

Side effects and complications of orthodontic treatment

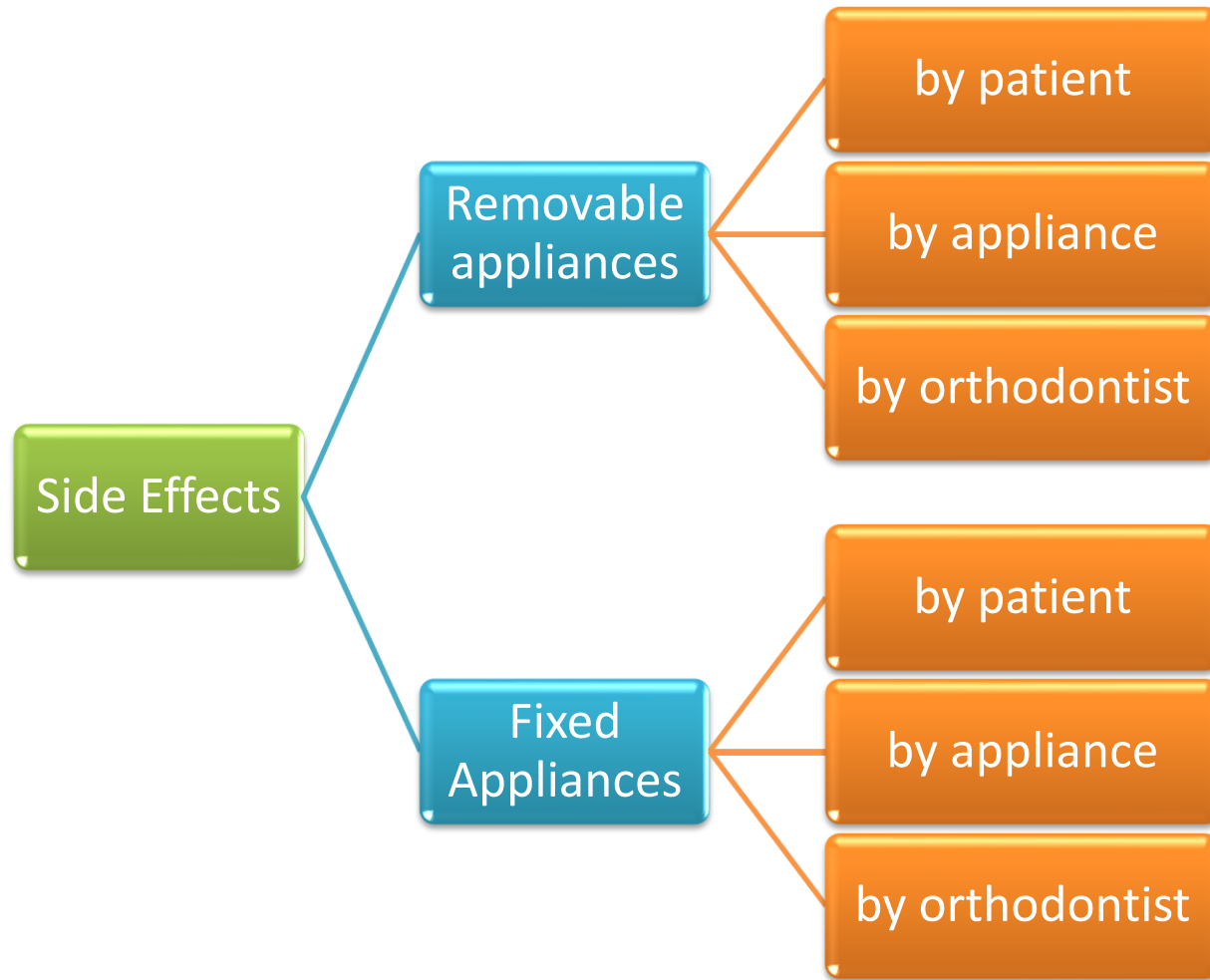
Dr. Kaán Gergely

Semmelweis University,
Department of Paediatric Dentistry and Orthodontics



SEMMELWEIS
UNIVERSITY 178969

Side effects



Side effects



• Chronic atrophic candidasis

- Caused by
 - Poor oral / appliance hygiene
 - Candida albicans
- Symptoms
 - Mild erythema or redness of the mucosa under the appliance
 - Patient hasn't got severe pain, only discomfort
- Therapy
 - Oral and denture hygiene instructions
 - Antifungal therapy
 - Nystatin pills / drops (effectiveness can be reduced by chlorhexidine mouthwash)
 - Disinfection of the appliance (or make a new one)

Side effects



- Chronic atrophic candidiasis



Side effects



• Allergy

- Caused by
 - Acrylic monomers
 - Metallic clasps (nickel)
- Symptoms
 - Can be very similar to the candida infection (of course it appears earlier and the oral hygiene can be good)
 - Rashes can appear on the face
 - Itchy pharynx
- Therapy
 - Only if it's proven (allergy test)
 - Caused by acrylic monomer
 - Using ALF appliance (skeletal removable appliance)
 - Caused by nickel
 - Using nickel free alloys

Side effects



• Allergy



Side effects



• Cheilitis angularis

- Caused by
 - Increased saliva production (especially at night)
 - Bacterial / Fungal superinfection
- Symptoms
 - Cracked and painful labial commissure
 - It heals very slowly
- Therapy
 - Daytime use of the appliance
 - Antibacterial gel (ex. Ebrimycin), antifungal gel (ex. Nystatin cream/ung)

Side effects



• Cheilitis angularis



Side effects

Side effect

Removable
appliance

By patient

• Excessive tilting of molars / incisors

- Caused by
 - Transversal expansion (molars)
 - Sagittal expansion (incisors)
- Symptoms
 - Immediately nothing
 - Few years later (incisors / molars)
 - Gingiva recession on the buccal side
 - Few decades later (buccal tilting of molars)
 - TMJ problem
- Therapy
 - Correct treatment plan
 - Hyrax ↔ removable appliance with expansion screw
 - Hybrid hyrax ↔ classic hyrax
 - Distractor ↔ hybrid hyrax
 - Headgear ↔ Class II elastic
 - Delaire mask ↔ Class III elastic

Side effects

Side effect

Removable
appliance

By patient

• White spots / caries incipiens / macula cretosa

- Caused by
 - Plaque
- Symptoms
 - White discoloration on the enamel
- Therapy
 - In the first 6 months - spontaneous remineralization
 - Use of
 - Different varnishes with high concentrate of NaF, amin-flouride - professional use (not perfect)
 - Different gels / mouthwashes with relative high concentrate of NaF, amin-flouride - patient use (not perfect)
 - Tooth mousse (Casein Phosphopeptide, Amorphous Calcium Phosphate) - professional or patient use (better)
 - Microabrasion (moderate)
 - ICON (infiltration concept)
- Prevention
 - Fluoride release adhesive
 - Good oral hygiene

Side effects

Side effect

Removable
appliance

By patient

- White spot / incipiens caries / macula cretosa



Side effects



- White spot / incipiens caries / macula cretosa
- ICON
 - <https://www.youtube.com/watch?v=jKlwpe50PV8>
 - Tooth Mousse
 - https://www.youtube.com/watch?v=Hz-_szpf85U

Side effects



• Enamel discoloration

- Caused by
 - Plaque and discoloration agents (tobacco, coffee, tea, curry, etc)
- Symptoms
 - Various colored spots on the enamel (generally brown and dark yellow)
- Therapy
 - Microabrasion (perfect)
 - Teeth whitening

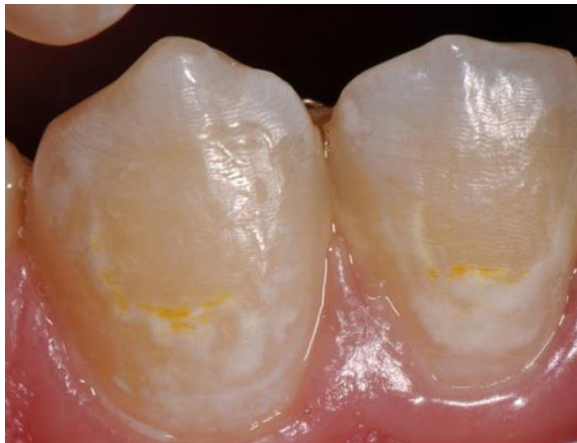
Side effects

Side effect

Removable
appliance

By patient

• Enamel discoloration



1. 치료 전



2. 치은격리 후
Opalustre 적용



3. OpalCup으로
치면 연마



4. 치료 후



REALITY

Side effects



•Caries

- Caused by
 - Plaque
- Symptoms
 - Depends on severity
- Therapy
 - Depends on severity
- Prevention
 - Fluoride releasing adhesive
 - Good oral hygiene

Side effects



•Caries



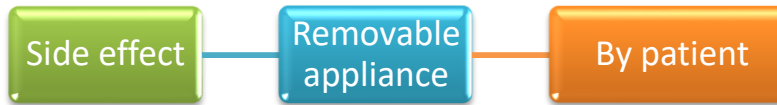
Side effects



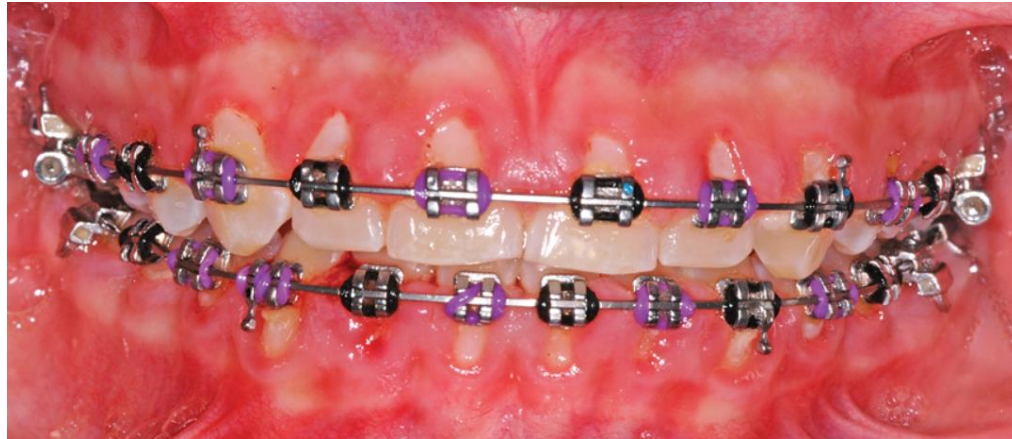
•Gingivitis

- Caused by
 - Plaque
 - Mechanical irritation
 - Allergy
- Symptoms
 - Various, depends on severity
 - Red line on the marginal gingiva - hypertrophic gingiva
 - Bleeding (general symptoms)
- Therapy
 - Depends on the cause
 - Better oral hygiene
 - Eliminate the mechanical irritation (not always possible)
 - Remove wire / brackets

Side effects



•Gingivitis



Side effects



• Allergy

- Prevalence in Europe 0,2-0,3% (allergy caused by orthodontic appliance)
- Caused by
 - Nickel
 - Source of reactive nickel is debated
 - Stainless steel wire and braces (G. Rahilly, N. Price: Nickel allergy and orthodontics. Journal of Orthodontics 2003; 30(2): 171-174) - About NiTi wire: nickel is bound in a crystal lattice it is not available to react.
 - Nickel-titanium wire (Sunitha Chakravarthi: J Orthod Sci. 2012 Oct-Dec; 1(4): 83-87.) About NiTi wire: Ni-Ti orthodontic wires in combination with fluoride media have been shown to release significantly more nickel ions in artificial saliva

Side effects



- Symptoms

- gingiva hyperplasia
- lip desquamation
- multiform erythema
- burning sensation in the mouth
- metallic taste
- peri-oral dermatitis

- Therapy

- Ceramic braces, nickel free braces
- Covered wires or TMA wire

Side effects



- Allergy



Figure 1 - Clinical condition of allergic patient after six months of treatment.

Side effects



• Mucosal injury

- Caused by
 - Sharp edges
 - Spiky ends
 - Chronical irritation
- Symptoms
 - Painful, inflamated lesion on the mucosa
 - Later it turns to chronical inflammation with hyperplasia or desquamation (painless)
- Therapy
 - Carefully cut wires
 - Cover the irritative parts of the appliances (wax, composite, wire barrel)

Side effects

Side effect

Removable
appliance

By patient

- Mucosal injury



Side effects



•Speech problems

- Caused by
 - Any appliance in the mouth
 - Of course palatal positioned appliances are worse
- Symptoms
 - Pronunciation of various letters are difficult
 - With buccal appliance (ex. F)
 - With palatal appliance (ex. C,D,L,N, etc)
- Therapy
 - After a few days the patient will get accustomed to it

Side effects



•Gingiva recession

- Caused by
 - Excessive buccal movement of the teeth
 - Poor oral hygiene
 - Thin biotype gingiva
- Symptoms
 - Most commonly it appears on the buccal side of lower incisors (of course after transversal expansion it can appear on the buccal side of molars as well)
 - In some cases, recession can appear during the treatment (poor oral hygiene)
 - In some cases the recession appears many months / years after the treatment
- Therapy
 - Periodontal surgery

Side effects

Side effect

Removable
appliance

By patient

- Gingiva recession



8/12/08
Final orthodontic result.



22 months after orthodontics.
Note recession tooth #24.



6/28/10
Day of surgery. Note no
vertical release incisions.



8/5/10
Final periodontal result.

Side effects

Side effect

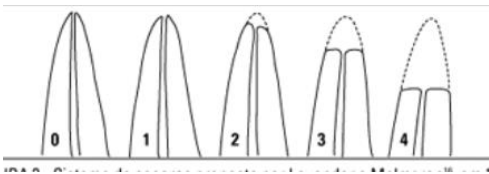
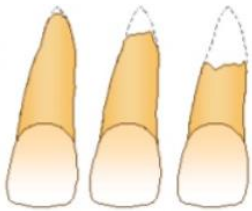
Removable
appliance

By patient

• Root resorption

• Classification

1. Linge&Linge (1983)
 - Mild $\leq 2\text{mm}$ - 90%
 - Moderate 2-4mm - 6-13%
 - Severe $\geq 4\text{mm}$ - 2% (adolescent) - 5%(adult)
2. Levander & Malmgren (1988)
 - Grade 0 - no resorption
 - Grade 1 (blunting) - Irregular root outline
 - Grade 2 (minor) - 0-2mm resorption
 - Grade 3 (moderate) - 2-4mm resorption
 - Grade 4 (extreme) - 4mm-complete root resorption
3. Generalized / localized



Side effects

Side effect

Removable
appliance

By patient

• Root resorption

- Etiological factors associated with root resorption
 1. Type of malocclusion
 - Class I < Class II/1 < Class II/2
 2. Extraction
 - Extraction > Non-extraction
 3. Type of tooth movement
 - Intrusion & torque > other tooth movement
 4. Length of treatment
 - Increased treatment time > decreased treatment time
 5. Type of force
 - Continuous > interrupted
 6. Tooth specificity
 - Maxillary incisors > mandibular incisors > canines > mandibular distal root of molars

Side effects

Side effect

Removable
appliance

By patient

• Root resorption

- Etiological factors associated with root resorption

7. Root shape

- Pointed, tapered > dilacerated > pipette shaped > blunted, incomplete

8. Root length

- Long > short

9. Trauma

- Traumatic injury > intact

10. Overjet / overbite

- Increased overjet / overbite > normal overjet / overbite (in case you would try to treat)

11. Age

- Older > younger

12. Gender

- Females > males

13. Ethnicity

- Caucasian > Asian

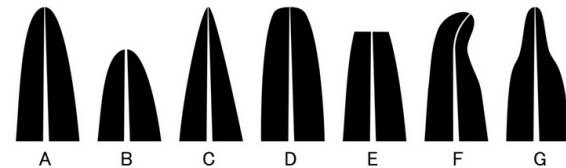


FIGURE 3.

Morphology classification of the root (A) Normal, (B) Shortened, (C) Pointed, (D) Blunt, (E) Eroded, (F) Bent, (G) Bottle shaped.

Side effects



• Root resorption

- Management

1. After the treatment
 1. Patient has to be informed
 2. Follow-up radiographic examination
 3. Flexible bonded retainer
 4. In extreme resorption, with after treatment progression endodontic treatment may be needed - CaOH
 5. Long term prognosis even in severe resorption is quite good (cervical third is enough to keep the teeth in place) * CONSOLARO, Alberto; FURQUIM, Laurindo Zanco. Extreme root resorption associated with induced tooth movement: A protocol for clinical management. **Dental Press J. Orthod.**, Maringá , v. 19, n. 5, p. 19-26, Oct. 2014

Side effects



• Root resorption

- Management

1. After the treatment
6. Occlusion must be thoroughly balanced without further interference.
7. The patient should be advised to use a mouthpiece while practicing sports.
8. Making patients aware that while eating, they should avoid grasping hard food, such as some fruit or bread, with their teeth, only
9. In cases of bruxism, the patient should use individual acrylic plates while sleeping.
10. Endodontic treatment isn't required!

Side effects



• Root resorption

- Management

- 2. During the treatment

- 1. Patient has to be informed
 - 2. The force level should be modified or a 2-3 (other authors 4-6) months pause in the treatment should be implemented
 - 3. Decrease treatment duration
 - 4. Longer intervals between activations
 - 5. Light intermittent forces

Side effects



• Root resorption

- Management

- 3. Before the treatment

- 1. Patient has to be informed
 - 2. All the risk factors should be considered
 - 3. Using light (copper niti) forces
 - 4. Don't hurry the treatment (implement stops during the treatment)

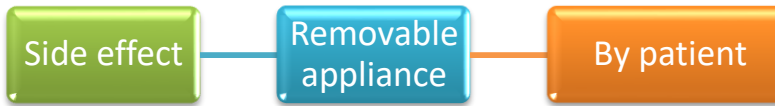
Side effects



• Root resorption

- Prognosis
 - 3mm root resorption is equivalent to 1mm alveolar bone loss (Kalkwarf 1986)
 - After the treatment (if there's no traumatic occlusion) further resorption doesn't appear (maybe the shape of the root's end will be more rounded)
 - The original root lengths were never re-established
 - Teeth with severely resorbed roots were found to be viable
 - Hypermobility can be the worst outcome (without fixed retainer it can become worse)

Side effects



• Root resorption

- Prognosis



Thank you for your attention

