

Traumatic injuries to the teeth



Presented by:
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Definitions

- ⚙ **Trauma** a physical injury or wound to the body
- ⚙ **Traumatic** relating to physical injuries or wounds to the body
- ⚙ **Traumatology** the branch of medicine that deals with serious injuries and wounds and their long-term consequences

Epidemiology

- ☀ Dental trauma is common in childhood & adolescent
- ☀ Incidence of dental trauma is 31-40% of boys & 16-30% of girls at 5 years of age
- ☀ Incidence of dental trauma is 12-33% of boys & 4-19% of girls at 12 years of age
- ☀ Boys are affected almost twice as often as girls in both the dentitions

Etiology

- ☼ Most accident prone age is between 2 & 4 years for the primary dentition & 7 & 10 years for the permanent dentition

Pre-School Child:

- ☼ Fall injuries.
- ☼ Child abuse.
- ☼ Injury during play.
- ☼ Seizures.

School Age:

- ☼ Athletic injuries.
- ☼ Fighting.
- ☼ Auto accidents.
- ☼ Seizure disorders.

Type of trauma

⚙ Direct trauma :

When the tooth itself is struck



⚙ Indirect trauma:

When the lower dental arch is forcefully closed against the upper



Ellis classification

Class I: Enamel fracture

Class II: Enamel and dentin fracture without pulp exposure

Class III: Crown fracture with pulp exposure

Class IV: Traumatized tooth that has become non-vital with or without loss of tooth structure

Class V: Teeth lost as a result of trauma (Avulsion)

Class VI: Fracture of root with or without loss of crown structure

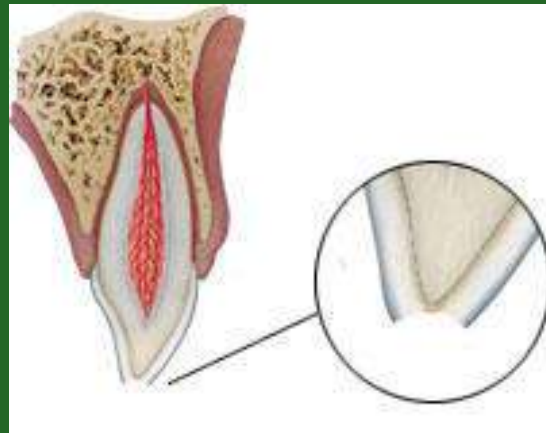
Class VII: Displacement of the tooth without fracture of crown or root

Class VIII: Fracture of the crown en masse and its replacement

Class IX: Fracture of deciduous teeth

CLASS I

Enamel fracture



A fracture confined to the enamel with loss of tooth structure

Class II

Enamel-dentin fracture



A fracture confined to enamel and dentin with loss of tooth structure but not involving the pulp

Class III

Enamel-dentin-pulp fracture



A fracture involving enamel and dentin with loss of tooth structure and exposure of the pulp

Class IV

Tooth becomes non-vital



Traumatized tooth that has become non-vital with or without loss of tooth structure

Class V

Avulsion



Teeth loss due to trauma

Class VI

Root Fracture



Fracture of root with or without loss of crown structure

Class VII

Tooth displacement



Displacement of the tooth without fracture of crown or root

Class VIII

Fracture of crown en masse or its replacement



Complete fracture of the crown

Class IX

Injuries to the primary teeth



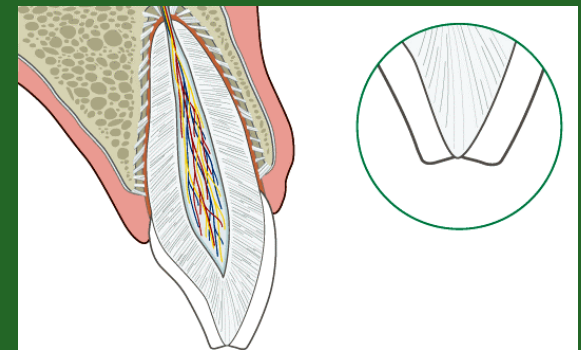
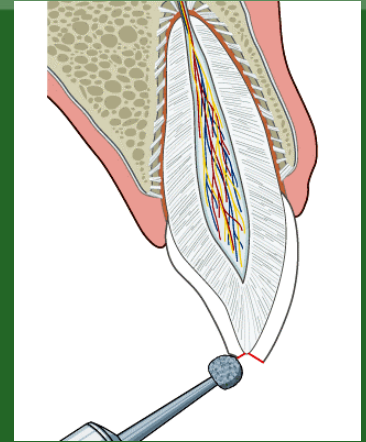
Any injury to the primary tooth

Treatment of various dental fractures



Management of Class 1 fracture

- ☺ If a tooth fragment is available, it can be bonded to the tooth.
- ☺ In many cases no immediate treatment is needed other than smoothing of sharp fracture edges. The fracture can be left for later restoration which in most cases will consist of augmentation with composite resin material.
- ☺ Grinding or restoration with composite resin depending on the extent and location of the fracture.
- ☺ Clinical and radiographic control at 6-8 weeks and 1 year.



Management of Class 2 fracture



- ⚙ If a tooth fragment is available, it can be bonded to the tooth. Otherwise perform a provisional treatment by covering the exposed dentin with glass-ionomer or a permanent restoration using a bonding agent and composite resin.
- ⚙ The definitive treatment for the fractured crown is restoration with accepted dental restorative materials.
- ⚙ Radiograph of lip or cheek lacerations to search for tooth fragments or foreign material
- ⚙ FOLLOW-UP
- ⚙ Clinical and radiographic control at 6-8 weeks and 1 year



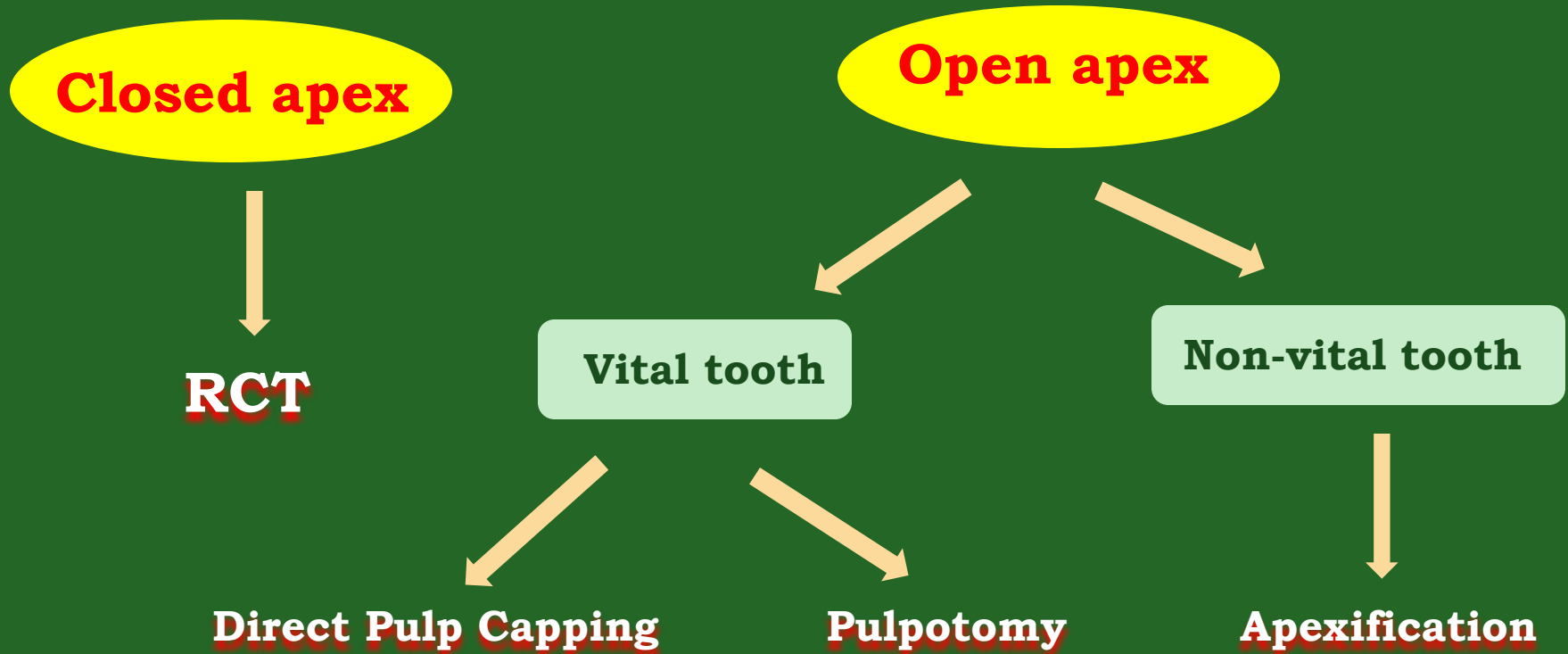
Management of class III fracture



Factors affecting management of class III fractures

- ✧ Vitality of the pulp
- ✧ Size of pulp exposure
- ✧ Time elapsed since exposure
- ✧ Stage of development of root apex
- ✧ Restorability of fractured crown

Treatment summary for class III fractures



Class IV fracture

Closed apex



RCT

Open apex

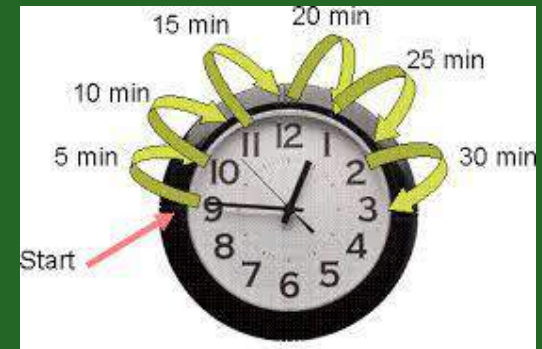


Apexification

Treatment of Class V fracture (Avulsion)

Factors affecting management of class V fracture

⚙ Time interval between injury and treatment



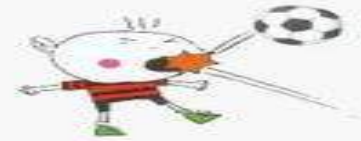
⚙ Conditions under which the tooth is stored



Instructions to the patient on Telephone

Save your tooth

Most of your permanent teeth may be saved if you know what to do after a blow to the mouth



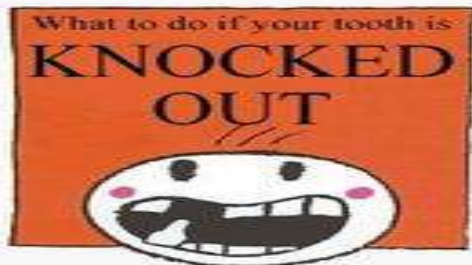
Find the piece of the tooth



The piece can be glued on



For this to be possible, seek attention immediately from a dentist



Find the tooth



Hold it by the crown



(Plug the sink)
Rinse in cold tap water

4
FOLLOW ONE OF THESE ALTERNATIVES



Put the tooth back in its place



Place the tooth in a cup of milk or saline



When milk is not available, place the tooth in the mouth between the cheeks and gums



Seek immediately specialized dental treatment, within a two hour time period



First aid for avulsed teeth



Keep the patient calm



Find the tooth & pick it up by the crown



Clean the tooth



Place the tooth in a suitable storage medium



Seek emergency dental treatment immediately

Storage media for avulsed tooth

- ⚙ Tissue or cell culture media like Hank's Balanced salt Solution (HBSS)
- ⚙ Milk
- ⚙ Isotonic Saline
- ⚙ Contact lens solution
- ⚙ Buccal vestibule or under the tongue
- ⚙ Unsalted water
- ⚙ Saliva

Treatment of Avulsion



Closed Apex

Tooth replanted prior to the patient's arrival at the dental clinic

Extraoral dry time less than 60 min.
The tooth has been kept in suitable storage media and/or stored dry less than 60 minutes.

Extraoral dry time exceeding 60 min or other reasons suggesting non-viable cells



Open apex

Tooth replanted prior to the patient's arrival at the dental clinic

Extraoral dry time less than 60 min.
The tooth has been kept in suitable storage media and/or stored dry less than 60 minutes.

Dry time longer than 60 min or other reasons suggesting non-viable cells

Closed Apex

Tooth replanted prior to the patient's arrival at the dental clinic

- ✿ Leave the tooth in place.
- ✿ Clean the area with water spray, saline, or chlorhexidine.
- ✿ Suture gingival lacerations if present.
- ✿ Verify normal position of the replanted tooth both clinically and radiographically.
- ✿ Apply a flexible splint for up to 2 weeks.
- ✿ Administer systemic antibiotics.
- ✿ If the avulsed tooth has been in contact with soil, and if tetanus coverage is uncertain, refer to physician for a tetanus booster.
- ✿ Initiate root canal treatment 7-10 days after replantation and before splint removal.



Patient instructions

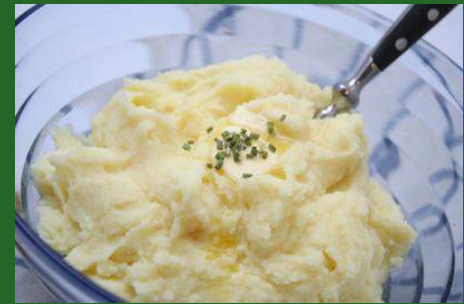
Avoid participation in contact sports



Brush teeth with a soft toothbrush after each meal



Soft food for up to 2 weeks



Use a chlorhexidine (0.1 %) mouth rinse twice a day for 1 week.



Follow-up

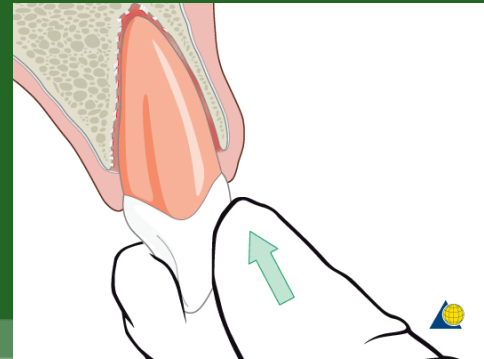
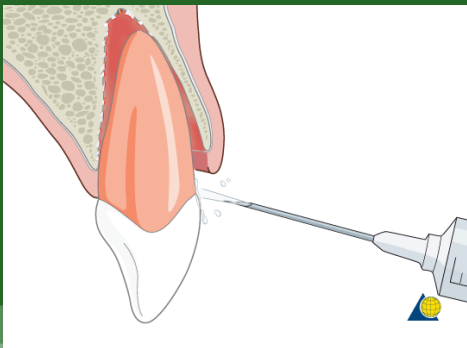


- ❖ Root canal treatment 7-10 days after replantation. Place calcium hydroxide as an intra-canal medicament for up to 1 month followed by root canal filling with an acceptable material.
- ❖ Alternatively an antibiotic-corticosteroid paste may be placed immediately or shortly following replantation and left for at least 2 weeks.
- ❖ Splint removal and clinical and radiographic follow-up after 2 weeks.
- ❖ Clinical and radiographic follow-up after 4 weeks, 3 months, 6 months, 1 year and then yearly thereafter.

Closed apex

Extra-oral dry time less than 60 min. The tooth has been kept in suitable storage media and/or stored dry less than 60 minutes

- ✿ Clean the root surface and apical foramen with a stream of saline and soak the tooth in saline thereby removing contamination and dead cells from the root surface.
- ✿ Administer local anesthesia
- ✿ Irrigate the socket with saline.
- ✿ Examine the alveolar socket. If there is a fracture of the socket wall, reposition it with a suitable instrument.
- ✿ Replant the tooth slowly with slight digital pressure. Do not use force.



Closed apex

Extra-oral dry time less than 60 min. The tooth has been kept in suitable storage media and/or stored dry less than 60 minutes

- ✧ Suture gingival lacerations if present.
- ✧ Verify normal position of the replanted tooth both, clinically and radiographically.
- ✧ Apply a flexible splint for up to 2 weeks, keep away from the gingiva.
- ✧ Administer systemic antibiotics.
- ✧ If the avulsed tooth has been in contact with soil, and if tetanus coverage is uncertain, refer to physician for a tetanus booster.
- ✧ Initiate root canal treatment 7-10 days after replantation and before splint removal.



Patient instructions

Avoid participation in contact sports



Brush teeth with a soft toothbrush after each meal



Soft food for up to 2 weeks



Use a chlorhexidine (0.1 %) mouth rinse twice a day for 1 week.



Follow-up



- ❖ Root canal treatment 7-10 days after replantation. Place calcium hydroxide as an intra-canal medicament for up to 1 month followed by root canal filling with an acceptable material.
- ❖ Alternatively an antibiotic-corticosteroid paste may be placed immediately or shortly following replantation and left for at least 2 weeks.
- ❖ Splint removal and clinical and radiographic follow-up after 2 weeks.
- ❖ Clinical and radiographic follow-up after 4 weeks, 3 months, 6 months, 1 year and then yearly thereafter.

Closed Apex

Extra-oral dry time exceeding 60 min or other reasons suggesting non-viable cells



- ⚙ Delayed replantation has a poor long-term prognosis. The periodontal ligament will be necrotic and can not be expected to heal. The goal in delayed replantation is, in addition to restoring the tooth for esthetic, functional and psychological reasons, to maintain alveolar bone contour.
- ⚙ However, the expected eventual outcome is ankylosis and resorption of the root and the tooth will be lost eventually.



Closed Apex

Extra-oral dry time exceeding 60 min or other reasons suggesting non-viable cells

- ✧ Remove attached non-viable soft tissue carefully, with gauze.
- ✧ Root canal treatment can be performed prior to replantation, or it can be done 7-10 days later.
- ✧ Administer local anesthesia & Irrigate the socket with saline.
- ✧ Examine the alveolar socket. If there is a fracture of the socket wall, reposition it with a suitable instrument.
- ✧ Replant the tooth slowly with slight digital Do not use force.
- ✧ Suture gingival lacerations if present. pressure.



Closed Apex

Extra-oral dry time exceeding 60 min or other reasons suggesting non-viable cells

- ✧ Verify normal position of the replanted tooth clinically and radiographically.
- ✧ Stabilize the tooth for 4 weeks using a flexible splint.
- ✧ Administer systemic antibiotics.
- ✧ If the avulsed tooth has been in contact with soil, and if tetanus coverage is uncertain, refer to physician for a tetanus booster.
- ✧ To slow down osseous replacement of the tooth, treatment of the root surface with fluoride prior to replantation has been suggested (2 % sodium fluoride solution for 20 min).



Patient instructions

Avoid participation in contact sports



Brush teeth with a soft toothbrush after each meal



Soft food for up to 2 weeks



Use a chlorhexidine (0.1 %) mouth rinse twice a day for 1 week.



Follow-up



- ❖ Root canal treatment 7-10 days after replantation. Place calcium hydroxide as an intra-canal medicament for up to 1 month followed by root canal filling with an acceptable material.
- ❖ Alternatively an antibiotic-corticosteroid paste may be placed immediately or shortly following replantation and left for at least 2 weeks.
- ❖ Splint removal and clinical and radiographic follow-up after 2 weeks.
- ❖ Clinical and radiographic follow-up after 4 weeks, 3 months, 6 months, 1 year and then yearly thereafter.

Follow-up

- ⚙ Ankylosis is unavoidable after delayed replantation and must be taken into consideration. In children and adolescents ankylosis is frequently associated with infraposition.
- ⚙ Careful follow-up is required and good communication is necessary to ensure the patient and guardian of this likely outcome.

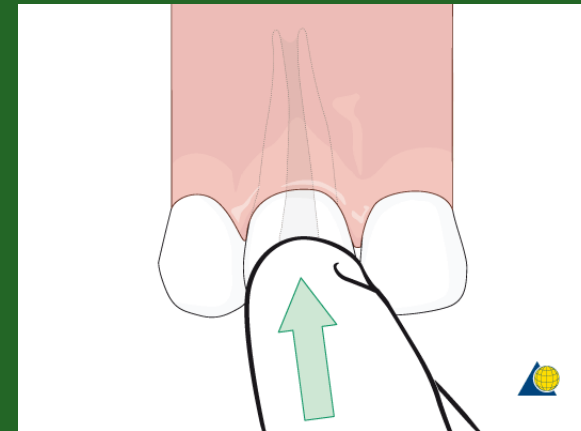


Open apex

Tooth replanted prior to the patient's arrival at the dental clinic



- ⚙ Leave the tooth in place.
- ⚙ Clean the area with water spray, saline, or chlorhexidine.
- ⚙ Suture gingival laceration if present.
- ⚙ Verify normal position of the replanted tooth both clinically and radiographically.
- ⚙ Apply a flexible splint for up to 1-2 weeks.
- ⚙ Administer systemic antibiotics.
- ⚙ If the avulsed tooth has been in contact with soil and if tetanus coverage is uncertain, refer to physician for a tetanus booster.
- ⚙ The goal for replanting still-developing (immature) teeth in children is to allow for possible revascularization of the tooth pulp. If that does not occur, root canal treatment is recommended.



Patient instructions

Avoid participation in contact sports



Brush teeth with a soft toothbrush after each meal



Soft food for up to 2 weeks



Use a chlorhexidine (0.1 %) mouth rinse twice a day for 1 week.



Follow-up

- ⚙ For immature teeth, root canal treatment should be avoided unless there is clinical or radiographic evidence of pulp necrosis.
- ⚙ Splint removal and clinical and radiographic control after 2 weeks.
- ⚙ Clinical and radiographic control after 4 weeks, 3 months, 6 months, 1 year and then yearly thereafter.

Open apex

Extra-oral dry time less than 60 min. The tooth has been kept in suitable storage media and/or stored dry less than 60 minutes



- ✧ Clean the root surface and apical foramen with a stream of saline.
- ✧ Topical application of antibiotics has been shown to enhance chances for revascularization of the pulp and can be considered if available (minocycline or doxycycline 1 mg per 20 ml saline for 5 minutes soak).
- ✧ Administer local anesthesia.
- ✧ Examine the alveolar socket. If there is a fracture of the socket wall, reposition it with a suitable instrument.
- ✧ Irrigate the socket with saline.
- ✧ Replant the tooth slowly with slight digital pressure.
- ✧ Suture gingival lacerations, especially in the cervical area.
- ✧ Verify normal position of the replanted tooth clinically and radiographically.
- ✧ Apply a flexible splint for up to 2 weeks.

Open apex

Extra-oral dry time less than 60 min. The tooth has been kept in suitable storage media and/or stored dry less than 60 minutes

- ⚙ Administer systemic antibiotics.
- ⚙ If the avulsed tooth has been in contact with soil and if tetanus coverage is uncertain, refer to physician for a tetanus booster.
- ⚙ The goal for replanting still-developing (immature) teeth in children is to allow for possible revascularization of the pulp space. The risk of infection-related root resorption should be weighed up against the chances of revascularization. Such resorption is very rapid in children. If revascularization does not occur, root canal treatment may be recommended.

Open apex

Dry time longer than 60 min or other reasons suggesting non-viable cells



- ⚙ Remove attached non-viable soft tissue with gauze.
- ⚙ **Root canal treatment can be carried out prior to replantation or later.**
- ⚙ Administer local anesthesia.
- ⚙ Irrigate the socket with saline.
- ⚙ Examine the alveolar socket. if there is a fracture of the socket wall, reposition it with a suitable instrument.
- ⚙ Replant the tooth slowly with slight digital pressure.
- ⚙ Suture gingival lacerations if present.

Open apex

Dry time longer than 60 min or other reasons suggesting non-viable cells

- ✧ Verify normal position of the replanted tooth clinically and radiographically.
- ✧ Stabilize the tooth for 4 weeks using a flexible splint.
- ✧ Administer systemic antibiotics.
- ✧ If the avulsed tooth has been in contact with soil or if tetanus coverage is uncertain, refer to physician for evaluation of the need for a tetanus booster.
- ✧ To slow down osseous replacement of the tooth, treatment of the root surface with fluoride prior to replantation has been suggested (2 % sodium fluoride solution for 20 min.

THANK
YOU

