
UNIVERSITY OF TORONTO
FACULTY OF DENTISTRY
The Toronto Osseointegration Conference Revisited
25 Years since the 1982 Toronto Conference on Osseointegration in Clinical Dentistry
May 8-10, 2008
METRO TORONTO CONVENTION CENTRE

Traume-pasienten

Veivalg hvis pasienten er ung eller hvis pasienten og skaden er eldre

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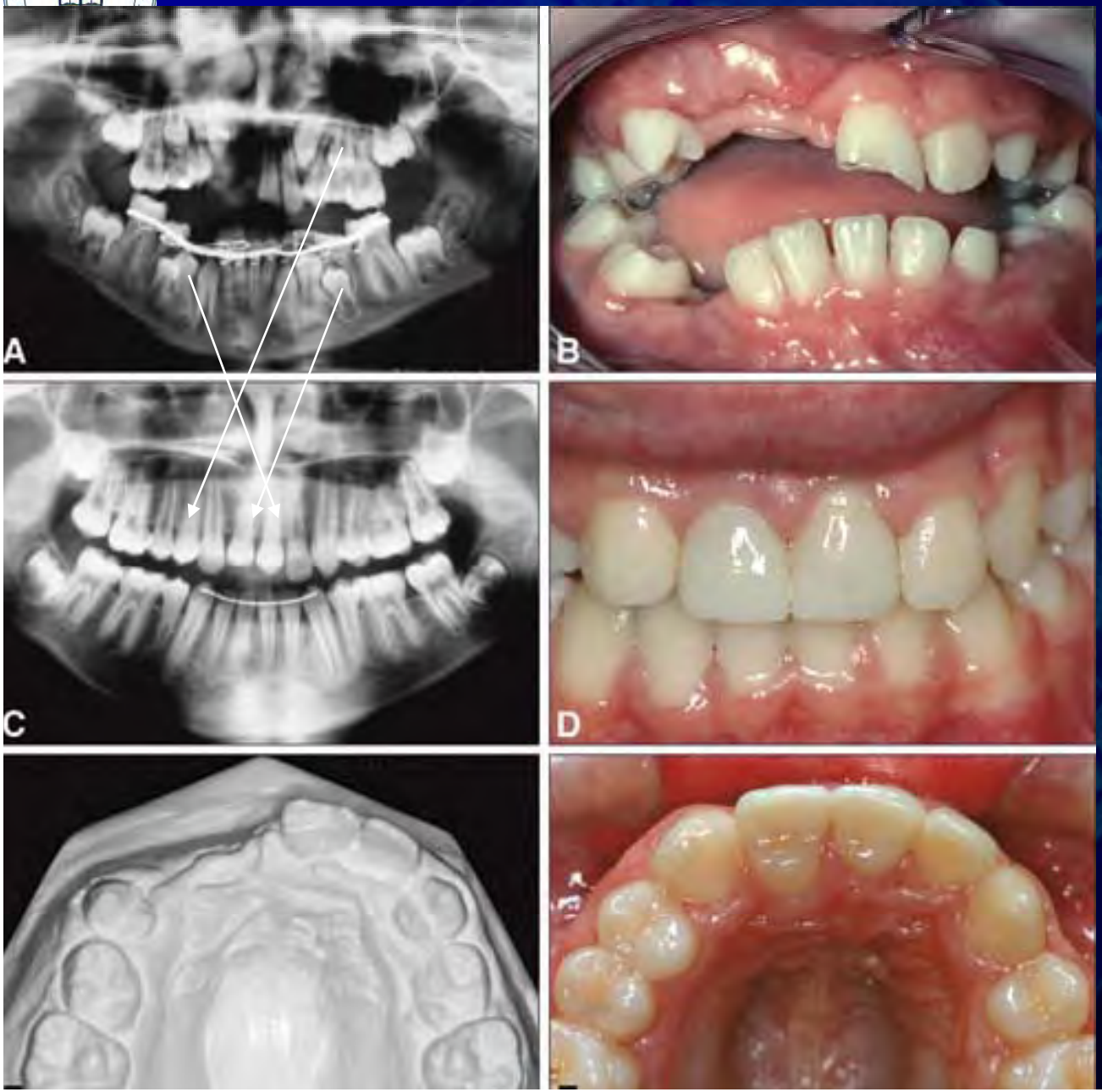
Trauma types

1. Fracture
   - Jaw
   - Crown-root
   - Root – cervical / middle / apical
2. Post trauma complications
   - Inflammatory root resorption
   - Ankylosis
3. Exarticulation (”avulsed tooth”)

1. Fractures

Jaw fracture



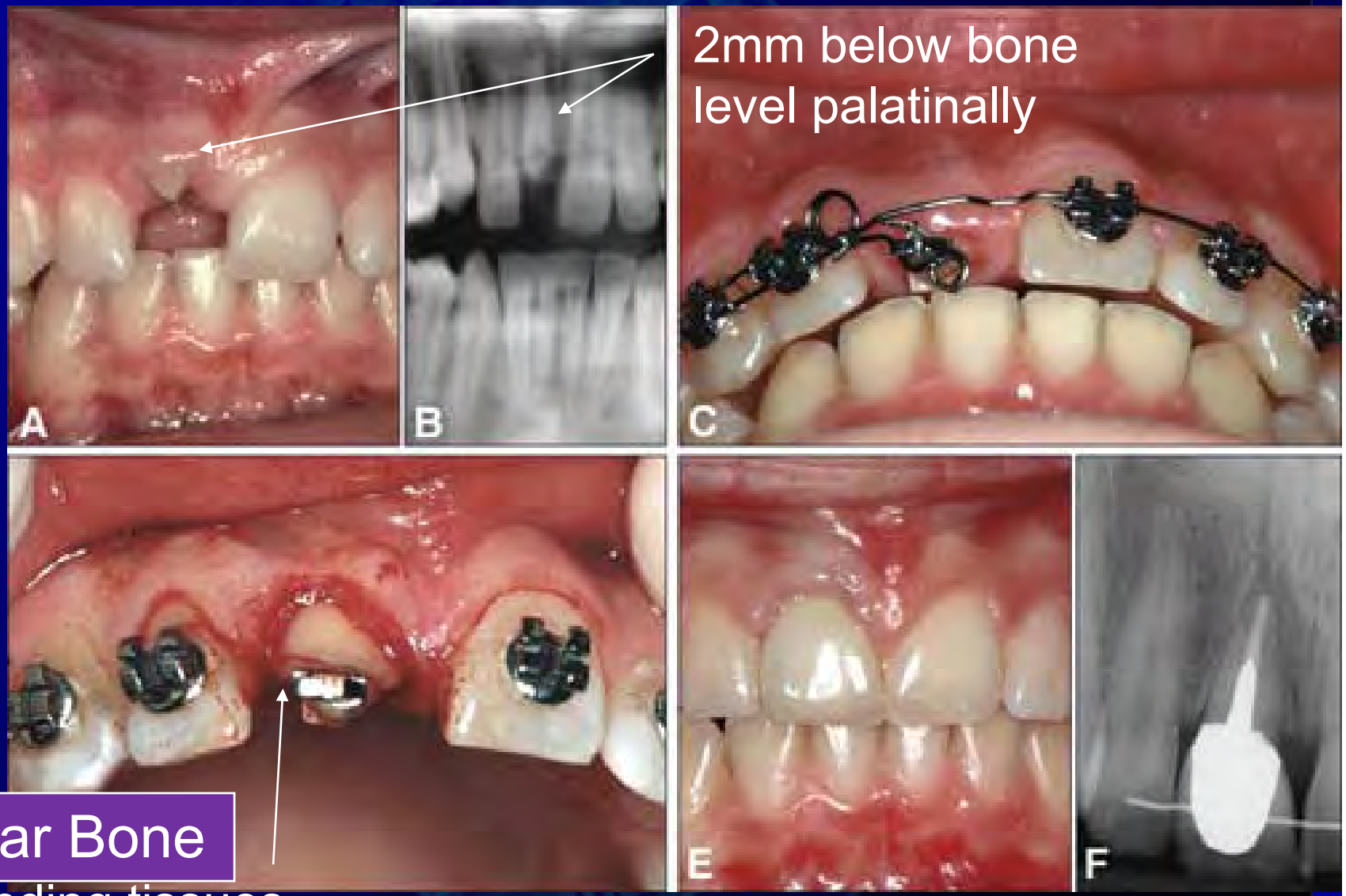
Age 10
Corpus & condyle
11 & 12
14 & 21

Autotransplant
Orthodontics
Composites

Alveolar Bone

Faculty of Dentistry, University of Oslo, Depts. of Pedodontics, Orthodontics & Prosthodontics. Stenvik & Birkeland, 2007.

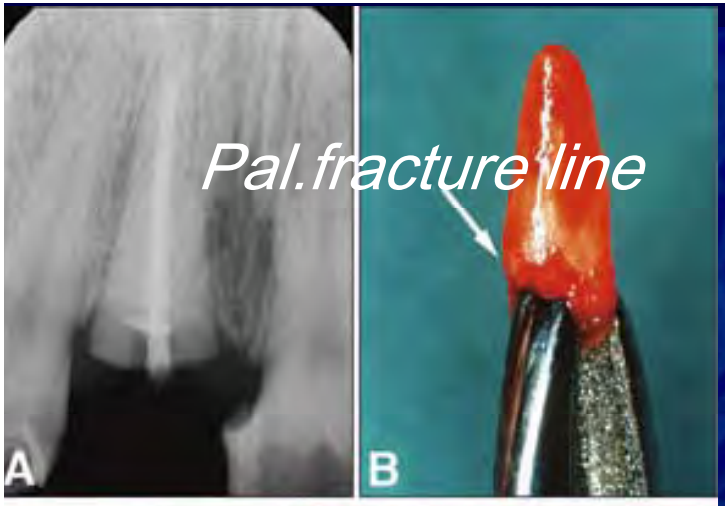
Crown–root fracture

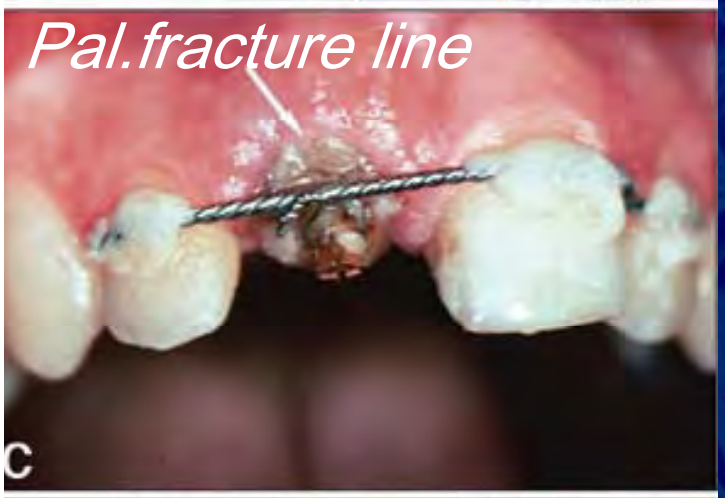


Alveolar Bone

Surrounding tissues follow the fragment

Faculty of Dentistry, University of Oslo, Depts. of Pedodontics, Orthodontics & Prosthodontics. Stenvik & Birkeland, 2007.





Crown–root fracture

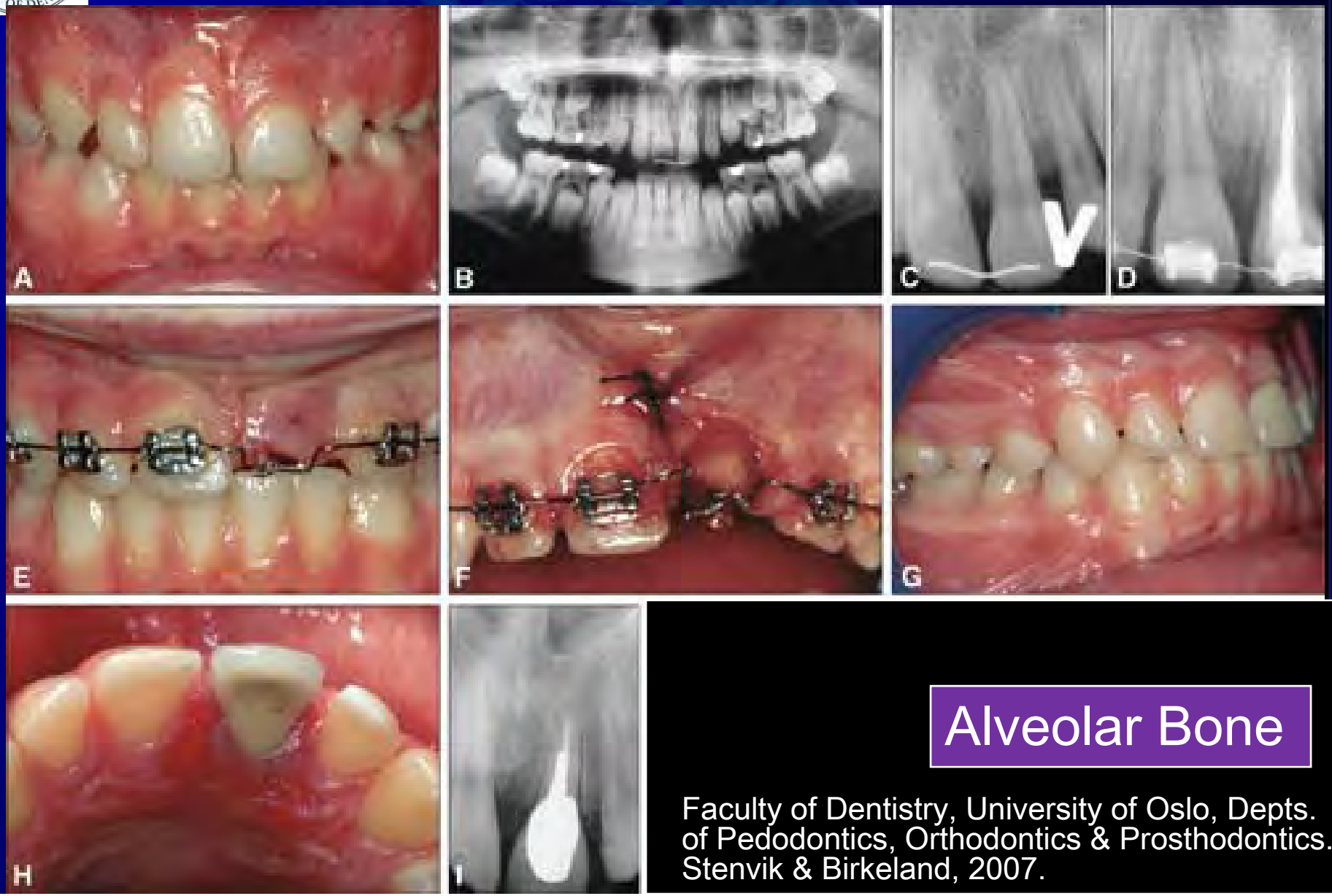
Surgical repositioning (intraalveolar transplant) 180 degrees rotated

Fixate min. 2 weeks before crown therapy

Alveolar Bone

Faculty of Dentistry, University of Oslo, Depts. of Pedodontics, Orthodontics & Prosthodontics.

Root fracture *Cervical 1/3 third.*



Alveolar Bone

Faculty of Dentistry, University of Oslo, Depts. of Pedodontics, Orthodontics & Prosthodontics.
Stenvik & Birkeland, 2007.

Root fracture

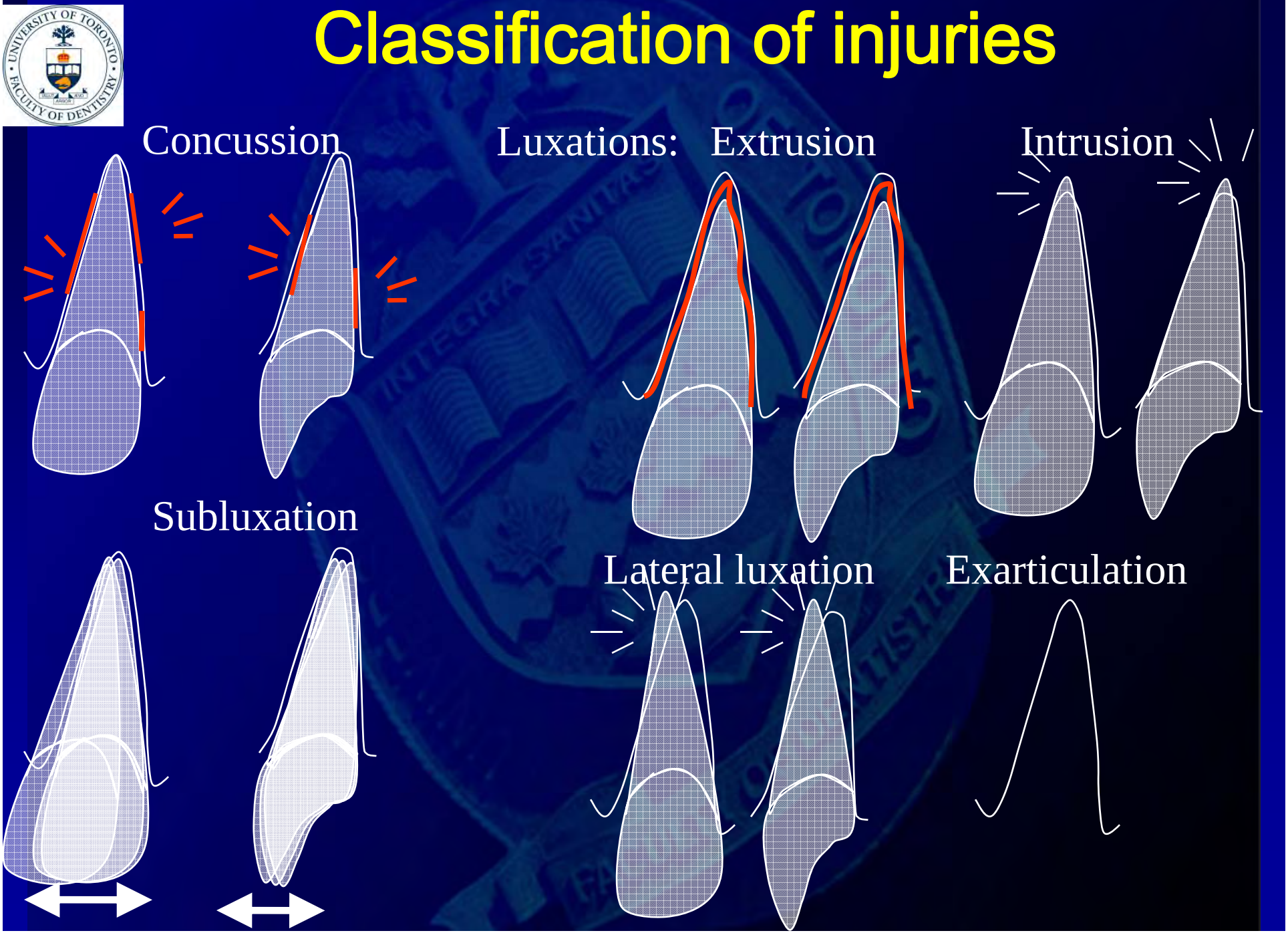
Middle 1/3 third.

Faculty of Dentistry, University of Oslo, Depts. of Pedodontics, Orthodontics & Prosthodontics. Stenvik & Birkeland, 2007.

1. Fractures

2. Post-trauma complications

Classification of injuries



Progressive resorption

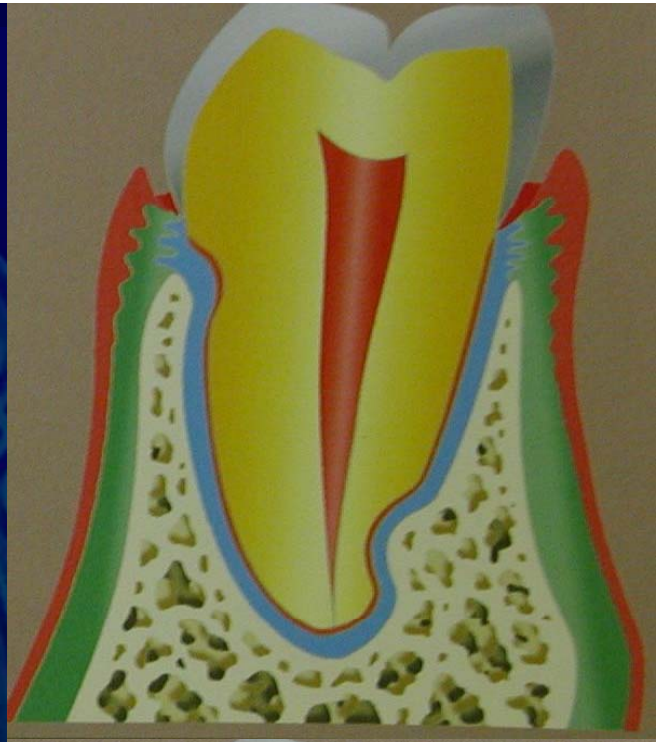
Prevalence following tooth trauma

Concussion 0%
Subluxation 0%
Lateral luxation 4%
Extrusion 6%
Exarticulation and replantation 40%
Intrusion 64%

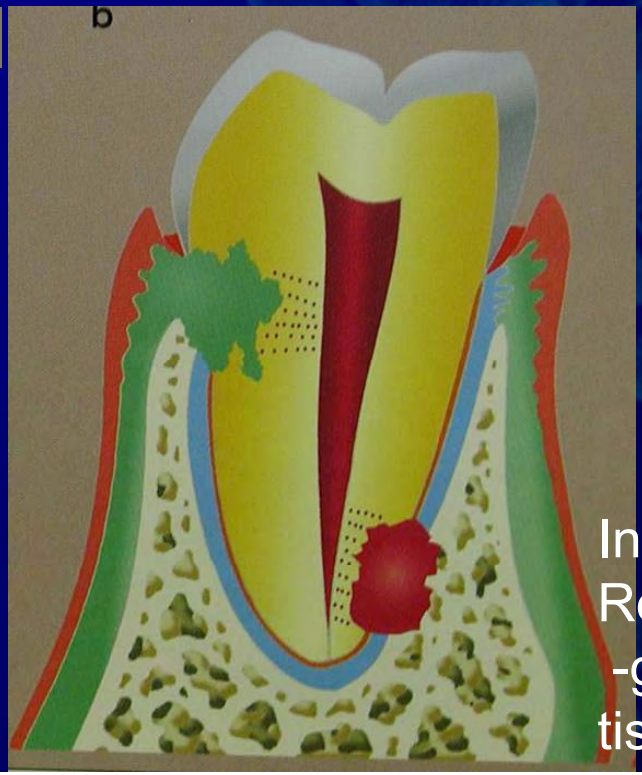
(Andreasen et al. .94)

FREQUENT OBSERVATIONS!

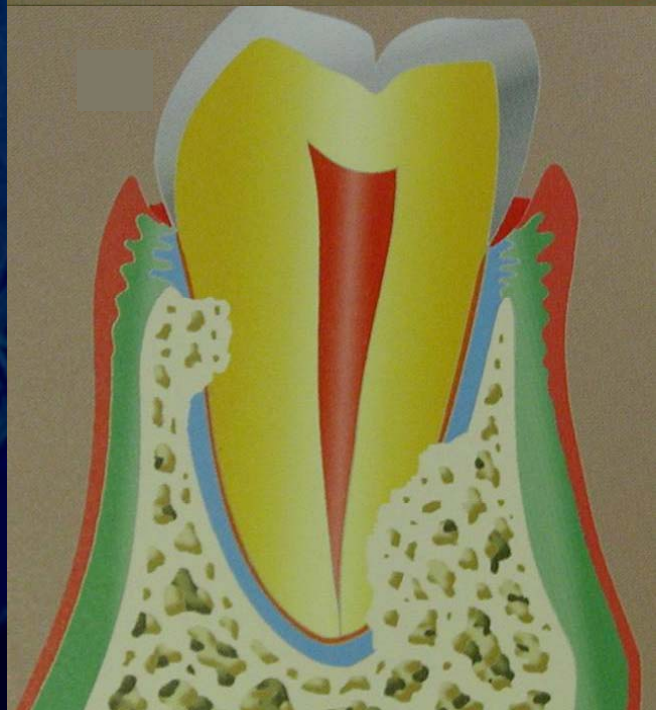
EARLY INTERVENTION!



Surface Resorption



Inflammatory Resorption -granulation tissue



Replacement Resorption → ankylosis

1. Fractures
2. Post-trauma complications
3. Exarticulation

Long term planning for the patient with an exarticulated tooth

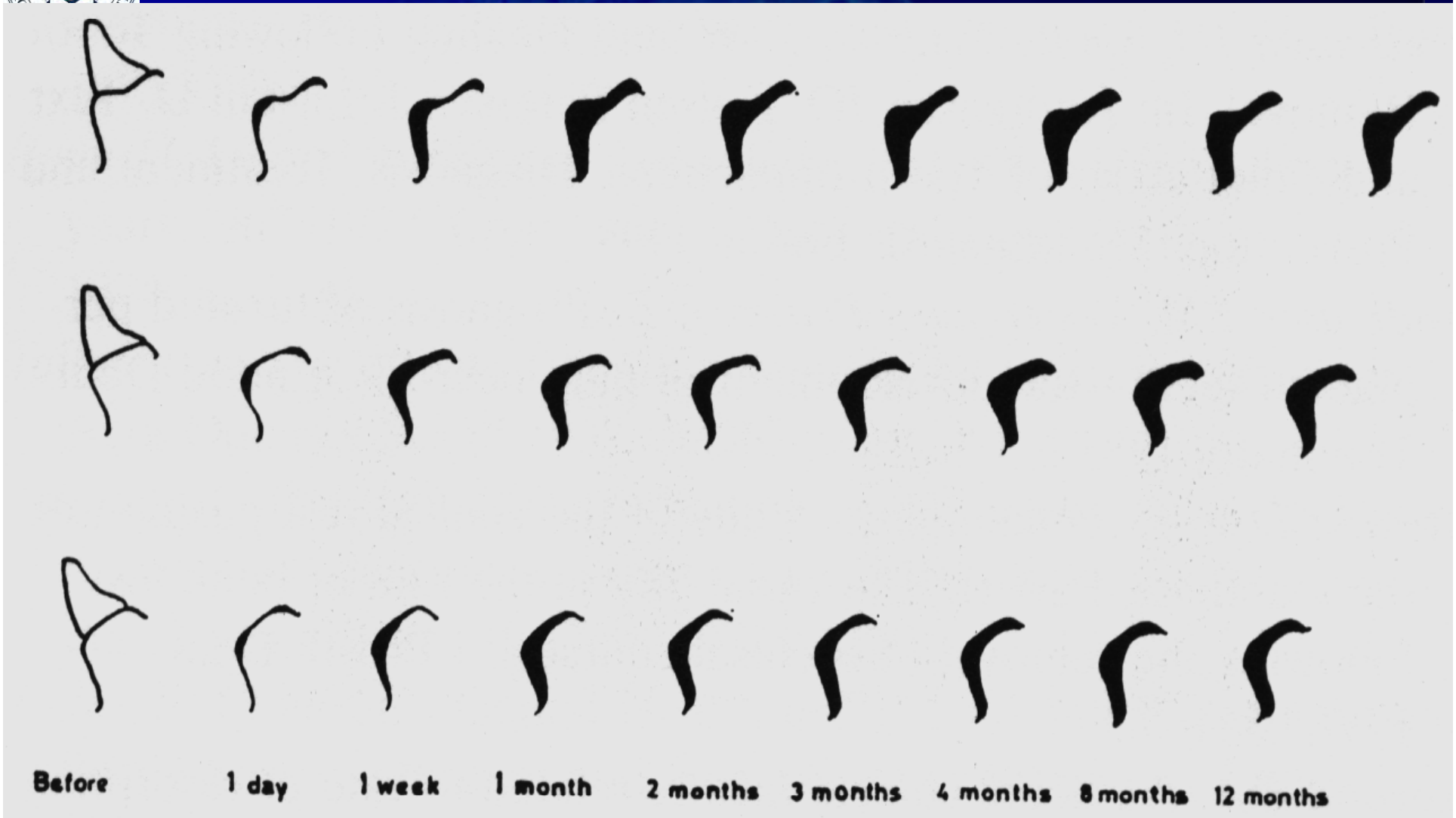
Choice of appropriate intervention complicated by:

* Few long term studies
* New technical solutions have been introduced
* Method reported: indications, procedures, execution?
* Higher demands of aesthetics than before

Rule #1

Maintain the alveolar bone!

Bone loss following tooth loss

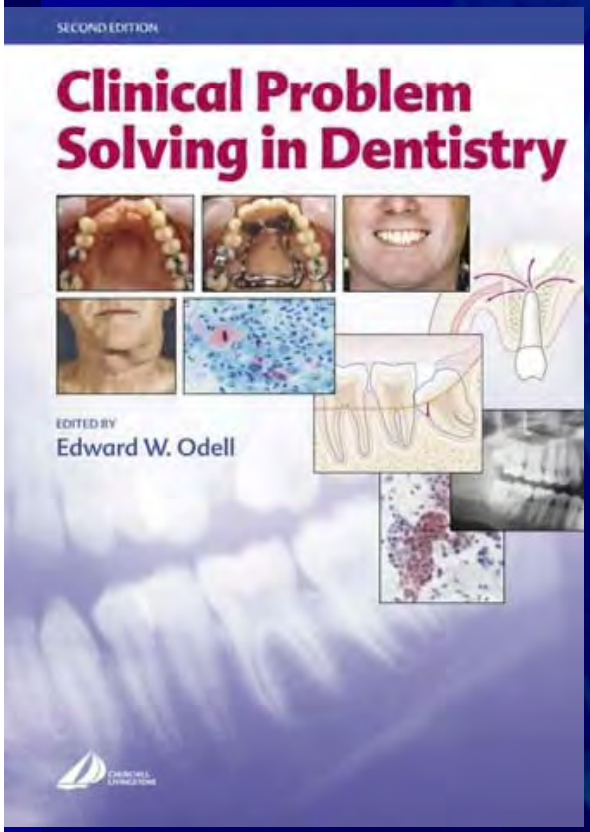


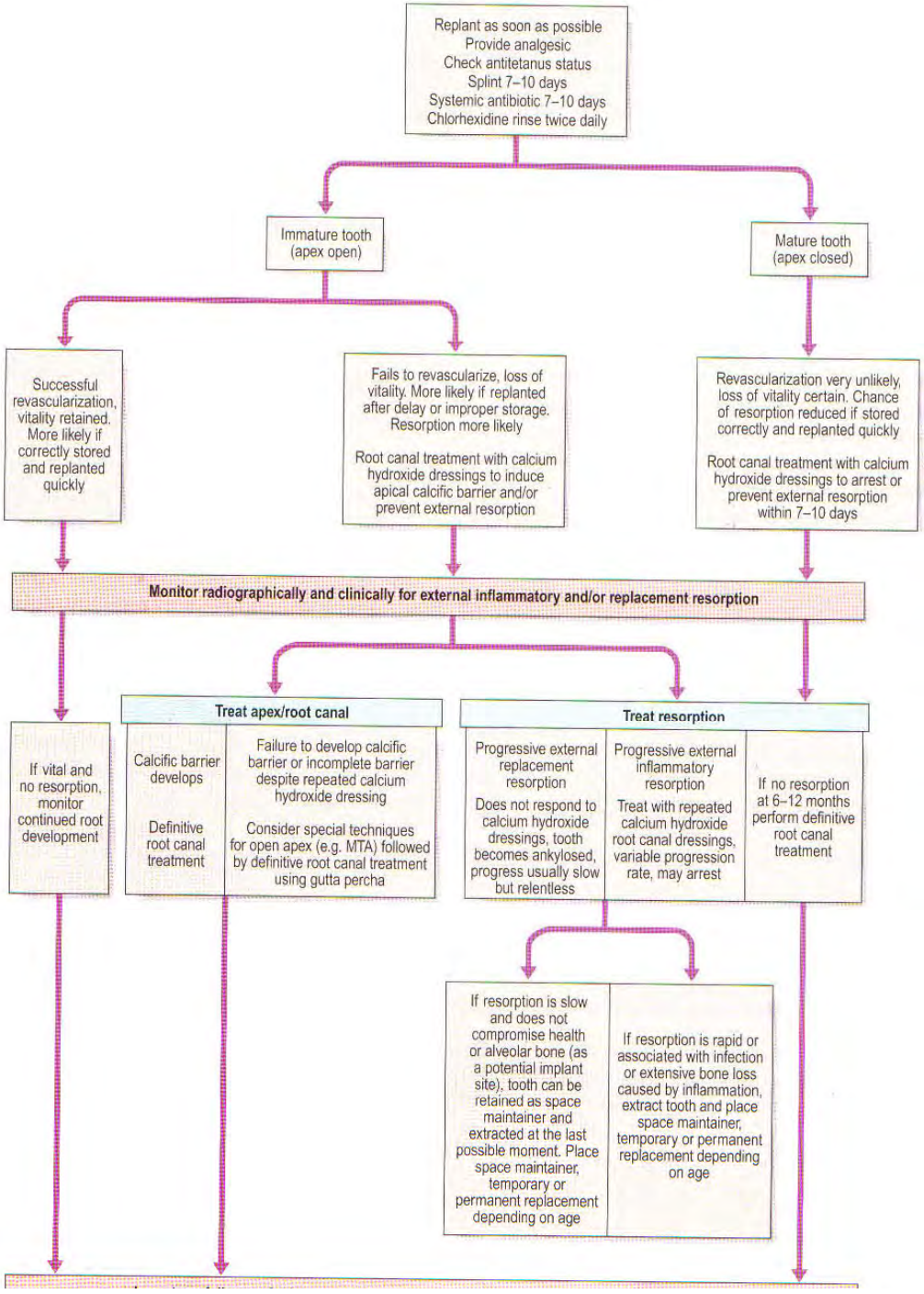
+ unknown damage of the buccal bone plate?

Lam, 1960

Rule #2

The management at the early phase will determine the long term outcome


SECOND EDITION
Clinical Problem Solving in Dentistry
EDITED BY
Edward W. Odell


Replant as soon as possible
Provide analgesic
Check antitetanus status
Splint 7–10 days
Systemic antibiotic 7–10 days
Chlorhexidine rinse twice daily
Immature tooth (apex open)
Mature tooth (apex closed)
Successful revascularization, vitality retained. More likely if correctly stored and replanted quickly
Fails to revascularize, loss of vitality. More likely if replanted after delay or improper storage. Resorption more likely
Root canal treatment with calcium hydroxide dressings to induce apical calcific barrier and/or prevent external resorption
Revascularization very unlikely, loss of vitality certain. Chance of resorption reduced if stored correctly and replanted quickly
Root canal treatment with calcium hydroxide dressings to arrest or prevent external resorption within 7–10 days
Monitor radiographically and clinically for external inflammatory and/or replacement resorption
If vital and no resorption, monitor continued root development
Treat apex/root canal
Calcific barrier develops
Definitive root canal treatment
Failure to develop calcific barrier or incomplete barrier despite repeated calcium hydroxide dressing
Consider special techniques for open apex (e.g. MTA) followed by definitive root canal treatment using gutta percha
Treat resorption
Progressive external replacement resorption
Does not respond to calcium hydroxide dressings, tooth becomes ankylosed, progress usually slow but relentless
Progressive external inflammatory resorption
Treat with repeated calcium hydroxide root canal dressings, variable progression rate, may arrest
If no resorption at 6–12 months perform definitive root canal treatment
If resorption is slow and does not compromise health or alveolar bone (as a potential implant site), tooth can be retained as space maintainer and extracted at the last possible moment. Place space maintainer, temporary or permanent replacement depending on age
If resorption is rapid or associated with infection or extensive bone loss caused by inflammation, extract tooth and place space maintainer, temporary or permanent replacement depending on age

Rule #3

It is necessary to make an individualized treatment plan for each patient

Replant the exarticulated tooth

Advantage	Disadvantage
➢ Buy time! ➢ Retain bone	➢ Frequent controls and follow-up examinations

Replant the exarticulated tooth

Advantage	Disadvantage
➢ Buy time! ➢ Retain bone	➢ Frequent controls and follow-up examinations

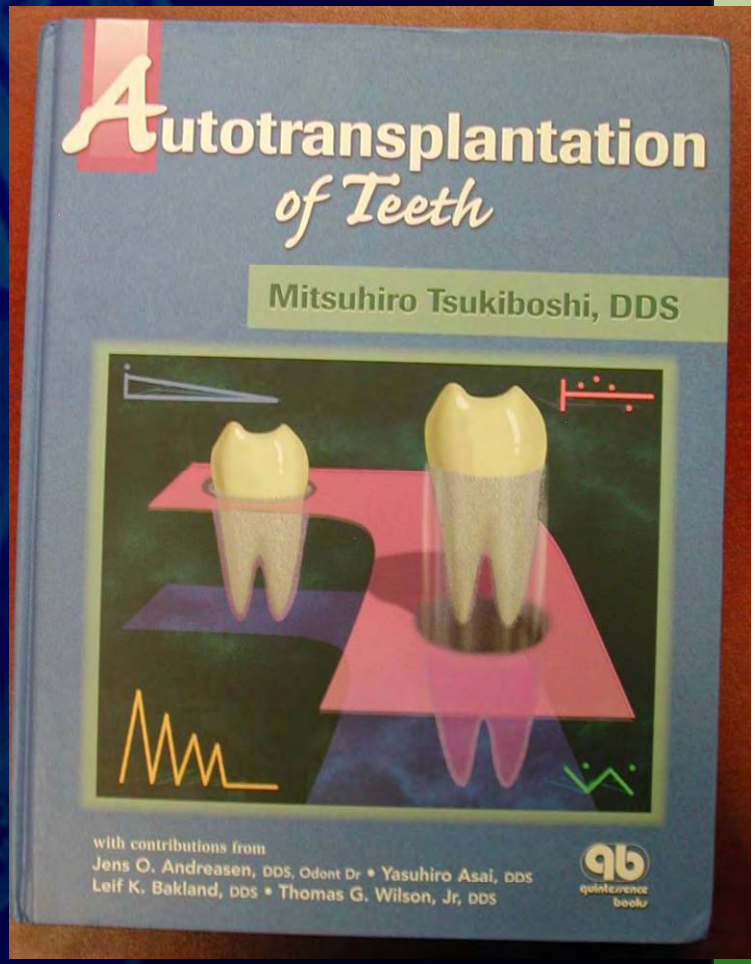
EXCEPTION:

IF PATIENT < 12 YEARS OLD:

CONSIDER AUTOTRANSPLANTATION

Auto-transplantation

”The transplantation of embedded, impacted or erupted teeth from one site to another in the same individual into extraction sites or surgically prepared sockets”



Autotransplantation and prognostic variables

Intrinsic factors

- Root development of donor tooth
- Size of apical foramen
- Timing of ortodonthic intervention
- Surgical technique

Clinical experience

- Trauma to the periodontal ligament and root-resorption

  (Andreassen et al 90)
- Eruption and growth of the alveolar process

  (Paulsen et al. 98)

Autotransplantation of (1st.) premolars with incomplete root formation to anterior maxilla

* > 90 % success
* New periodontal membrane
* Continuous root formation
* Pulp obliteration
* Keep alveolar process
* Keep functional occlusion

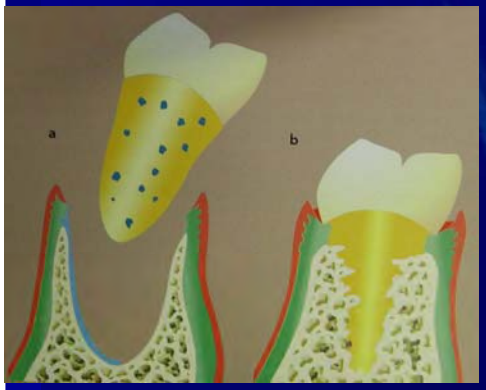
Autotransplanted teeth

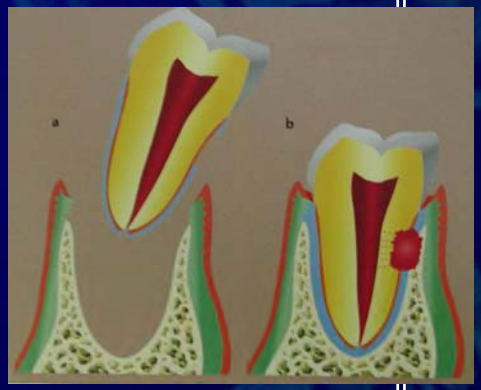
1. Induces bone
2. Induces a gingival papilla
3. No requirement of bone support
4. Eruption possible
5. Can be moved orthodontically
6. No age-related requirements
7. Very good cost-effectiveness

Replant the exarticulated tooth

Advantage

- Buy time!
- Retain bone
- Symmetry maintained





Disadvantage

- Risk of:
  - Infection?
  - Pulp necrosis
  - Ankylosis
    - Infraposition
    - Ridge disharmony
    - Soft tissue disharmony
  - Inflammatory resorption
    - Discoloration

When can the lost tooth be restored permanently?

Alternatives

FIRST:

Consider consequences of interventions in the mixed dentition with regard to jaw development and establishment of the permanent dentition

Alternatives

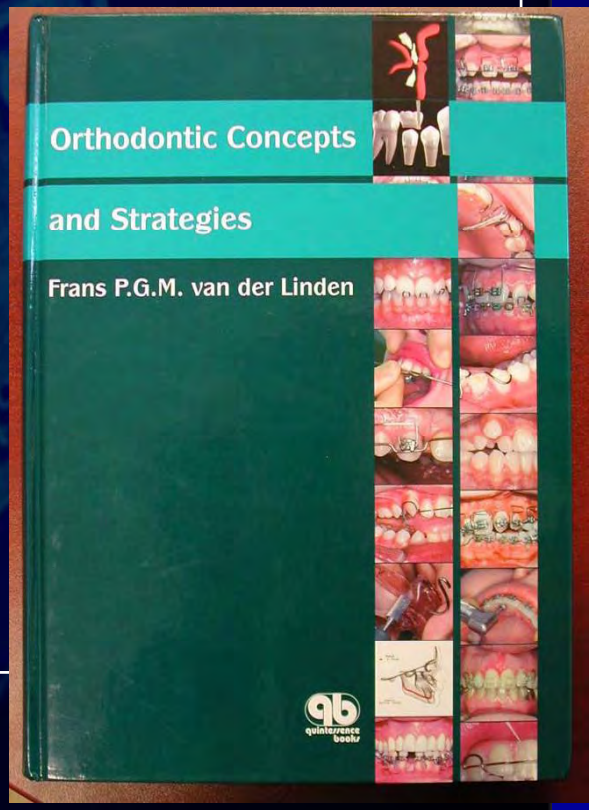
Consider consequences of interventions in the mixed dentition with regard to jaw development and establishment of the permanent dentition

1. Orthodontic space closure

1. Orthodontic space closure

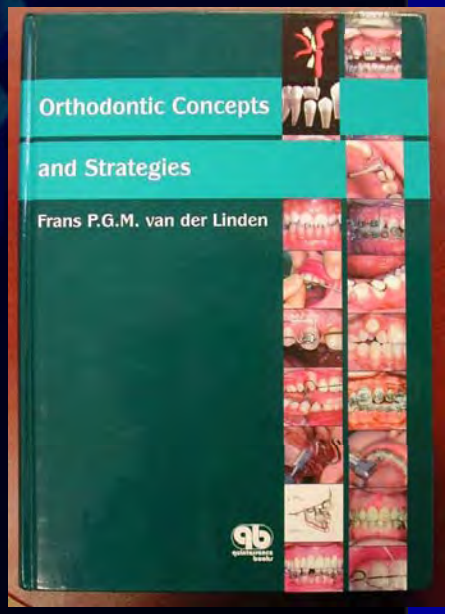
General considerations

- Morphology and dimension requirements
- Esthetics requirements
- Patient age
- Space situation
- Mid-line
- Root-cement
- Symmetry



Indicators for orthodontic solution

* Young patient
* Lack of space
* Proclined incisives
* Large lateral
* Other need for orthopedic treatment



Orthodontic process if early loss of central

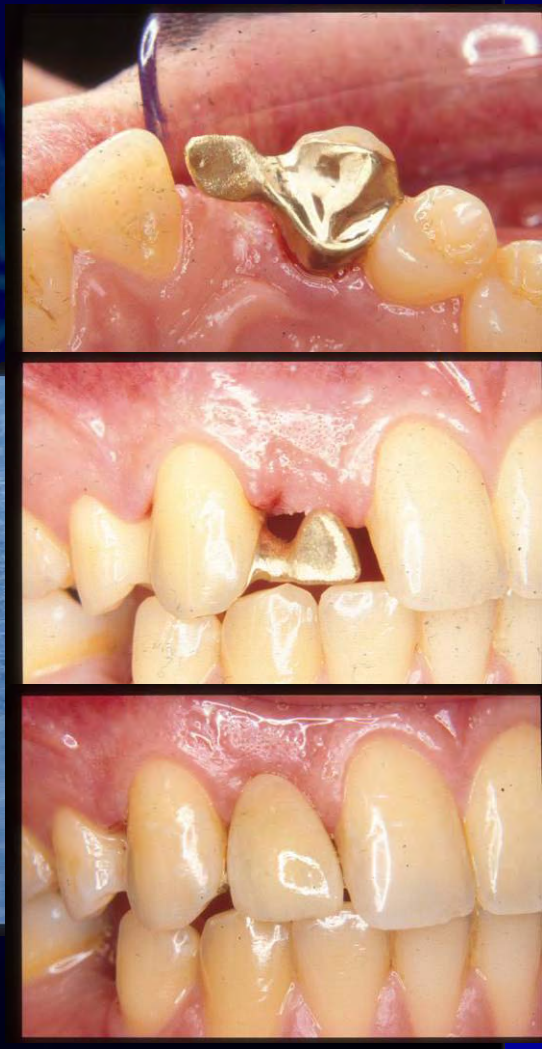
* Move lateral to midline immediately
* Extract 1st deciduous molar to obtain mesial movement of 1st molar
* Deciduous canine extracted depending on angulation of canine
* Complete the orthodontic treatment early in the permanent dentition

Alternatives

Consider consequences of interventions in the mixed dentition with regard to jaw development and establishment of the permanent dentition

1. Orthodontic space closure
2. Conventional prosthodontics

Fixed ”esthetic” solutions – preimplant –pre-etch-bridge era



Fixed prothodontics and young patients

Complications

- Large risk for accidental pulp exposure
- Large risk of pulp damage due to thermic, osmotic chemical and bacterial effects
- Tooth in eruption, retention and esthetic problems
- Contour and gingival problems

Delay! Delay! Delay!

Etch bridges - young vz older patients

- Seems to loosen more than for adults
  - More often problems with a dry work field?
  - Longer clinical crowns?
  - Resin attachment to enamel depend on age?
- Etch bridges that become loose is often after short time – good cement technique crucial.
- Recemented etch-bridges show higher loosening rate compared to recemented repaired etch-bridges – consider functional stresses
- Preparation of guideplanes, occlusal stops and proximale furrows increase retention but decrease reversibility of therapy

Alternatives

Consider consequences of interventions in the mixed dentition with regard to jaw development and establishment of the permanent dentition

1. Orthodontic space closure
2. Conventional prosthodontics
3. Removable flipper

Temporary Removable "Esthetic" solutions

Alternatives

Consider consequences of interventions in the mixed dentition with regard to jaw development and establishment of the permanent dentition

1. Orthodontic space closure
2. Conventional prosthodontics
3. Removable flipper
4. Implant supported therapy
5. (Auto-transplantation)

Implant therapy – delay!

Three major reasons for not placing implants in patients before growth ends:

1. The implant does not follow the growth of the alveolar ridge and will remain in an infraposition or perhaps even submerged
2. An implant can potentially influence the normal growth of the jaw
3. Immature bone reacts differently from mature bone. The implant may deviate from the original positional axis

Koch G, Bergendal T, Kvint S, Johansson UB, 1996

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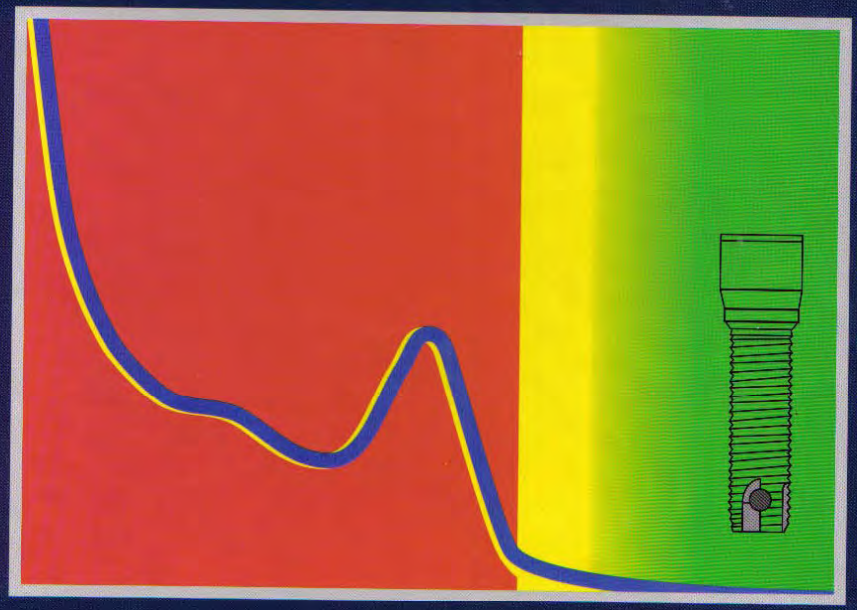
THE INSTITUTE FOR POSTGRADUATE DENTAL EDUCATION
JÖNKÖPING, SWEDEN

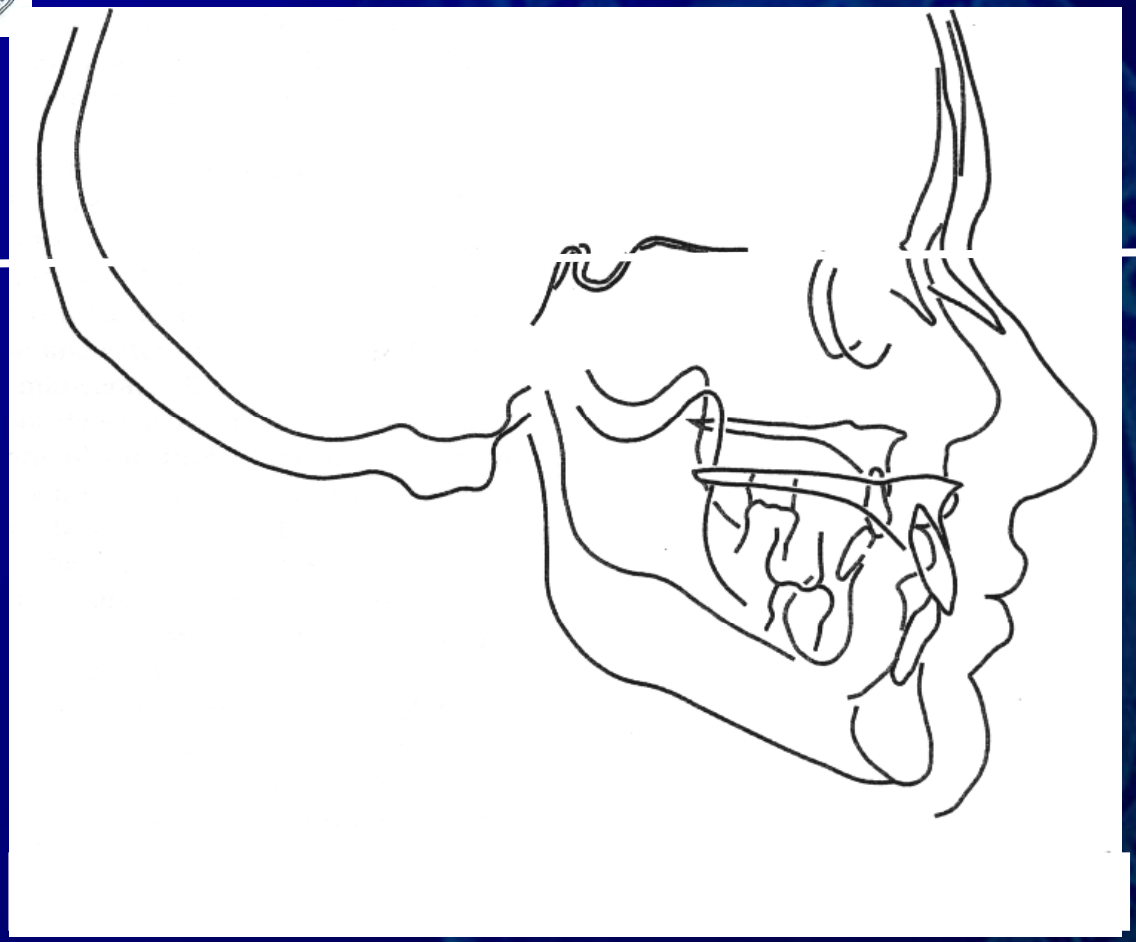
Consensus Conference on

Oral Implants in Young Patients



Editors: Göran Koch, Tom Bergendal, Sven Kvint, Ulla-Britt Johansson

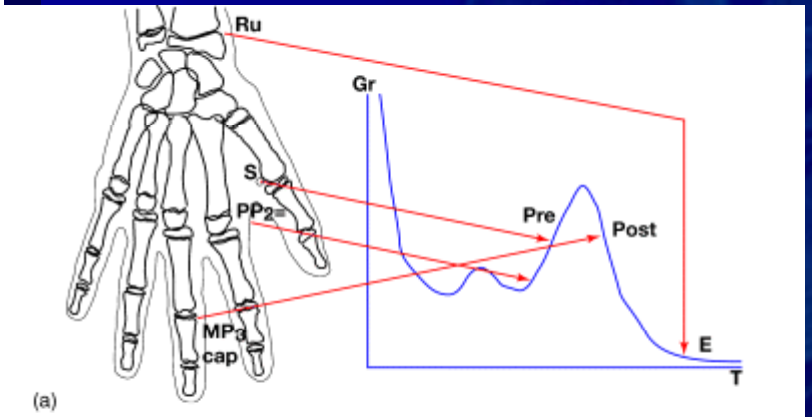
Growth



Growth:
Horisontal
Vertical

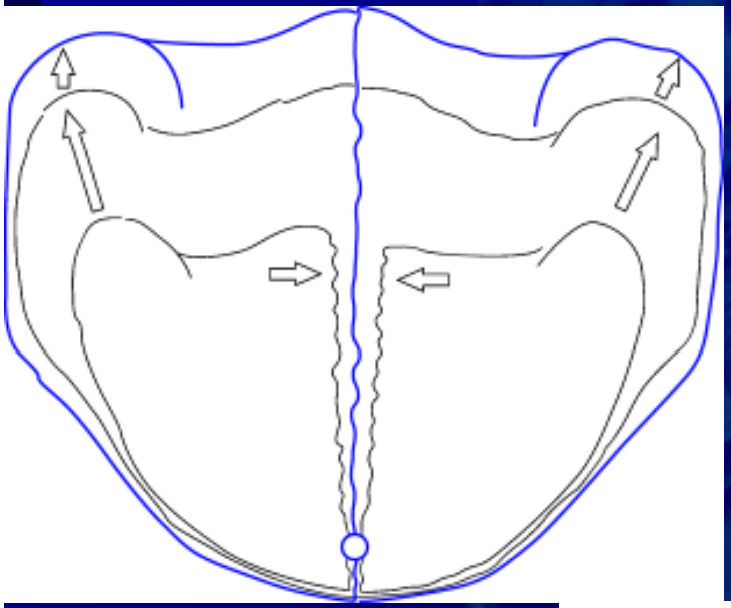
Planes:
Sagital
Frontal
Transversal

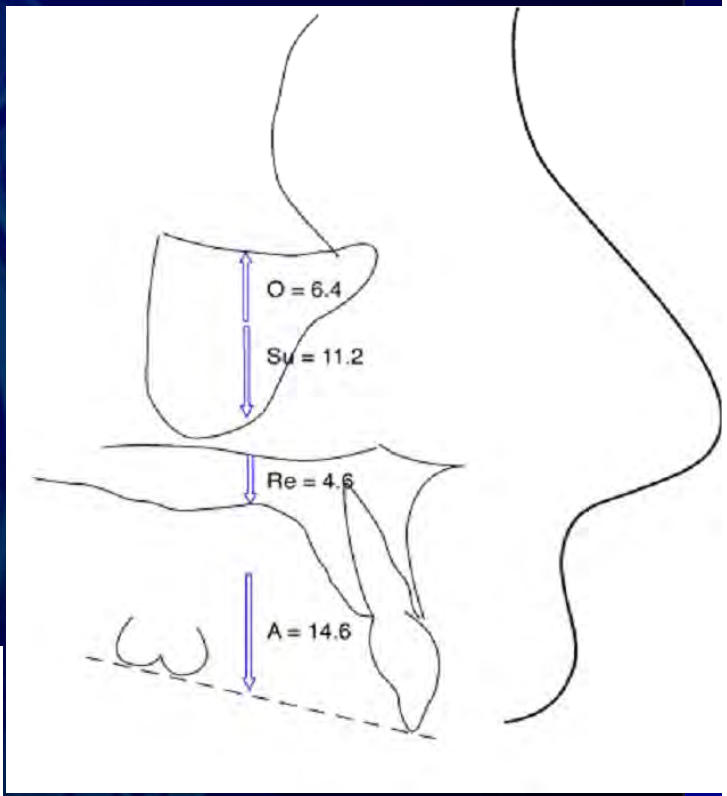
Growth in time

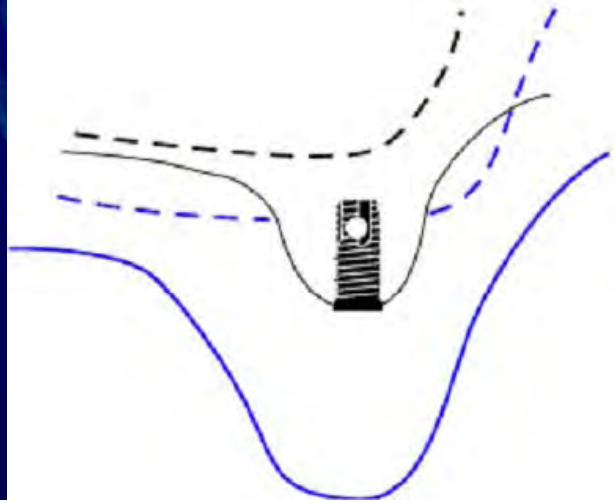


Hand–wrist radiograph indicators can be used to place a patient in the general area of the growth curve.

Maxillary growth-

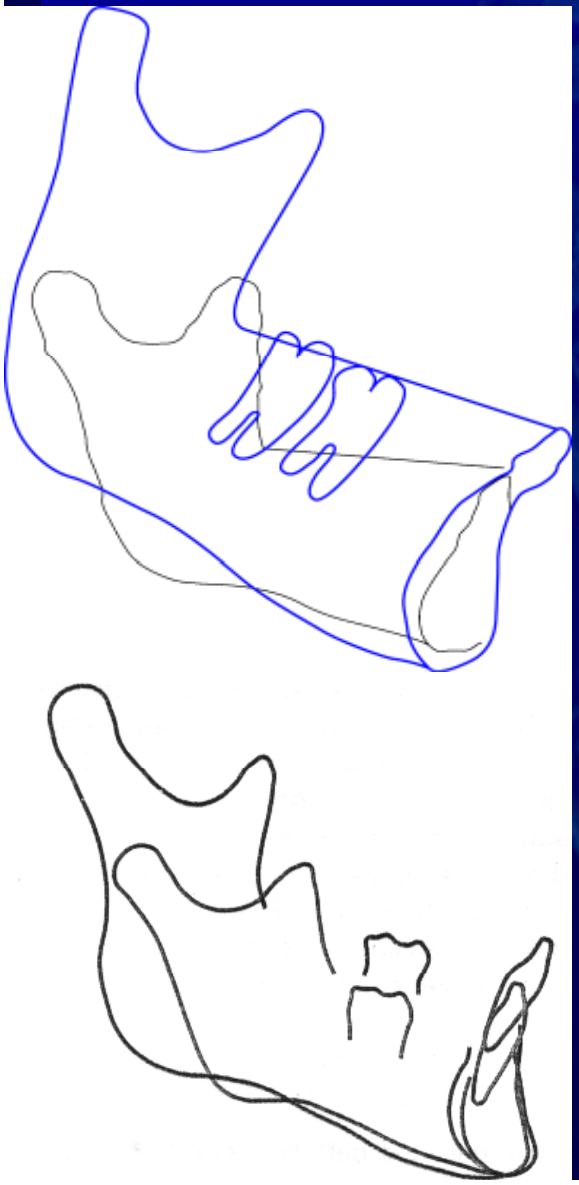


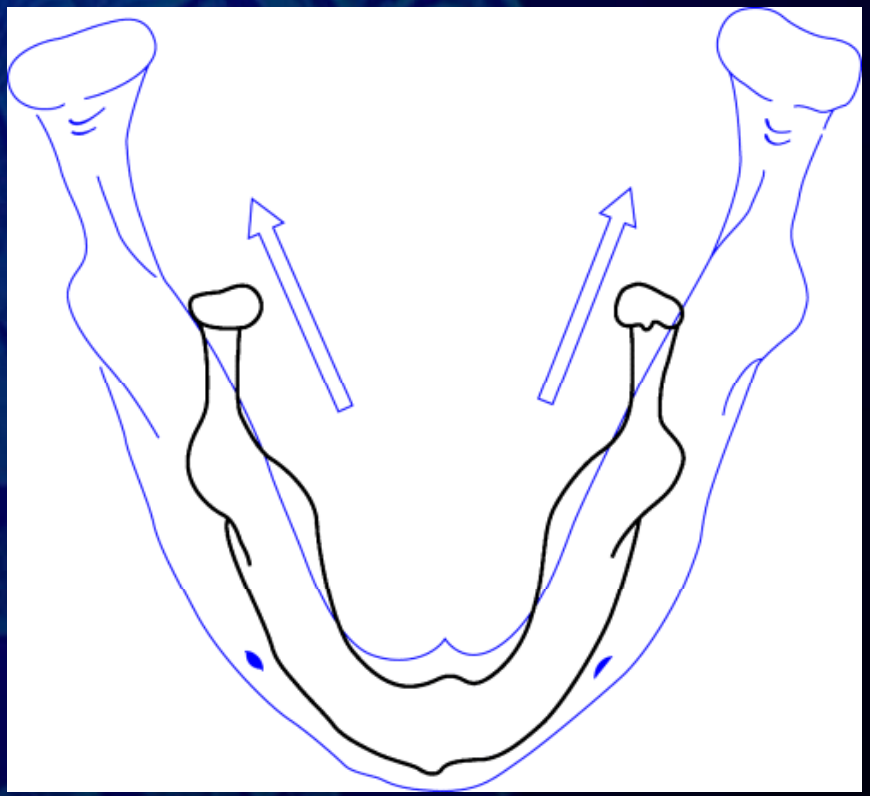




Op Heij, et al. 2003

Mandible growth





Op Heij, et al. 2003

Implant therapy – delay!