

Iatrogenic harms, injuries caused by dental manipulation

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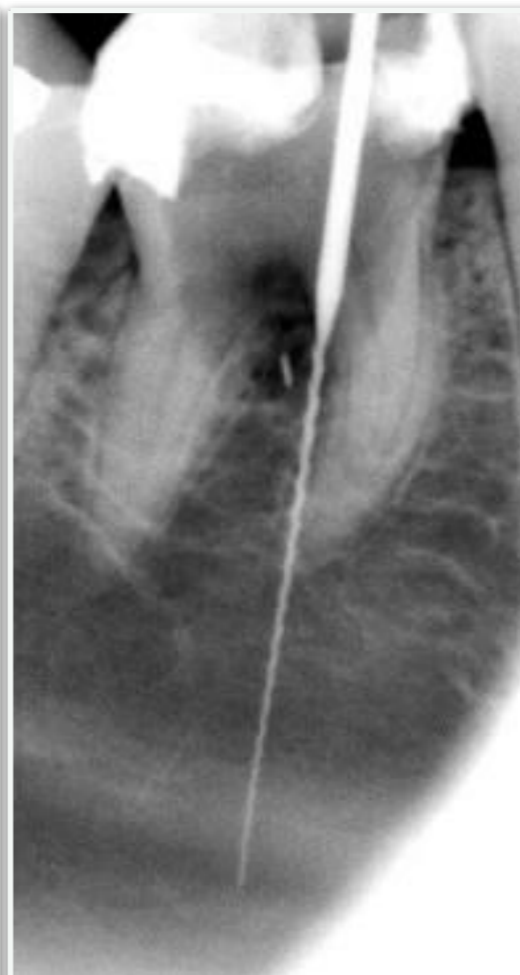
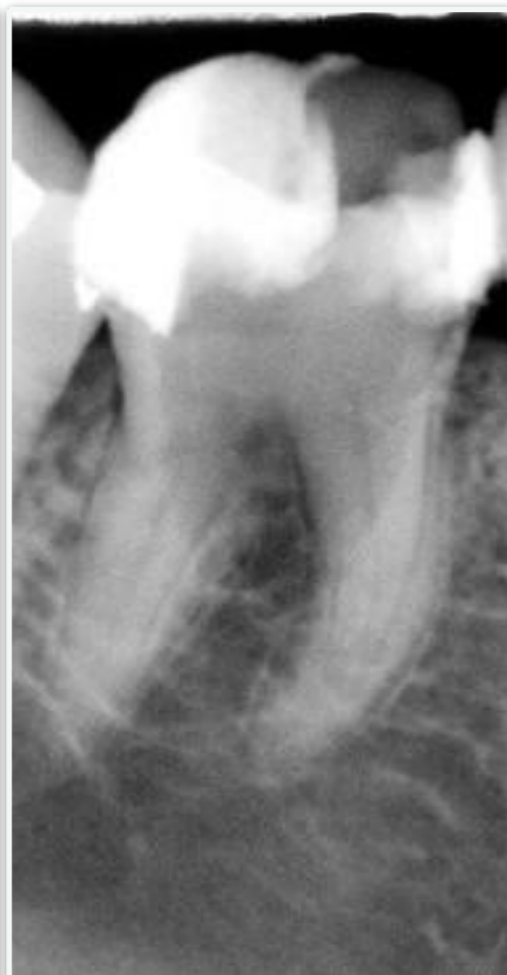
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Iatrogenic harms

Induced inadvertently by a physician or surgeon or by medical treatment or diagnostic procedures

“Primum nil nocere”



Possible iatrogenic injuries, harms caused by dentists

Soft tissues

- Injection of a different solution
- Needle fracture
- Painful anaesthesia
- Incomplete anaesthesia
- Anaemic zone
- Nerve damage
- Facial paresis
- Vascular damage/haematoma
- Muscle damage
- Intraglandular injection
- Postinjection abscess
- Mechanical damage
- Thermal damage
- Necrosis

Hard tissues

- Tooth fracture
- Tooth luxation
- Tooth resorption
- Enamel damaging agents
- Tooth/root/implant dislocation
- TMJ damage
- Bone fracture
- Thermal damage
- Inflammation, foreign body reaction
- Broken instrument
- Necrosis

Other organs

- Toxic reaction
- Allergic reaction
- Aspiration
- Swallowing harmful substances/
instruments
- Air embolism
- Bacteraemia- endocarditis
- Pacemaker malfunction
- Foetus developmental disorder
- Eyes' chemical irritation
- Bőrnecrosis



- vulnus punctum, scissum, caesum, lacerum; contusio, abrasio
- **Reasons:** needles, rotating instruments, instruments of soft tissue protection, endodontic files/reamers, periodontal curettes, forceps, elevators, surgical instruments, brackets, wires, x-ray,



- **Clinical findings**: bleeding, oedema, haematoma
- **Prevention**: soft tissue protection
- **Therapy**: bleeding control (compression, suture, etc.)
cooling, painkillers



Chemical and thermal soft tissue injuries

- Mucosal necrosis
- **Reasons:**
 - Chemical injuries: pulp devitalising pastes, acids, teeth whitening, root canal irrigation, mouthwash
 - Thermal: rotating instruments, Guttacut, hot metal objects, elektrocauter



Chemical and thermal soft tissue injuries

- **Clinical findings**: ulcerative laesions, hyperaemia, pain, oedema
- **Prevention**: cofferdam, isolation and protection of soft tissues
- **Therapy**: prevention of secondary infection (CHX, AB), painkillers, cooling, if needed necrectomy, suture



Haematoma

- Bleeding to the adjacent soft tissues caused by vascular damage
- **Reasons**: anaesthesia (pterygoid plexus!), soft tissue protection
- **Clinical findings**: swelling, discoloration



Haematoma

- **Cave!** anticoagulant therapy
- **Prevention**: needle aspiration, atraumatic soft tissue protection
- **Therapy**: cooling, antibiotics, oxerutin, Vitamin C, if needed evacuation
- 7-14 days healing



Subcutan emphysema

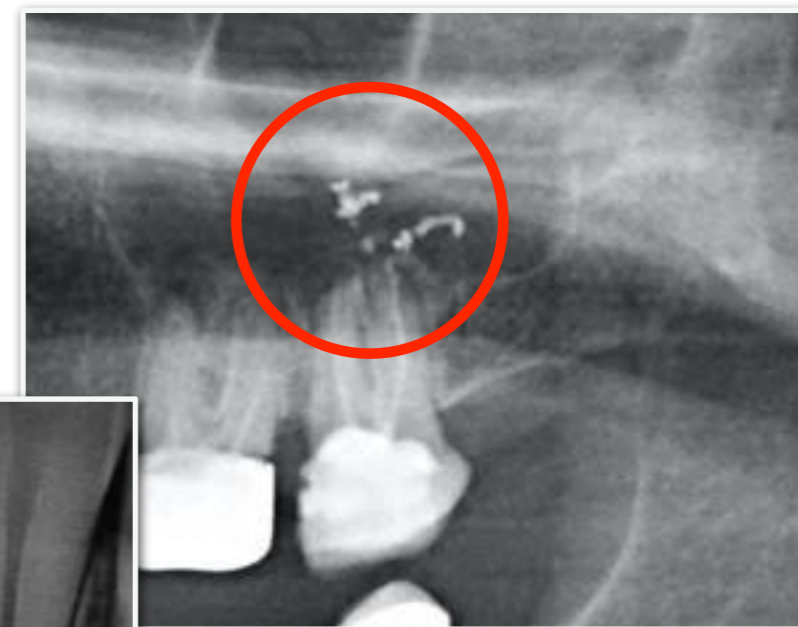
- Air pressed into the loose soft tissue spaces in the subcutaneous regions
- **Reasons**: turbine, pressured air, nose blow test, hidrogen-peroxide
- **Clinical findings**: straining, but painless swelling, crepitation on palpation



- **Complications**: pterygomaxillar, para-, retropharyngeal spreading, mediastinitis, pneumothorax, secondary infection, sepsis, air embolism
- **Prevention**: surgical drill for dentoalveolar manipulation, drying the root canal with paper points, cofferdam
- **Therapy**: antibiotics, same instructions after sinus closure, incision if needed

Foreign bodies

- **Foreign bodies**: filling, sealer, guttapercha, $\text{Ca}(\text{OH})_2$, endodontic files/reamers, impression material, gauze, drain, bur, bracket, needle
- **Position**: root canal, soft tissues, sinus maxillaris, bone, veins, nerves
- **Localisation**: periapical, OPG, Ultrasound, CBCT, MRI, CT



Foreign bodies

- **Complications**: inflammation, peripheral nerve damage, pseudoaneurysm, synovitis, cystic laesions
- **Prevention**: instrument quality control, torque control, proper work length, suture the drainages
- **Therapy**: observation, surgical removal and treatment of the complications



Foreign bodies in the GI tract and in the airways

- **Foreign body**: filling and root canal filling materials and instruments, impression material, restorations, gauze, drain, burs, bracket, implants and surgical instruments
- **Clinical findings**: change in breathing noises, cough, hoarse voice, pain, dysphagia
- **Localistaion**: chest and abdominal X-ray (radiopacity?), ultrasound, CT, MRI



Foreign bodies in the GI tract and in the airways

- **Complication**: compromised airways, impaction in GI tract, obstruction, perforation, foreign body granuloma, sepsis
- **Prevention**: cofferdam, suturing drains, patient positioning
- **Therapy**: emergency treatment in case of suffocation, surgical removal (gastroscopy, laparoscopy, bronchoscopy), observation



- **How**: anaesthesia, irrigation
- **Clinical findings**: pain, swelling, ecchymosis, trismus, airway obstruction
- **Tissue reaction**:
 - NaOCl: tissue necrosis, haemolysis, degradation of aminoacids
 - H₂O₂: oxygen radicals, minimal necrosis
 - CHX and iodine: not able to necrotise



- **Prevention**: marking the syringes, accurate work
- **Residual symptoms**: sensory/motoric function disorder, scarring



Injection of an irritating agent into soft tissues

- **How:**
 - Foramen apicale opens into the maxillary sinus
 - Wide apical foramen/external resorption
 - Accessory canals/perforation
- **Clinical findings:** sharp pain, swelling, ecchymosis, chlorine taste



Injection of an irritating agent into soft tissues

- **Prevention**: slow irrigation, careful pressure, working length-2 mm!, do not let the needle get stuck, watch as the fluid flows back
- **Therapy**: urgent incision, irrigation with physiological saline solution, cooling, antibiotics, painkillers, hospitalisation (stable airways, sinus trepanation and lavage, necrectomy)



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