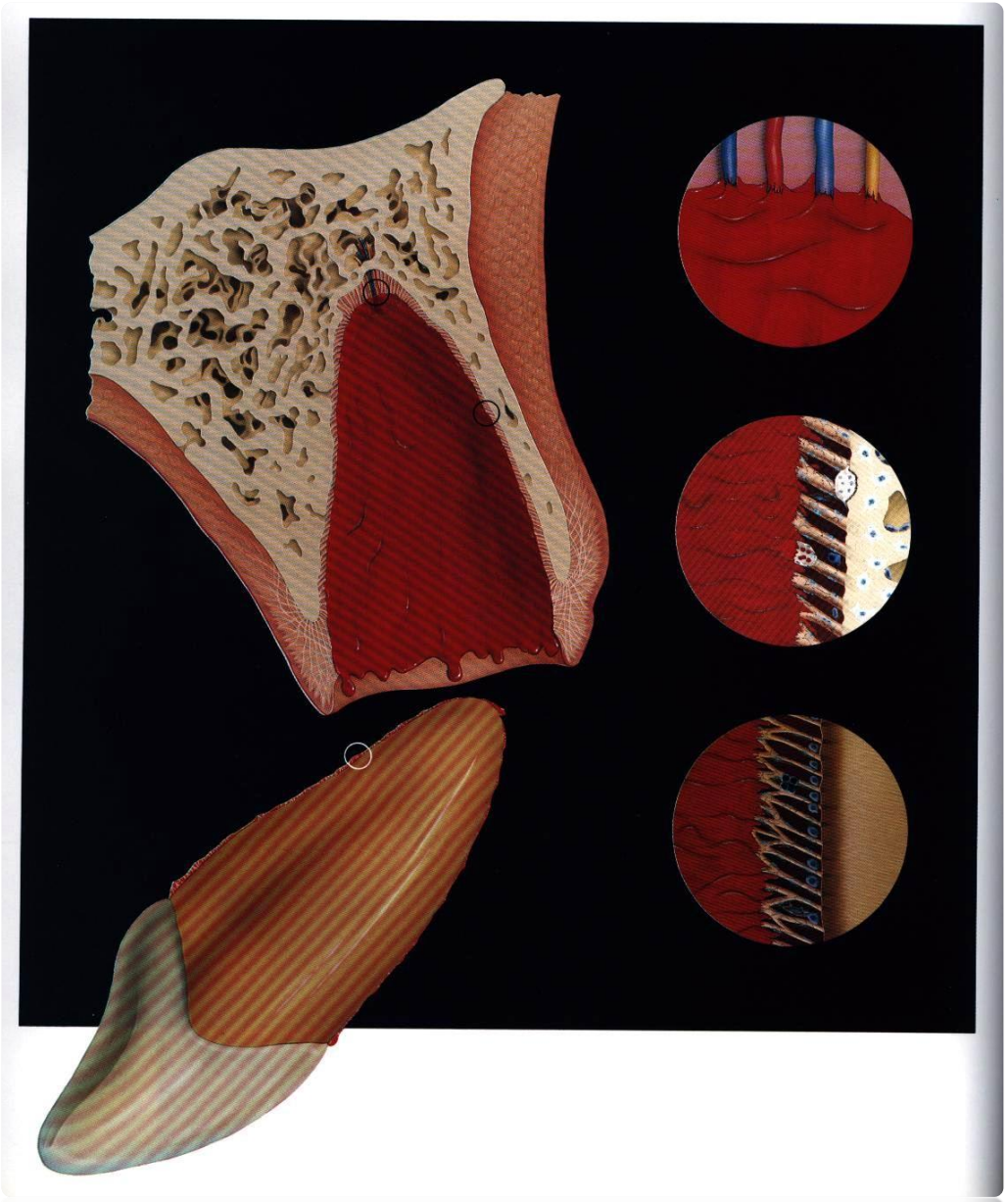
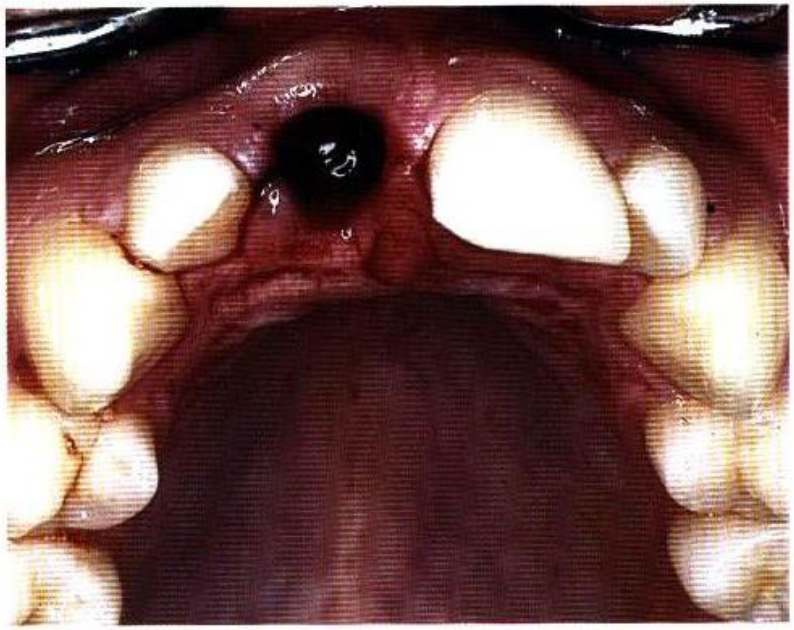


Fig. 8.2. **Healing events 2 weeks after replantation**
Most of the intraalveolar periodontal fibers have healed. Pulpal revascularization has reached mid-root level.

The *gingival attachment* is re-established 1 week after injury, including splicing of the ruptured gingival fibers (Fig. 8.2). Intraalveolar *periodontal ligament* revascularization is also complete and splicing of PDL fibers initiated 1 week after injury. After 2 weeks, periodontal ligament repair is so advanced that the perio-

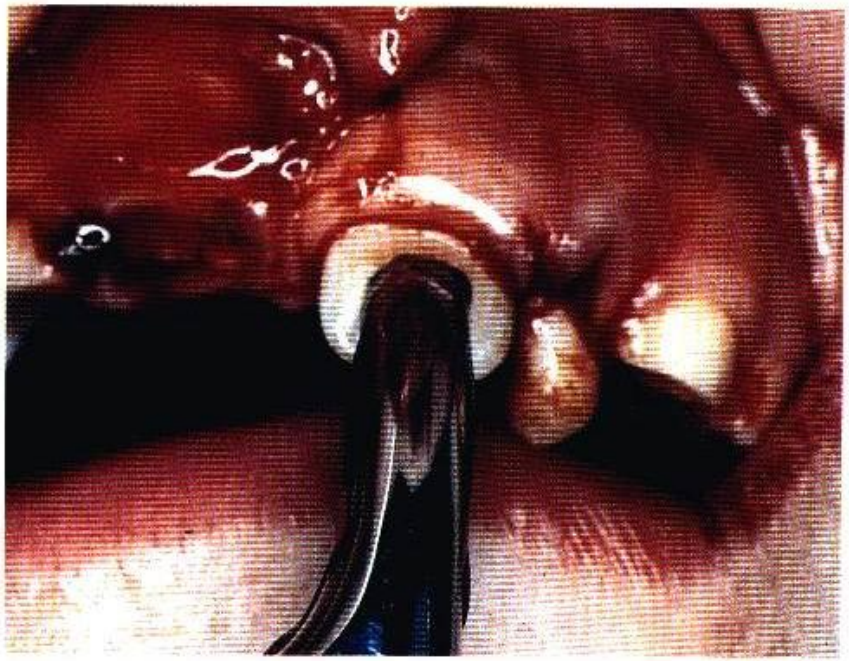
Replanting the tooth

The tooth is grasped by the crown with forceps and partially replanted in its socket. Replantation is completed using gentle finger pressure. If any resistance is met, the tooth should be removed, placed again in saline and the socket inspected. A straight elevator is then inserted in the socket and an index finger is placed labially. Using lateral pressure, counterbalanced by the finger pressure, the socket wall is repositioned. Replantation can then atraumatically proceed as described.



Replanting the tooth

After cleansing the socket with physiologic saline, the tooth is replanted using the procedure described in the previous case.



صدمات وارده بر استخوان اطراف دندان :

I. Comminution of the mandibular or maxillary Alveolar Socket

خرد شدن یا فشرده شدن دندان همزمان و همراه lateral Luxation و Intrusive Luxation دیده می شود

II. Fracture of the mandibular or maxillary Alveolar Socket wall

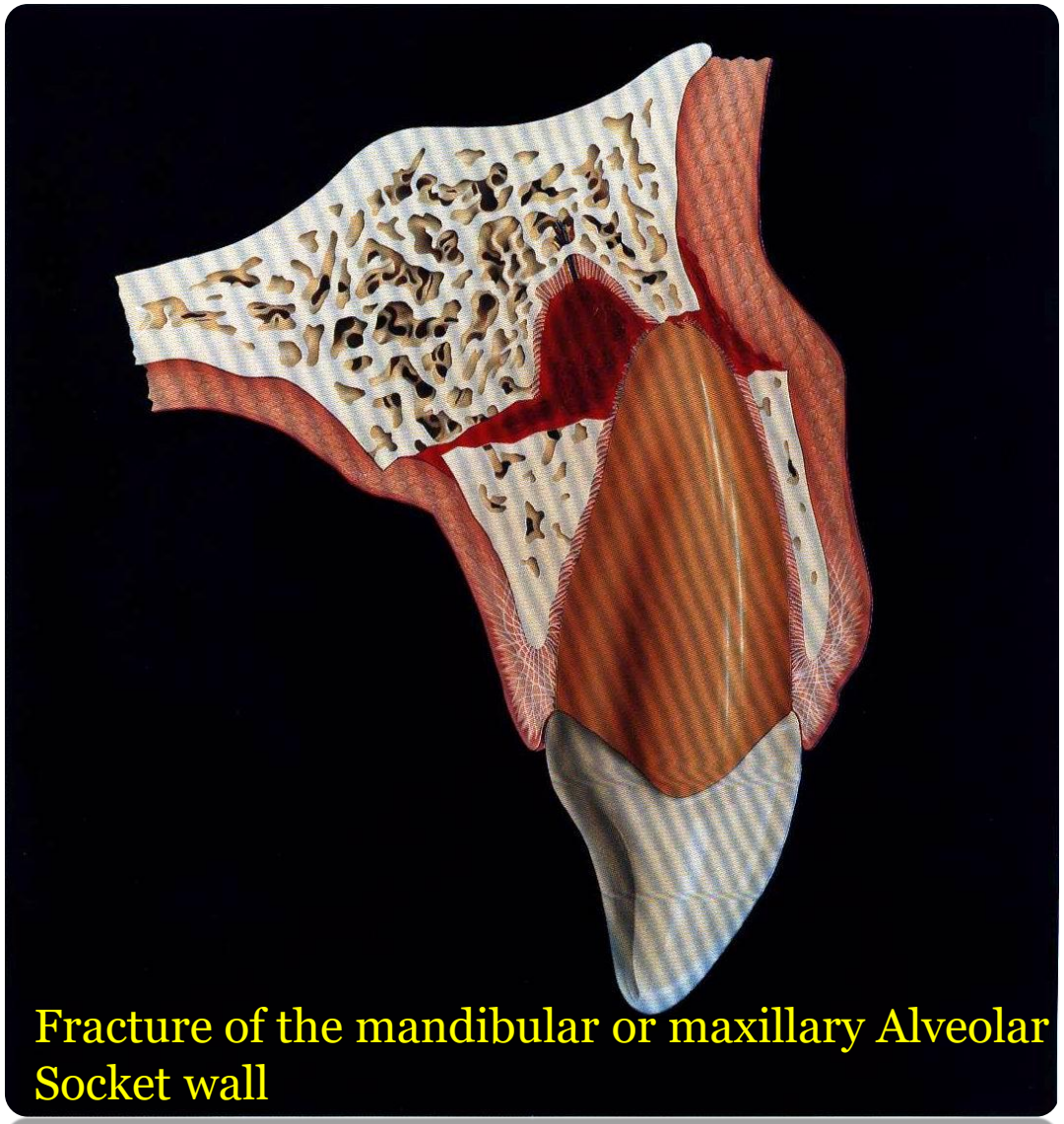
شکستگی دیواره حفره آلوئولی در مندیبل یا ماگزیلا ، محدود به دیواره باکالی و لینگوالی حفره آلوئول

III. Fracture of the mandibular or maxillary Alveolar process

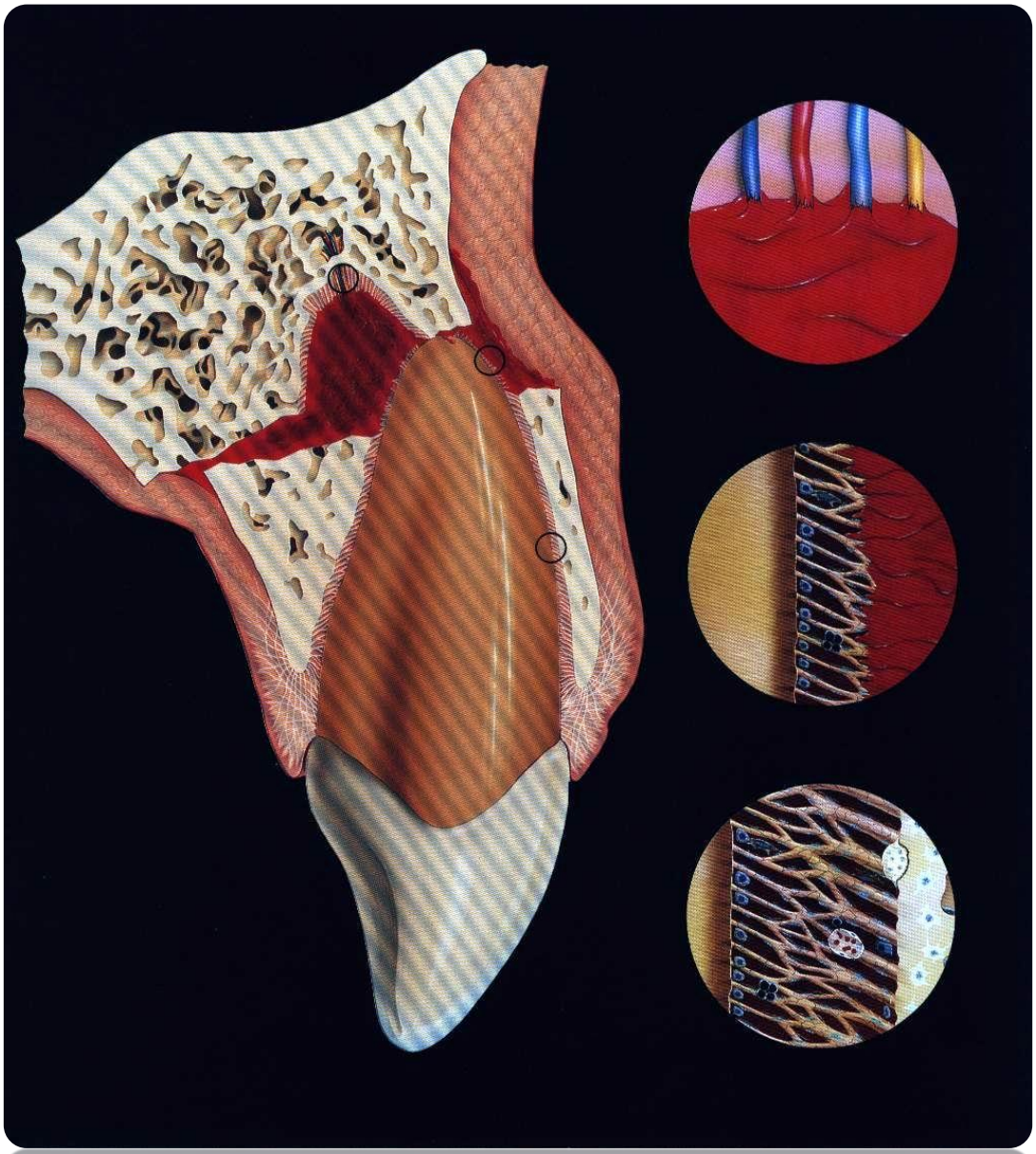
شکستگی زائده آلوئولر در مندیبول یا ماگزیلا ، ممکن است شامل حفره دندان باشد یا نباشد

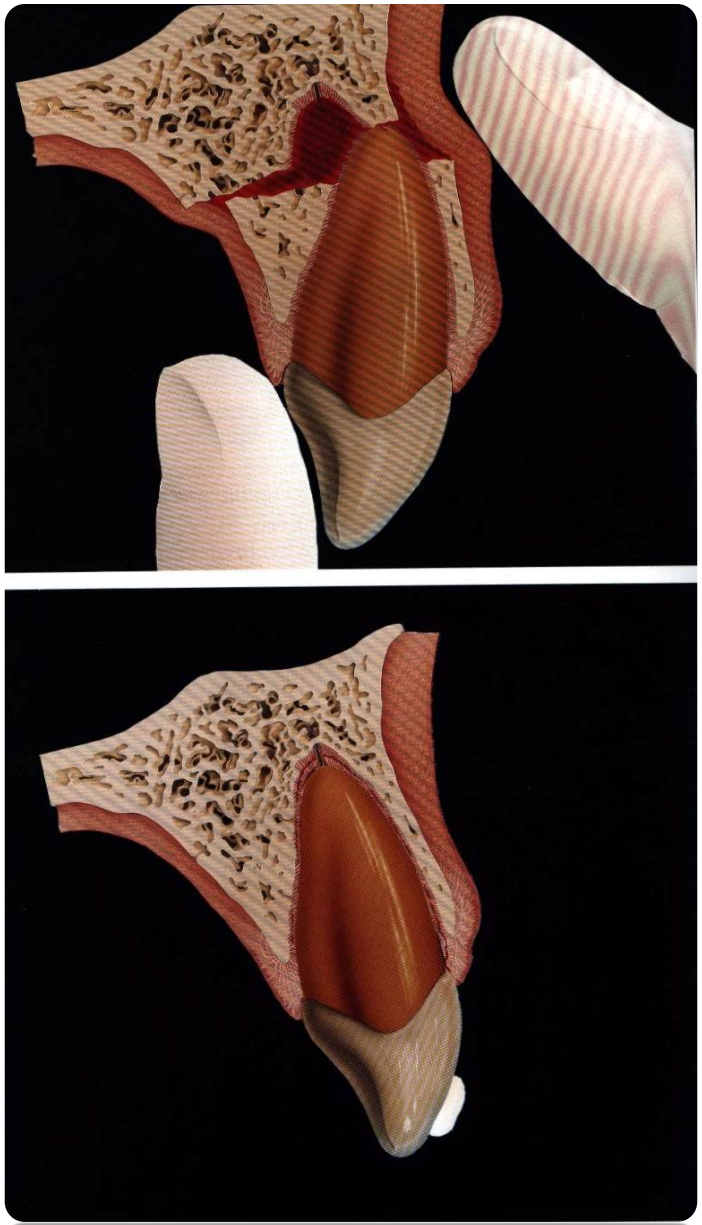
IV. Fracture of the mandibular or maxillary

شکستگی مندیبل یا ماگزیلا ، شامل تنه مندیبل یا ماگزیلا و اغلب زائده آلوئولر(شکستگی فک).شکستگی ممکن است شامل حفره دندان بشود یا نشود



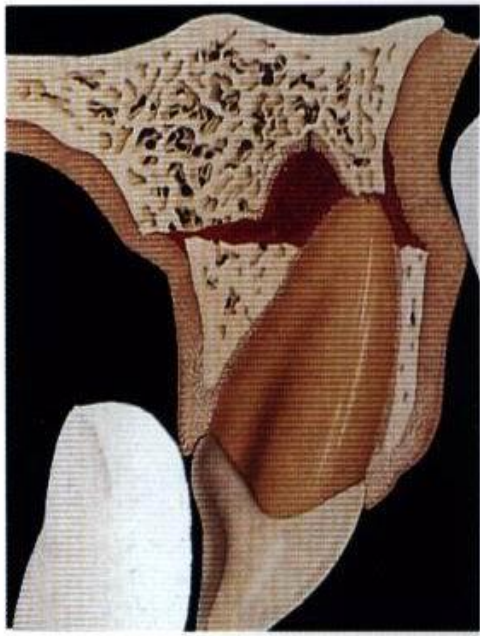
Fracture of the mandibular or maxillary Alveolar Socket wall





Repositioning

With hard finger pressure to the apical region the apices are disengaged. If this is not sufficient then the fragment has to be moved with forceps in a coronal and palatal direction.



صدمات به لثه و مخاط دهان :

Laceration of gingiva or oral mucosa

زخم عمیق یا کم عمق در نتیجه پاره شدن معمولا در اثر اشیاء تیز

Contusion of gingiva or oral mucosa

کبودی معمولا در اثر برخورد اشیاء کند ، مخاط پاره نمی شود، معمولا سبب خونریزی تحت مخاطی می شود

Abrasion of gingiva or oral mucosa

زخم سطحی به علت خراشیدگی یا سائیدگی مخاط، یک سطح خشن خونریزی دهنده برجای میگذارد

Fig. 11.7. **Split lip due to a frontal impact**
This patient was hit in the face with a bottle, resulting in a split lip and lateral luxation of the right central incisor. The vermilion border is sutured first, whereafter the rest of the laceration is closed with interrupted sutures (e.g. Prolene® 6.0).