



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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Faculty of Dentistry, University of Toronto



Trauma types

1. Fracture

- Jaw
- Crown-root
- Root – cervical / middle / apical

2. Post trauma complications

- Inflammatory root resorption
- Ankylosis

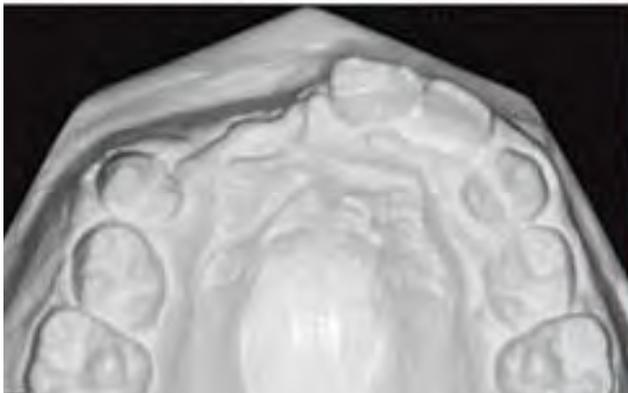
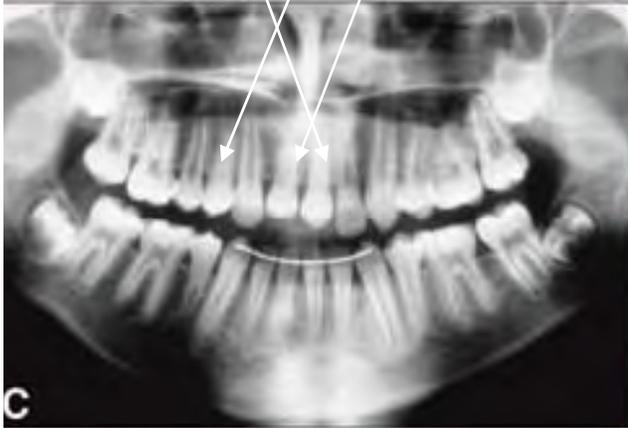
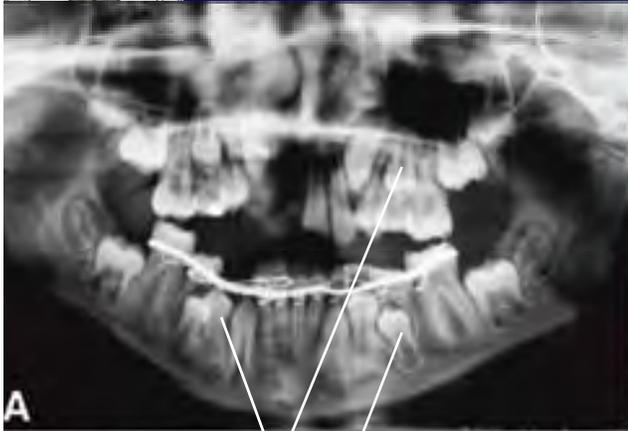
3. Exarticulation ("avulsed tooth")



1. Fractures



Jaw fracture



Age 10
Corpus & condyle
11 & 12
14 & 21

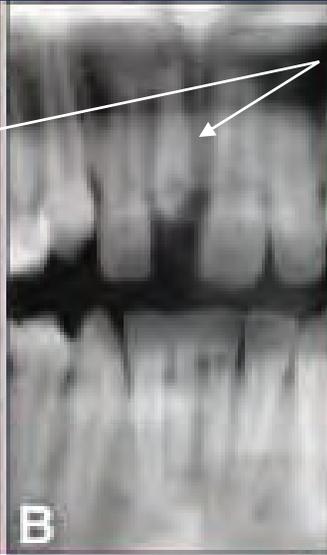
Autotransplant
Orthodontics
Composites

Alveolar Bone

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



Crown-root fracture



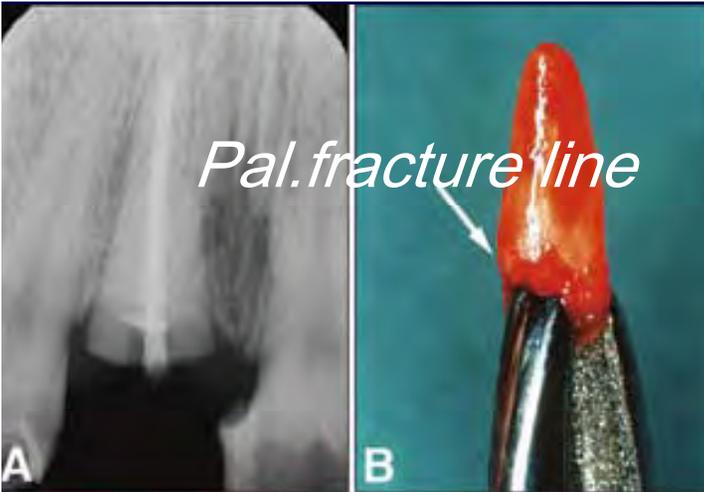
2mm below bone level palatally



Alveolar Bone

Surrounding tissues follow the fragment

Crown-root fracture



*Surgical repositioning
(intraalveolar transplant)
180 degrees rotated*

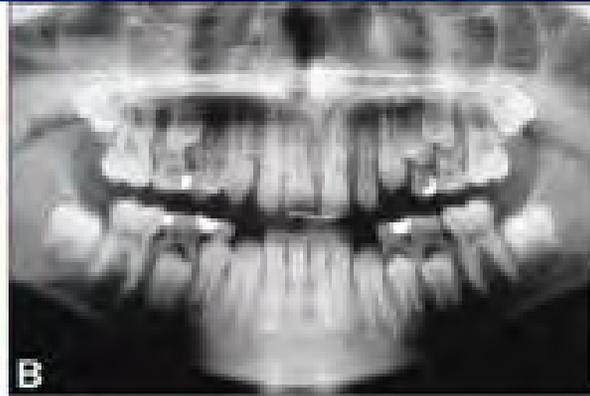
*Fixate min. 2 weeks before
crown therapy*

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.

bone level



A



B



C



D



E

bone level

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



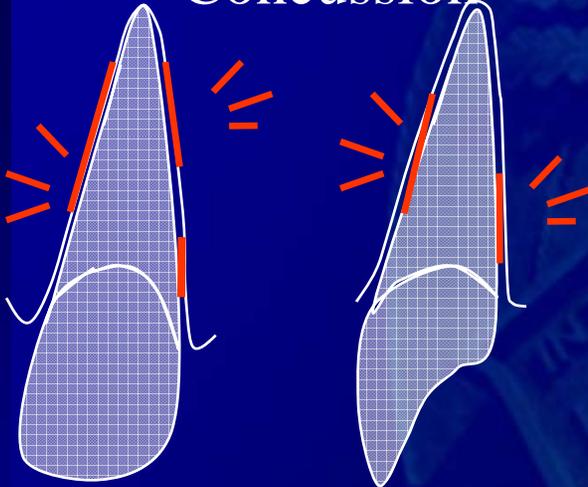
1. Fractures

2. Post-trauma complications

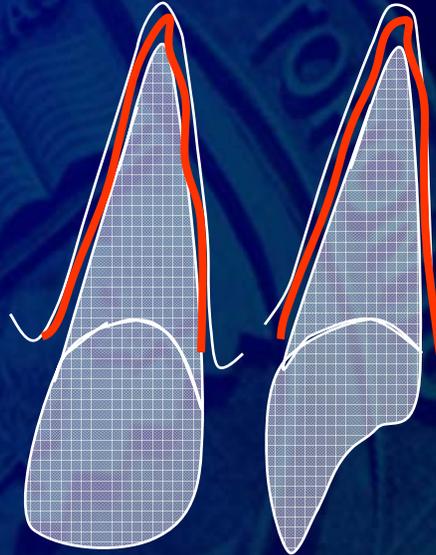


Classification of injuries

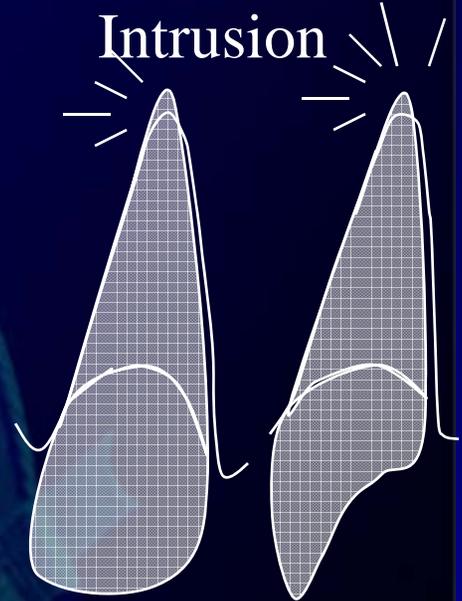
Concussion



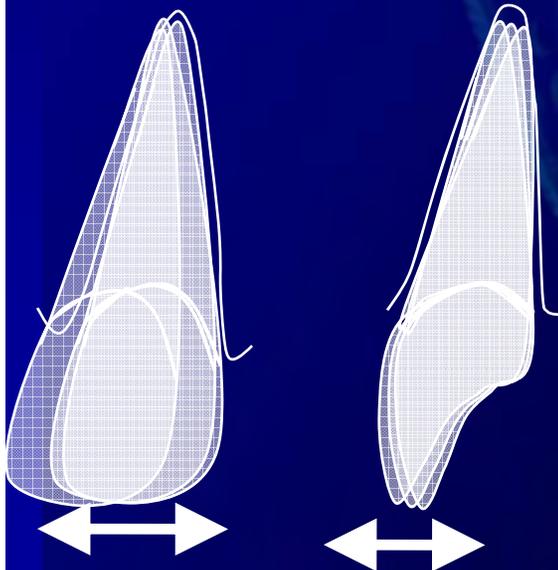
Luxations: Extrusion



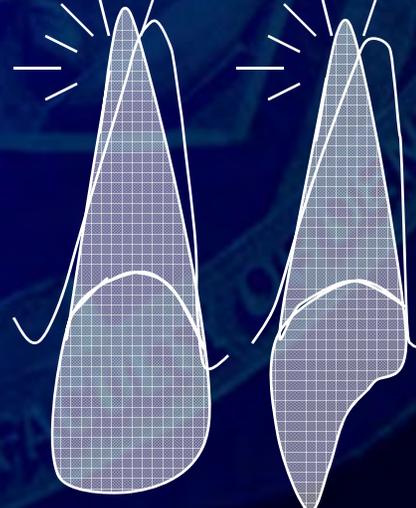
Intrusion



Subluxation



Lateral luxation



Exarticulation





Progressive resorption

Prevalence following tooth trauma

Concussion 0%

Subluxation 0%

Lateral luxation 4%

Extrusion 6%

Exarticulation and replantation 40%

Intrusion 64%

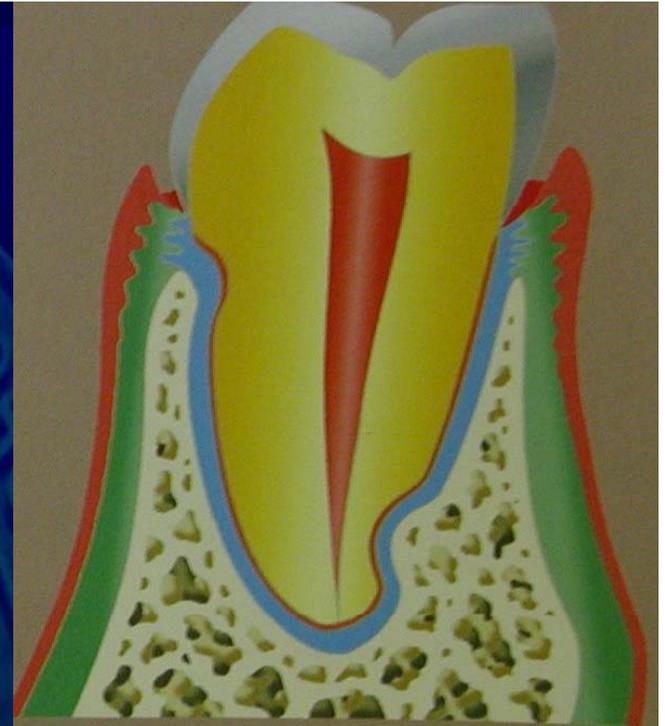
(Andreasen et al. .94)



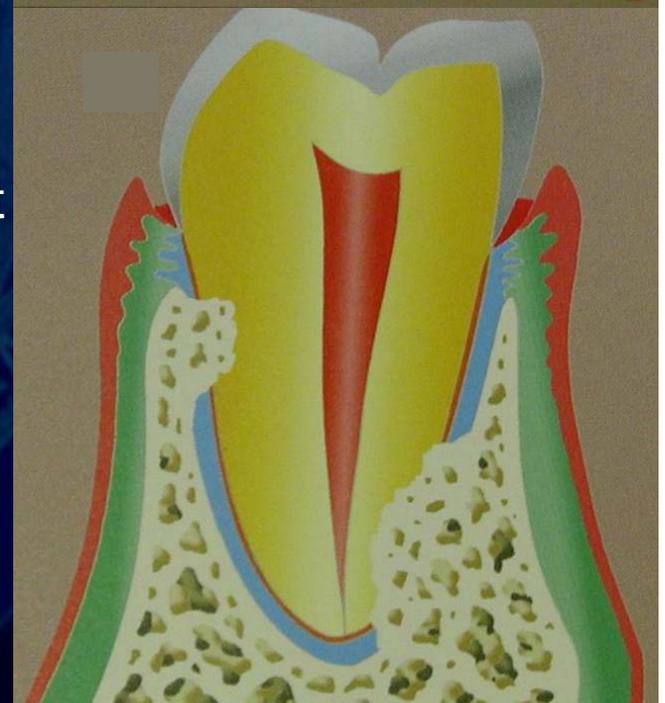
FREQUENT OBSERVATIONS!

EARLY INTERVENTION!

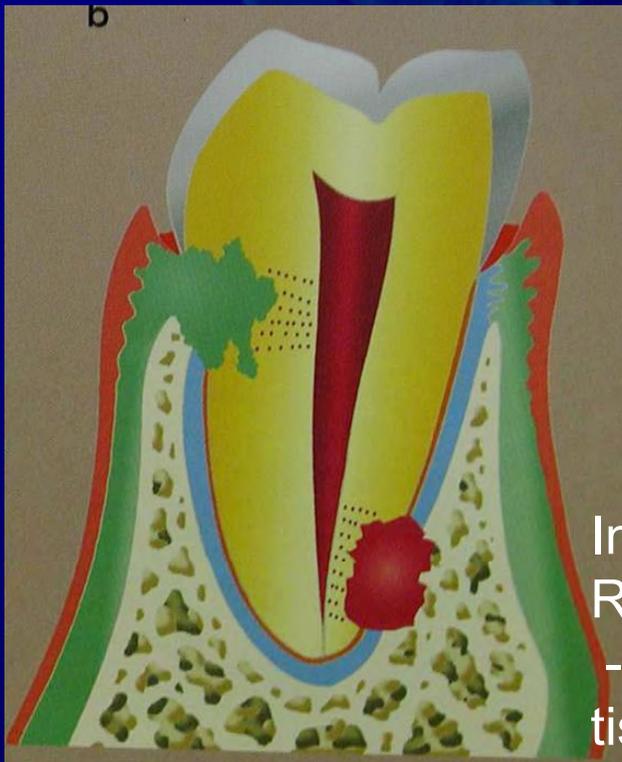
Surface Resorption



Replacement Resorption
→ ankylosis



Inflammatory Resorption
-granulation tissue





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

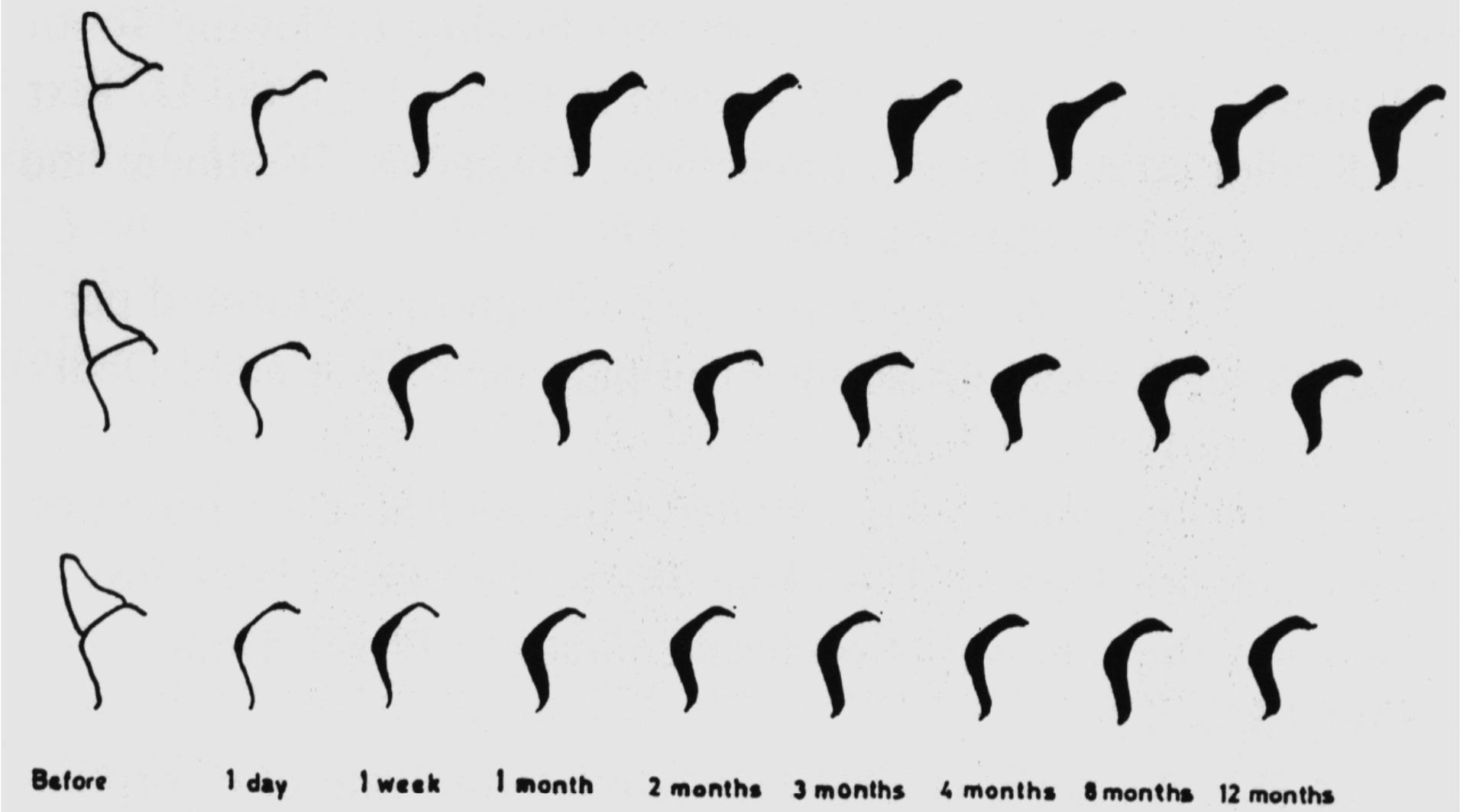


Rule #1

Maintain the
alveolar bone!



Bone loss following tooth loss



Before

1 day

1 week

1 month

2 months

3 months

4 months

8 months

12 months

after

+ unknown damage of the buccal bone plate?

Lam, 1960



Rule #2

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

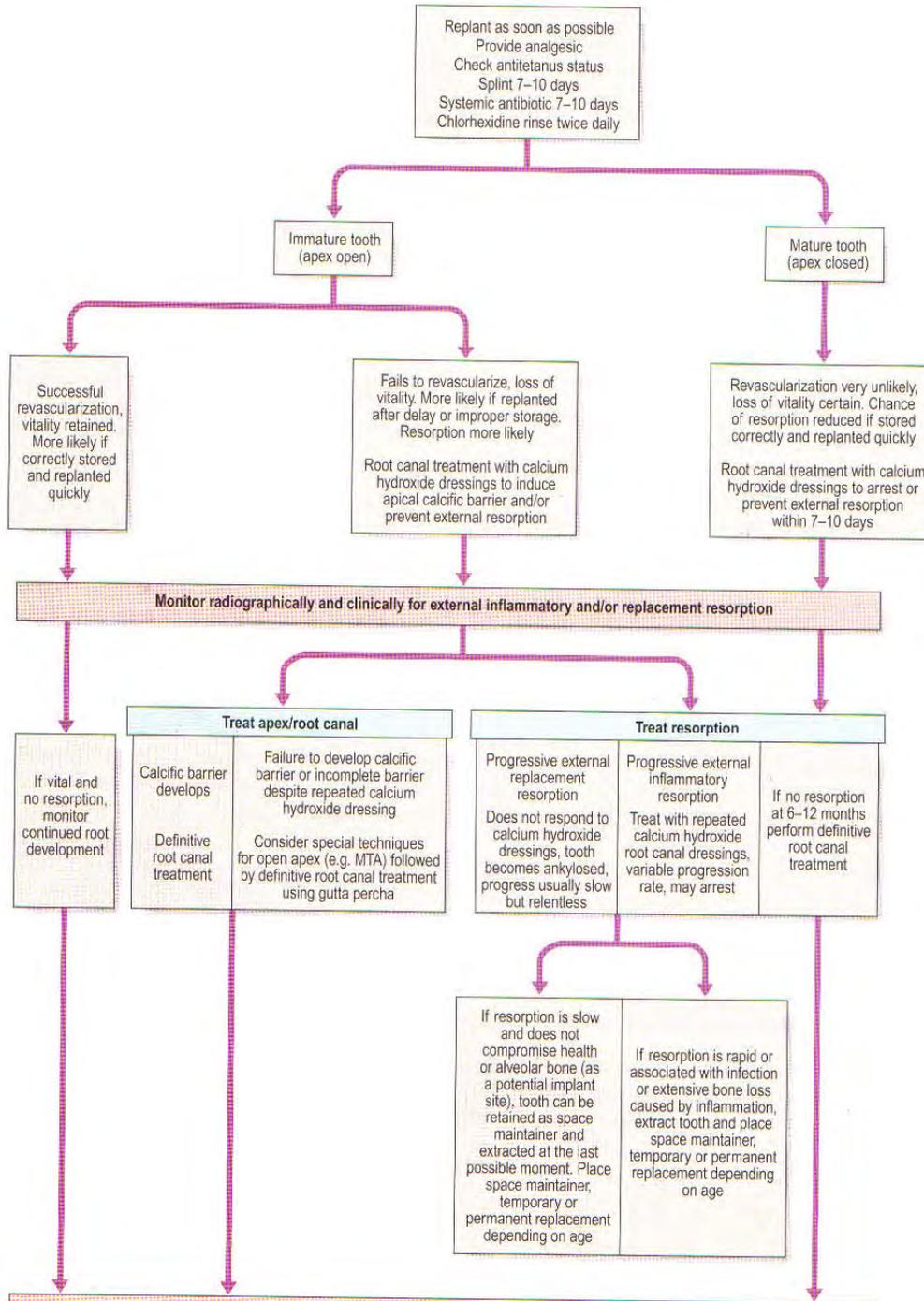


SECOND EDITION

Clinical Problem Solving in Dentistry



EDITED BY
Edward W. Odell





Rule #3

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



Replant the exarticulated tooth

Advantage

- Buy time!
- Retain bone

Disadvantage

- Frequent controls and follow-up examinations



Replant the exarticulated tooth

Advantage

- Buy time!
- Retain bone

Disadvantage

- Frequent controls and follow-up examinations

EXCEPTION:

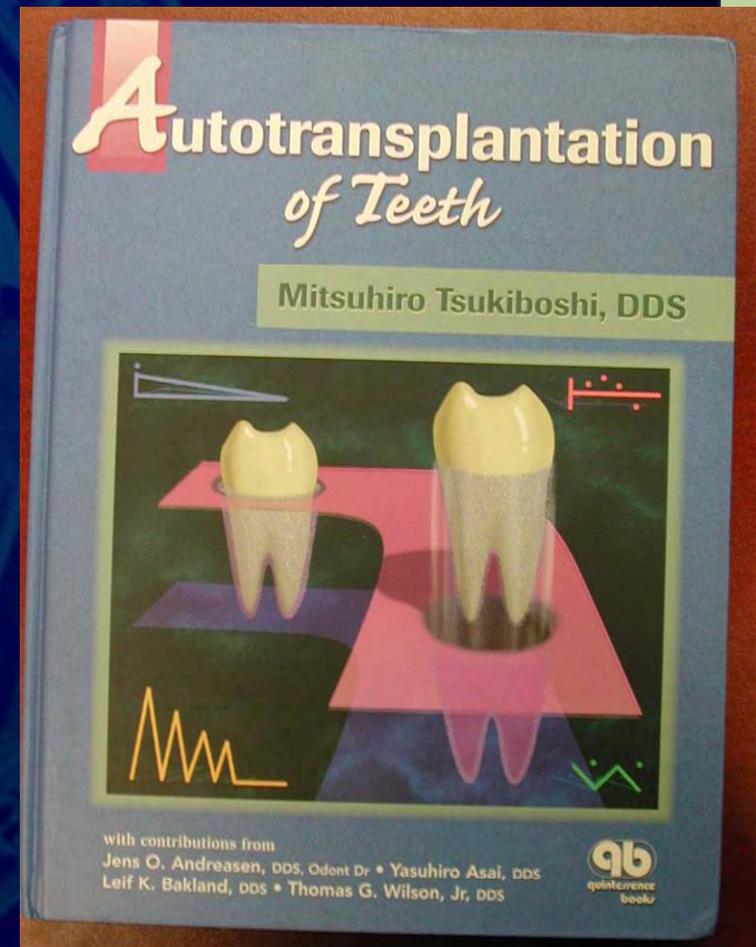
IF PATIENT < 12 YEARS OLD:

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 orthodontic 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 (1^{st.}) 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

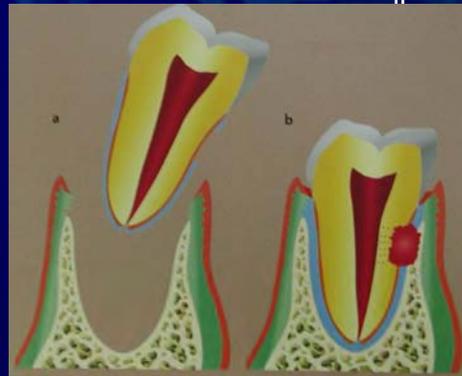
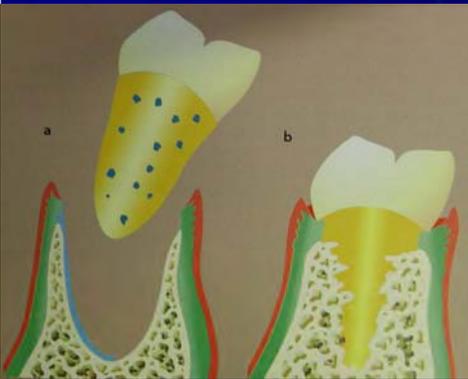
1. Induces bone
2. Induces a gingival papilla
3. No requirement of bone support
4. Eruption possible
5. Can be moved orthodontically
6. No age-related requirements
7. Very good cost-effectiveness



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

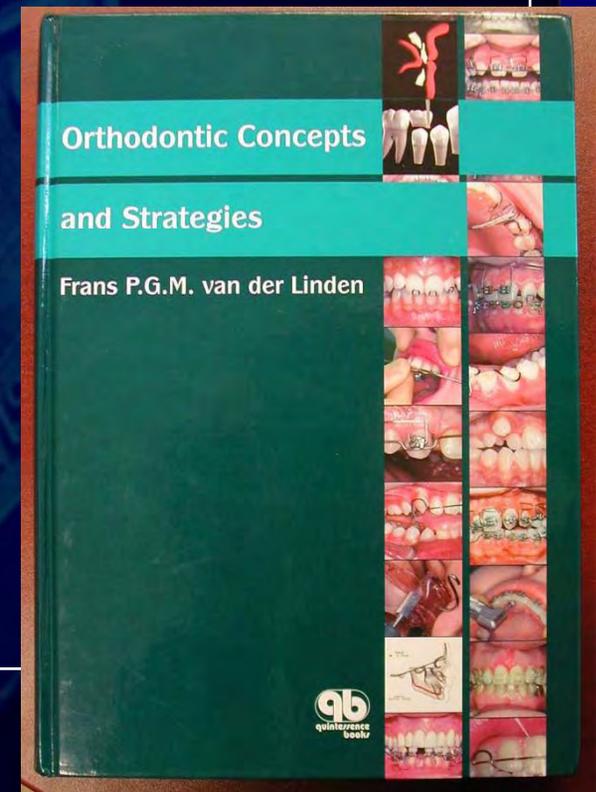
1. Orthodontic space closure



1. Orthodontic space closure

General considerations

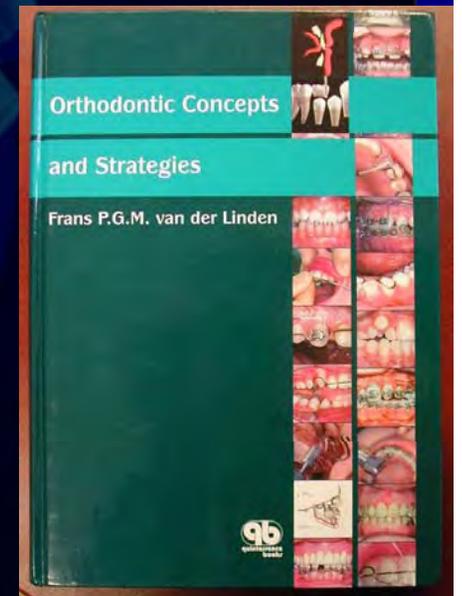
- Morphology and dimension requirements
- Esthetics requirements
- Patient age
- Space situation
- Mid-line
- Root-cement
- Symmetry





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

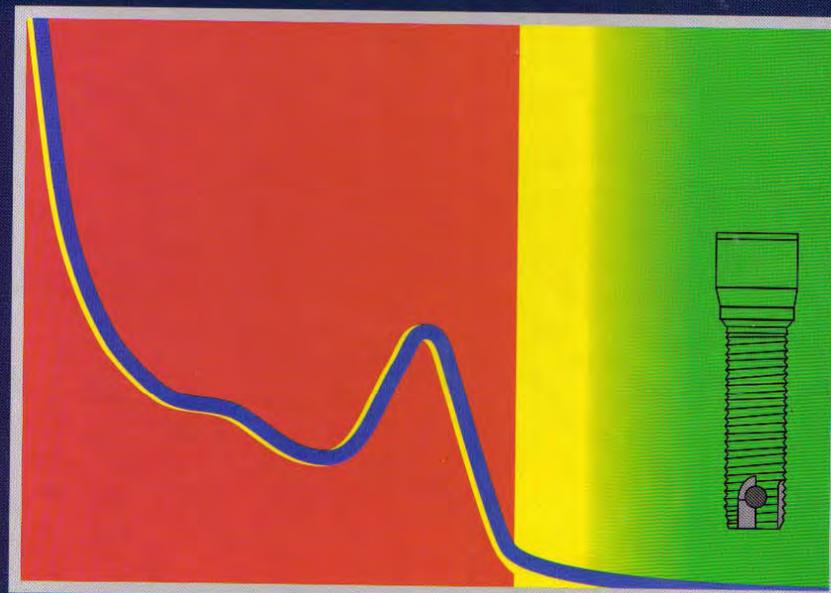


Koch G, Bergendal
T, Kvint S,
Johansson UB,
1996

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JÖNKÖPING, SWEDEN

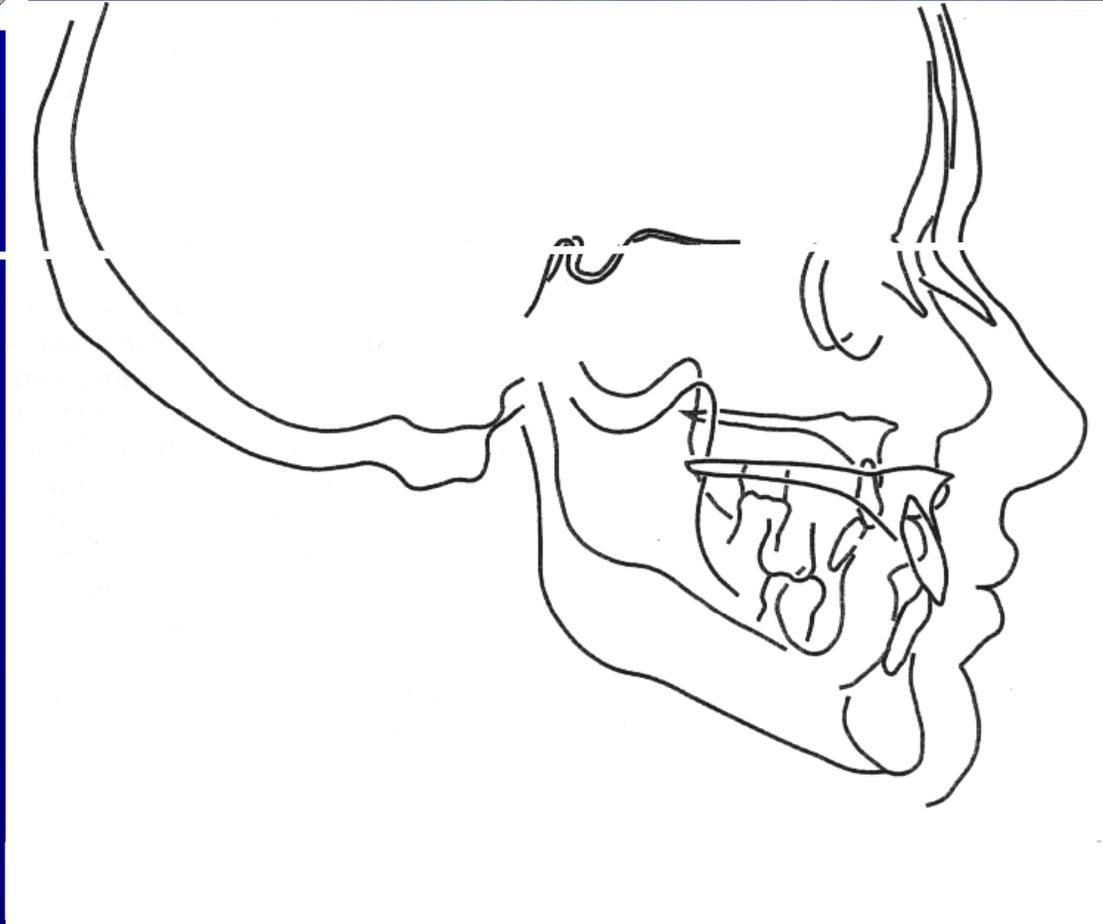
Consensus Conference on Oral Implants in Young Patients



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



Growth

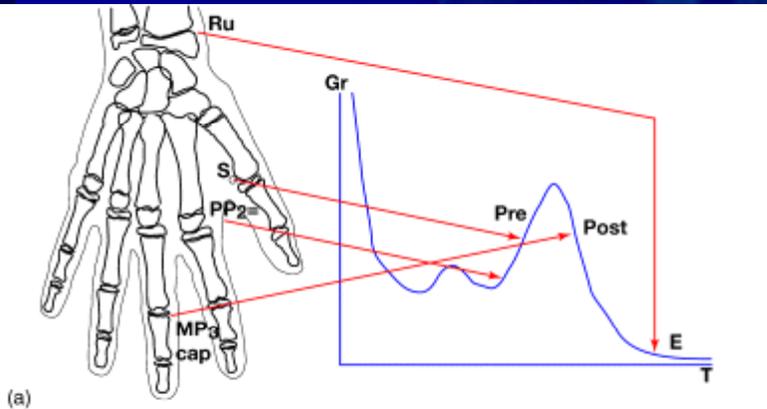


Growth:
Horizontal
Vertical

Planes:
Sagittal
Frontal
Transversal



Growth in time

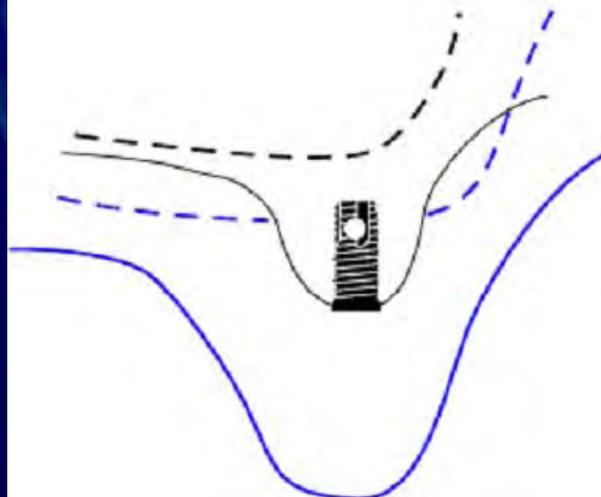
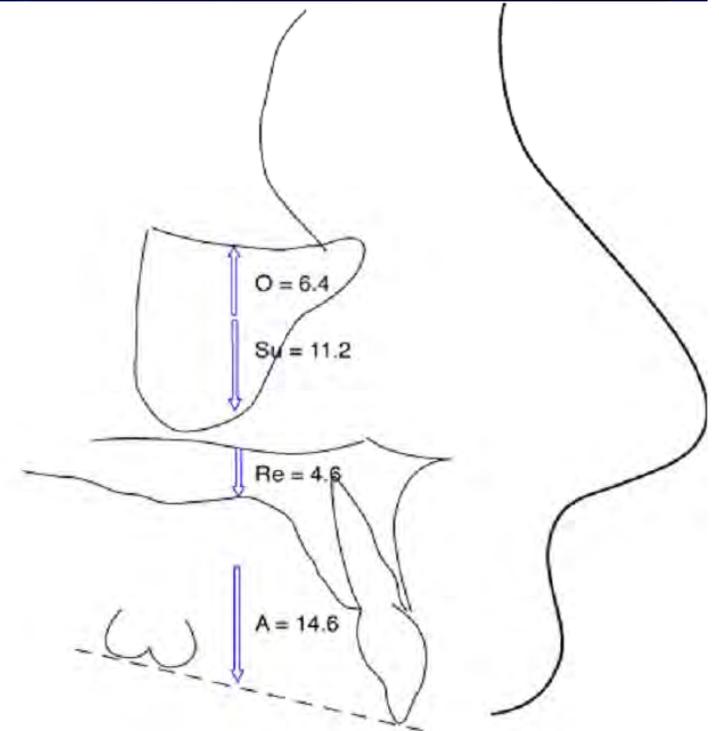
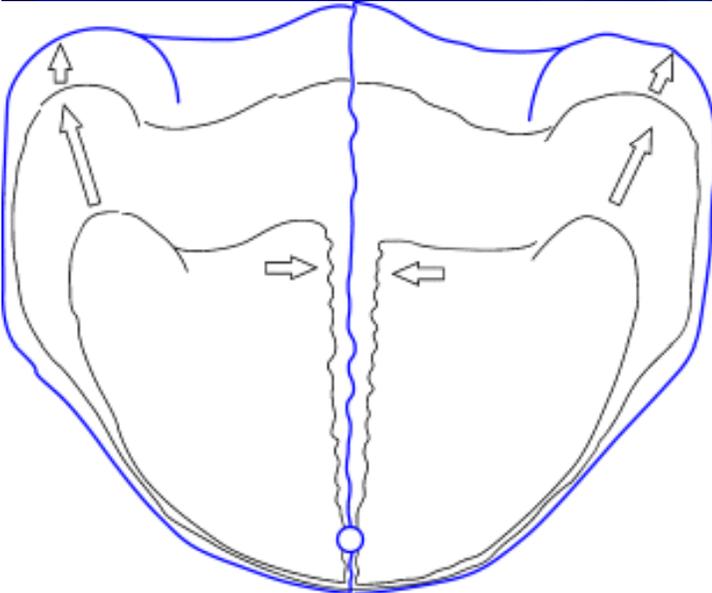


Hand-wrist radiograph indicators can be used to place a patient in the general area of the growth curve.





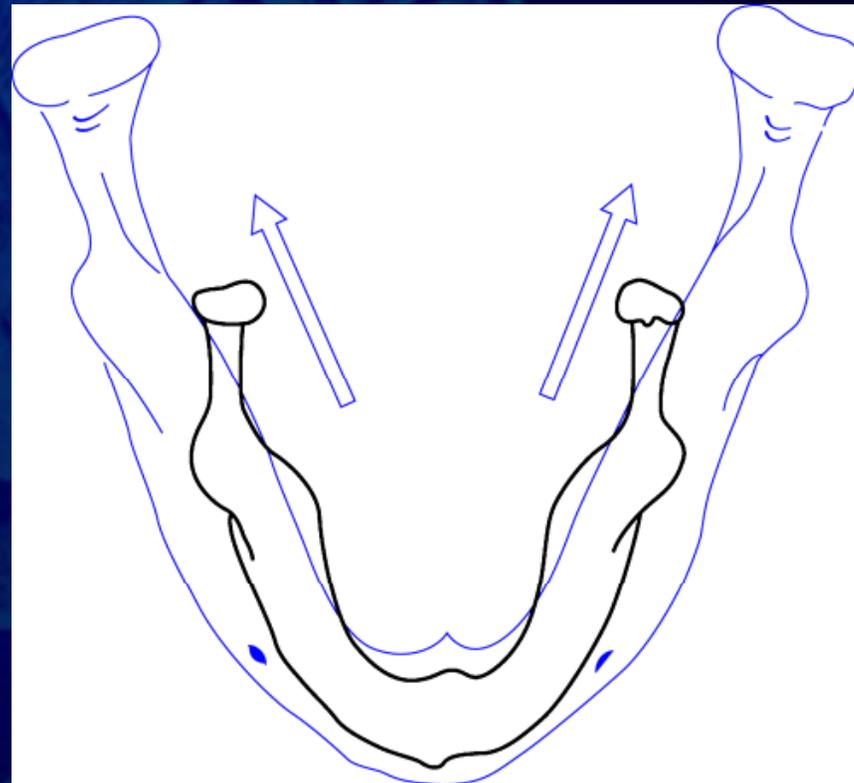
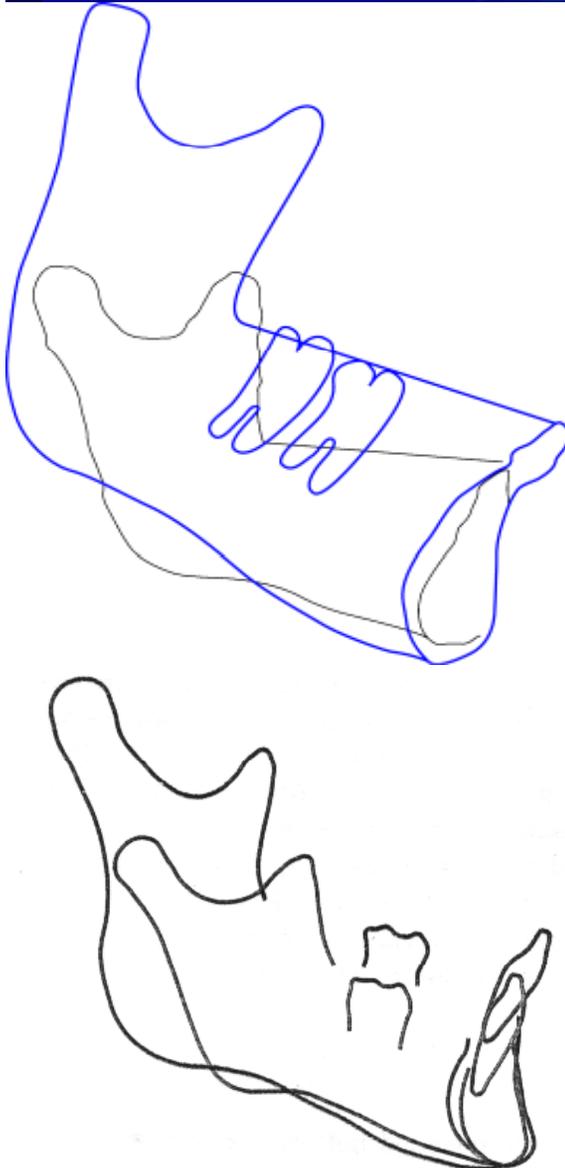
Maxillary growth-



Op Heij, et al. 2003



Mandible growth





Implant therapy – delay!

