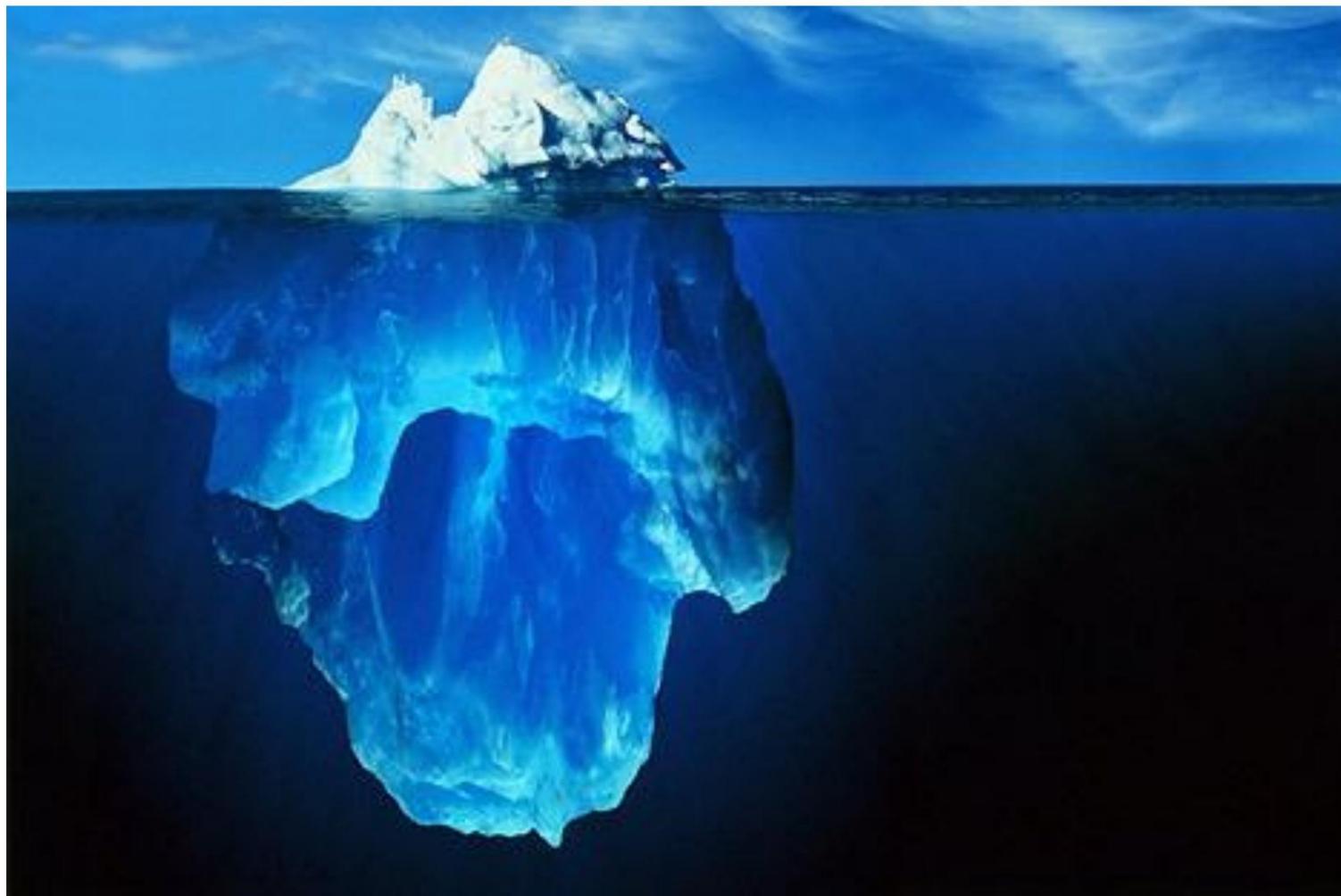
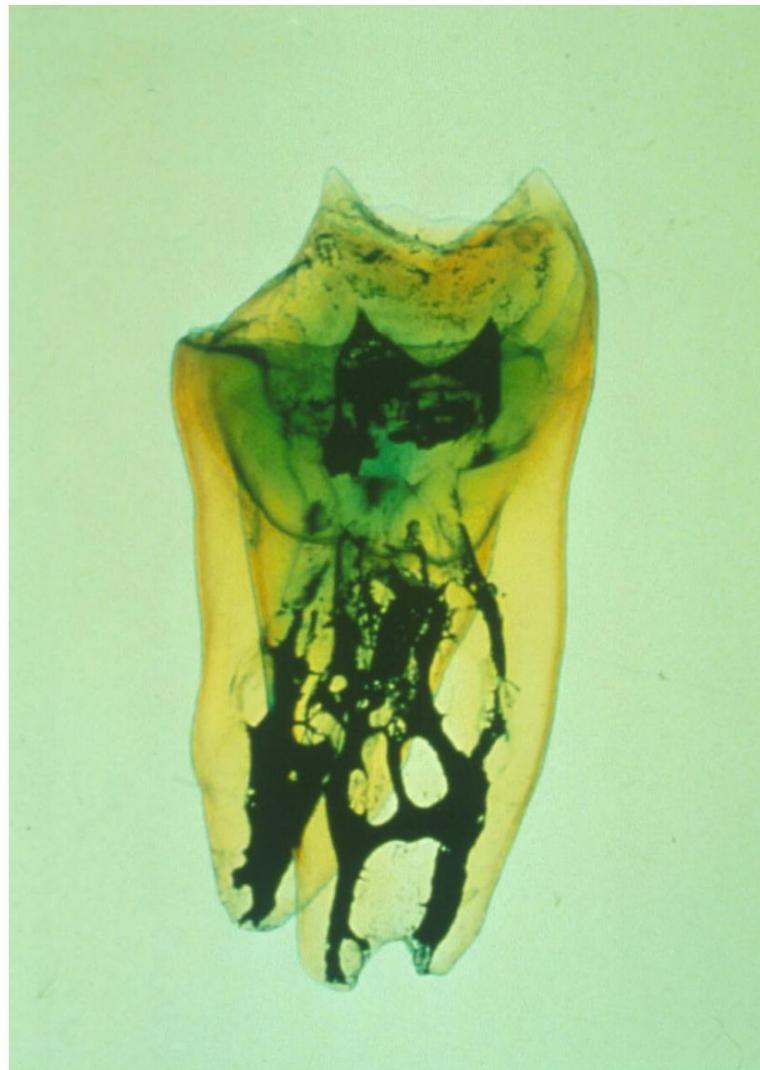

Endodontics 1



Endodontics 1



Contents

- Introduction to Endodontics • What does endodontic treatment look like?
- Construction of the block
- Diagnostics, including X-rays

- The endodontic opening • Selecting the required elements • Making a phantom jaw

- Next time...

Endodontologie

(v) [formed from Gr. endon (inside) + odon (tooth) + -logic (discourse)], dental specialty with regard to the marrow-like tissue in the cavity of teeth.

(From Van Dale, Large Dictionary of the Dutch Language)

Endodontologie

- Definition of endodontics...?

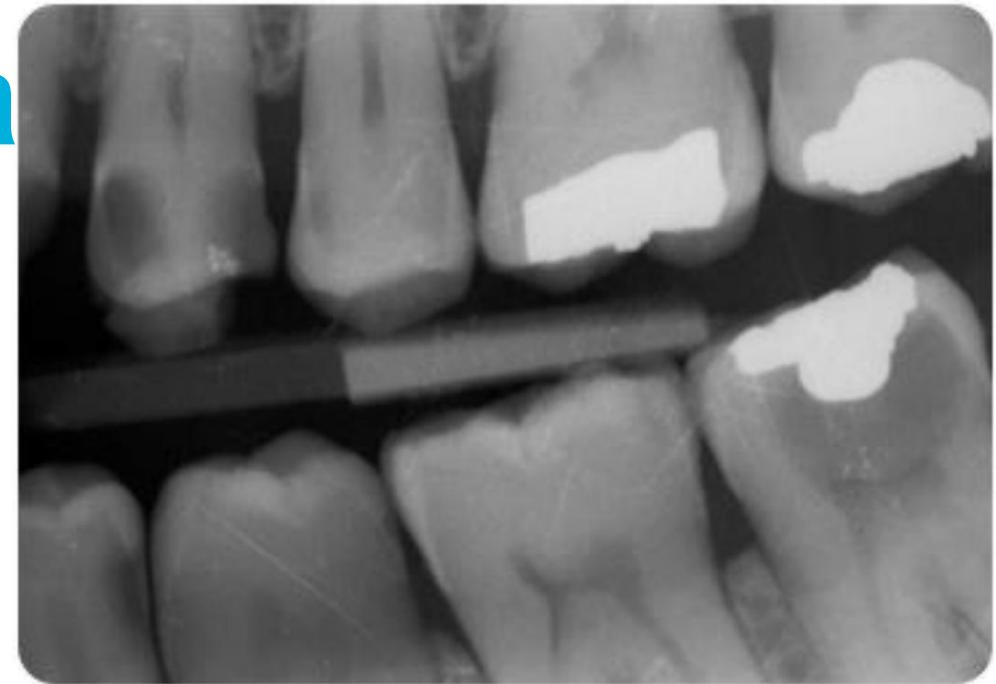
Endodontologie

- The part of dentistry that deals with the structure and function of the endodontium and with the etiology, pathology, prevention and therapy of diseases of the endodontium and related diseases of the tissues surrounding the tooth or molar

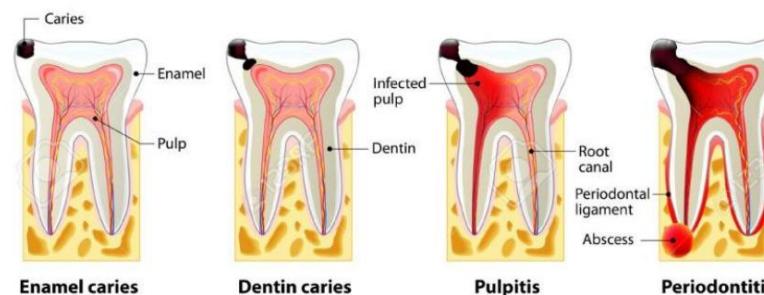
Endodontologie

- Natural trauma
- Iatrogenic trauma
- Diseases and age

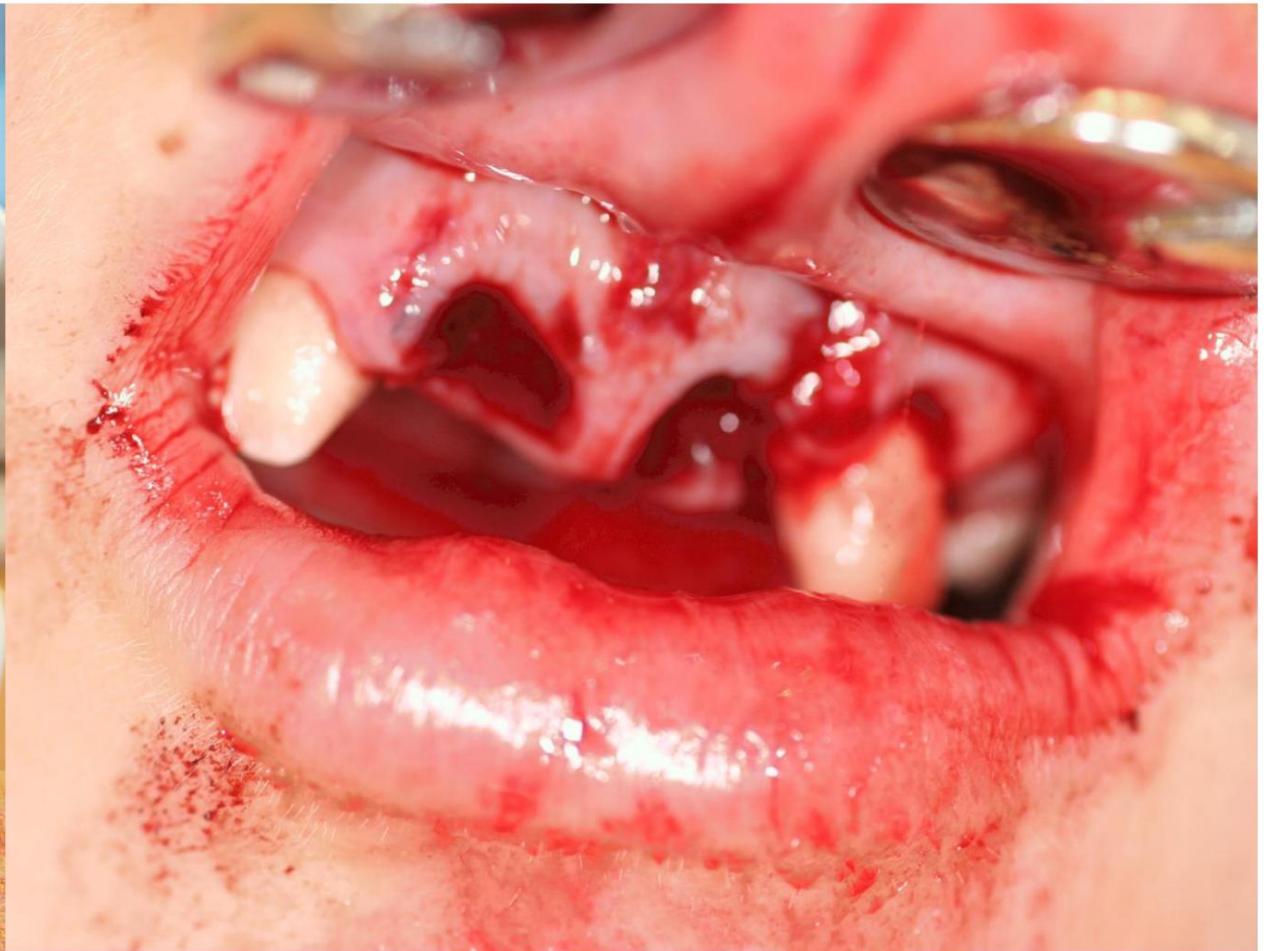
Natural trauma



THE STAGES OF CARIES DEVELOPMENT



Natural trauma



Iatrogenic trauma



Age and diseases



Contents

- Introduction Endodontics
- Construction and organization of the block
- Selecting required elements •
Making a phantom jaw

- What does endodontic treatment look like?
- Diagnostics, including X-rays

- The endodontic opening

- Next time...

Endodontic treatment



Diagnostics

Endodontic treatment

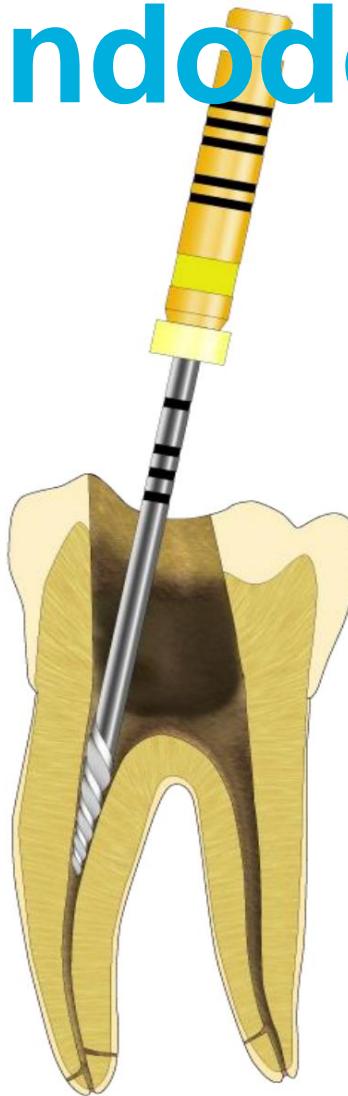


Diagnostics & Opening

Endodontic treatment



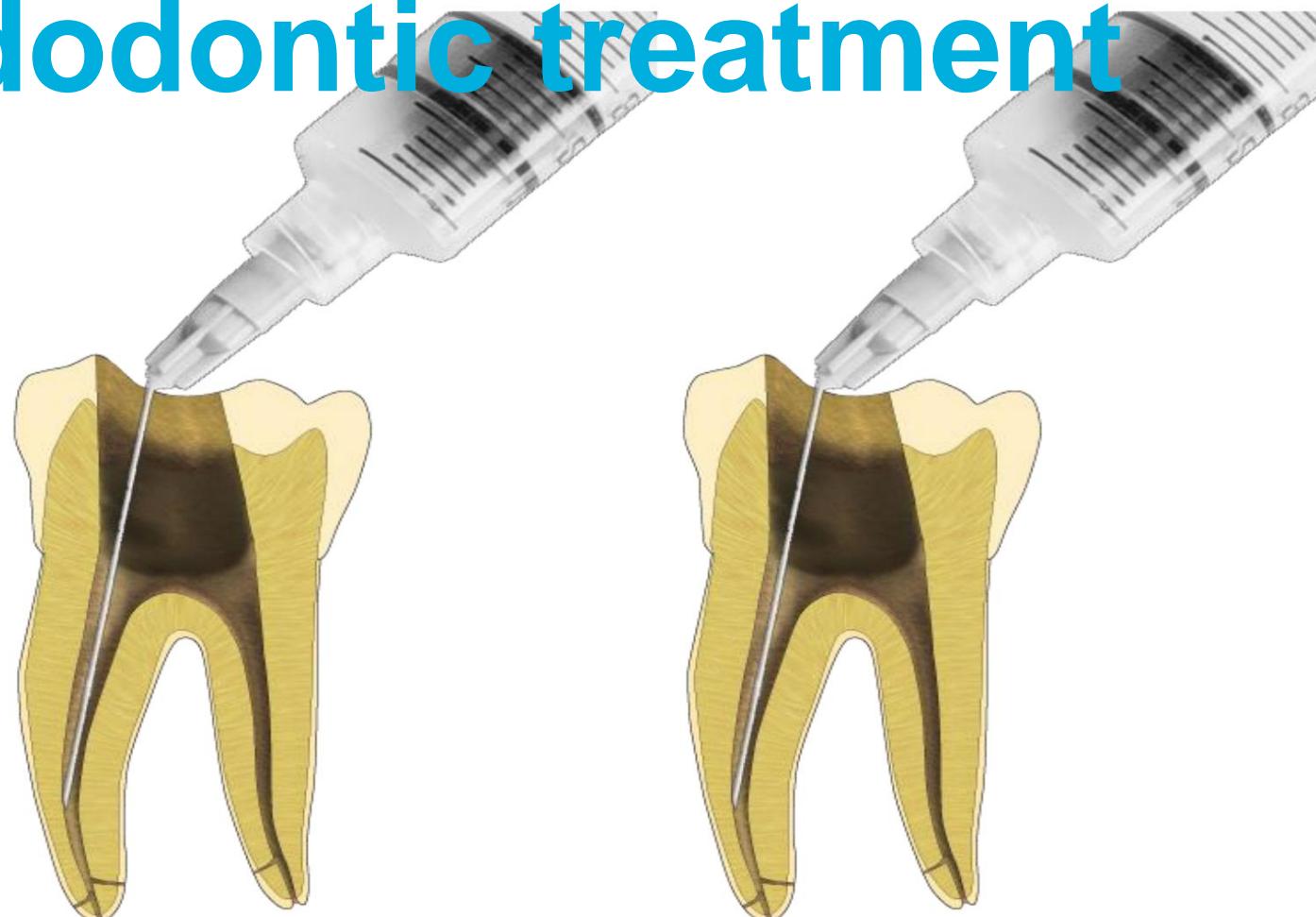
Endodontic treatment



Why? To combat
bacteria...



Endodontic treatment

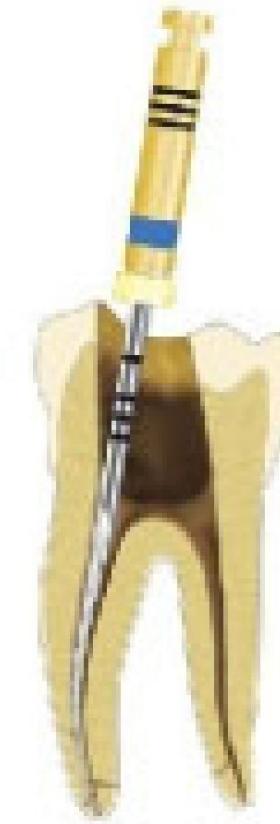
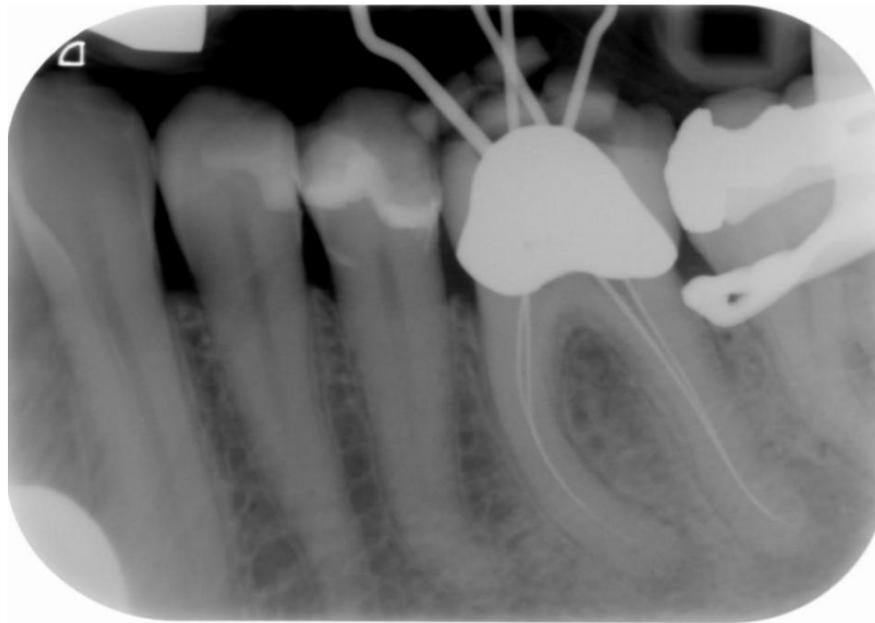


TO RINSE!!!

TO RINSE!!!

TO RINSE!!!

Endodontic treatment



Endodontic treatment



Endodontics 1

- Endodontontology: Thoden Van Velzen 4th edition
2022 •
Brightspace • Blokboek & Reader

Clearly....?!



Endodontics 1

- Staff members: Ms. Drs D. de Groot-Kuin, block coordinator



Endodontics 1

- Staff members: Drs. R. Stevens



Endodontics 1

- Staff members:
Drs. R. van der Horst, examiner



Steps of endodontic treatment

Diagnose

Conditions: caries-free/good restoration/DETI

Good, recent opening photo

Endodontic opening

Rubberdam

Coronal phase

Final Length Determination

Preparatie: Step-down/crown-down/apicale fase/step-back

Channel filling

Final coronal closure

Control

Treatment risk

- DETI score: Dutch Endodontic Treatment Index •

Category A or B: for example

- moderate to
strong root canal
curvature -molar >3 canals/third molar

Dutch Endodontic Treatment Index

JA DETI-score ("Dutch Endodontic Treatment Index")

- Fysieke beperkingen/ coöperatie patiënt matig tot slecht
- Diagnose moeilijk te stellen
- Premolaar >2 kanalen
- Molaar >3 kanalen/ derde molaar
- Kanaalsplitsing in middelste/ apicaal derde deel
- Matige tot sterke rotatie en/of inclinatie element ($> 10^\circ$)
- Afwijkende kroon- en/of wortelmorfologie/ lengte wortel ≥ 30 mm
- Voorbehandeling nodig bij isolatie m.b.v. rubberdam
- Kroon, opbouw en/of wortelstift aanwezig
- Matige tot sterke kanaalkrommingen ($> 10^\circ$)
- Obstructies, resorpties, calcificaties, perforaties en/of open apices
- Element eerder endodontisch behandeld
- Endo-paro problematiek
- Trauma in anamnese

Treatment risk

Classificatie Endodontische Behandeling

criteria	1 punt per item gemiddeld risico	2 punten per item bovengemiddeld risico	5 punten per item groot risico
A. Patiëntgebonden factoren			
1. Missen bij en typeren lange dragen	<input type="checkbox"/> Normale mondopening (≤ 30 mm)	<input type="checkbox"/> Reparatie mondopening (35-38 mm) <input type="checkbox"/> Modelleinden om 1m vast te houden	<input type="checkbox"/> Zeer lange mondopening (≥ 38 mm) <input type="checkbox"/> Beperking om achterover in de stoel te kunnen liggen
2. Rüttiging en herproblemen	<input type="checkbox"/> Normale condities	<input type="checkbox"/> Gedurende levensloop Een of drie nieuwe endopatologische symptomen	<input type="checkbox"/> Vandaag een goed resultaat te krijgen door gevoelige symptomen en al dan niet te stimuleren
3. Diagnose	<input type="checkbox"/> Duidelijke symptomen en klinische bevindingen, diagnose levert geen problemen op	<input type="checkbox"/> Differentiële diagnose van toepassing bij duidelijke symptomen en klinische bevindingen	<input type="checkbox"/> Complex symptoom en toegewezen of duidelijke klinische bevindingen; diagnose is moeilijk te stellen
B. Elementgebonden factoren			
4. Positie in tandboog	<input type="checkbox"/> Front en premolaar	<input type="checkbox"/> 1 ^o of 2 ^o molair	<input type="checkbox"/> 3 ^o molair
5. Infiltratie en rotatie element	<input type="checkbox"/> Geen infiltratie (≤ 10°) <input type="checkbox"/> Geen rotatie (≤ 10°)	<input type="checkbox"/> Matige infiltratie (10-30°) <input type="checkbox"/> Matige rotatie (10-30°)	<input type="checkbox"/> Extreme infiltratie (> 30°) <input type="checkbox"/> Extreme rotatie (> 30°)
6. Melding achterstandsgingen incisie, isolatie element	<input type="checkbox"/> Normale, congeerde/intra kanaalmonitade <input type="checkbox"/> Geen voorbereiding voor volstof voor isolatie	<input type="checkbox"/> Traumatische monitade	<input type="checkbox"/> Dubbele handelings in dentie*
7. Toegankelijkheid van kanalenstructuur	<input type="checkbox"/> Normale toegankelijkheid	<input type="checkbox"/> Eenvoudige voorbereiding (niet vereist voor isolatie) <input type="checkbox"/> Discrepante lengte(s) wortel(s) en kanaal <input type="checkbox"/> Afnamecanalus zonder wortel(s) in pulpalkamer	<input type="checkbox"/> Uitgebreide voorbereiding voor isolatie <input type="checkbox"/> Grotten, plassen en/of goudpastaën in restauratie <input type="checkbox"/> Compositepolimer in pulpkamer <input type="checkbox"/> Wordelijkh. gegoten enstoppeur
8. Wortel en kanalenstructuur	<input type="checkbox"/> Eenvoudige kanaluskromming Geen of geringe kanalenkromming (< 10°) <input type="checkbox"/> 1 element of premolaar met 1 kanaal	<input type="checkbox"/> Uitvormde kanaluskromming (10-30°) <input type="checkbox"/> 1 element of premolaar met 2 kanalen Molaar met 2 kanalen Kanaalverdubbeling (slechts gedeel. meer dan 1 wortel), één enige kanaluskromming	<input type="checkbox"/> Of 2 vormbare kanaluskromming Extreme kanalenkromming (> 30°) <input type="checkbox"/> Frontaal met 3 kanden Volcar met > 3 kanden Kanaalverdubbeling in molaal deel of episel deel/deel Zeer lange wortel (≥ 30 mm)
9. Metabiotisch	<input type="checkbox"/> Gedroogt (=volgdeel) apex		<input type="checkbox"/> Open apex (ontholingsspeciaalresidu zonder uitgespreide stukjes)
10. Kanaaldefecten	<input type="checkbox"/> Goed zichtbare sanden	<input type="checkbox"/> Huidklemmen en zichtbaar maar niet eenvoudig verwijderd Pulpaerium	<input type="checkbox"/> Uitzakken of oedematisch of zwart kanaalkeus <input type="checkbox"/> Kanalen niet zichtbaar*
11. Resorpties		<input type="checkbox"/> Interne resorptie zonder pericraëlia Apikale resorptie	<input type="checkbox"/> Interne resorptie met pericraëlia <input type="checkbox"/> Externe resorptie met of zonder pericraëlia
12. Intracanale incidenten		<input type="checkbox"/> Perforatie(s) buitensomitas.	<input type="checkbox"/> Afgebroken instrument Loophole Apikale transformatie Perforaties onder botlaag
C. Additionele Factoren			
13. Revise van eerder voltooide kanaalbehandeling			<input type="checkbox"/> Revise van eerder voltooide en stabiele behandeling Zwervende scheur*
14. Trauma in chronische	<input type="checkbox"/> Ongecompliceerde kroonfractuur Wortelfractuur in episel deel Carious	<input type="checkbox"/> Gecompliceerde kroon (worts) fractuur van element met volgende spec. Wortelfractuur in molaal deel Subkroonfractuur processus aequalis	<input type="checkbox"/> Gecompliceerde kroon (worts) fractuur van element met volgende spec. Wortelfractuur in episel deel Andere luxaties/knusels
15. Endo para associatie			<input type="checkbox"/> Wortscheer pocket + tandschade + defensie <input type="checkbox"/> Functiepatronenmerk Wortelassociatie + sensibele algodencet of necroseduct(s)
Subtotaal	<input type="checkbox"/> x 1 =	<input type="checkbox"/> x 2 =	<input type="checkbox"/> x 5 =
*Deze criteria vallen automatisch in Klasse III		Totaal: →	<input type="checkbox"/> 14-18 punten Klasse I <input type="checkbox"/> 19-24 punten Klasse II <input type="checkbox"/> > 24 punten Klasse III

Treatment risk

- Classification of endodontic treatment (CEB) •
- Complicated or uncomplicated treatment

Anatomy/Starting photo

- Why is it important to have a good opening photo?







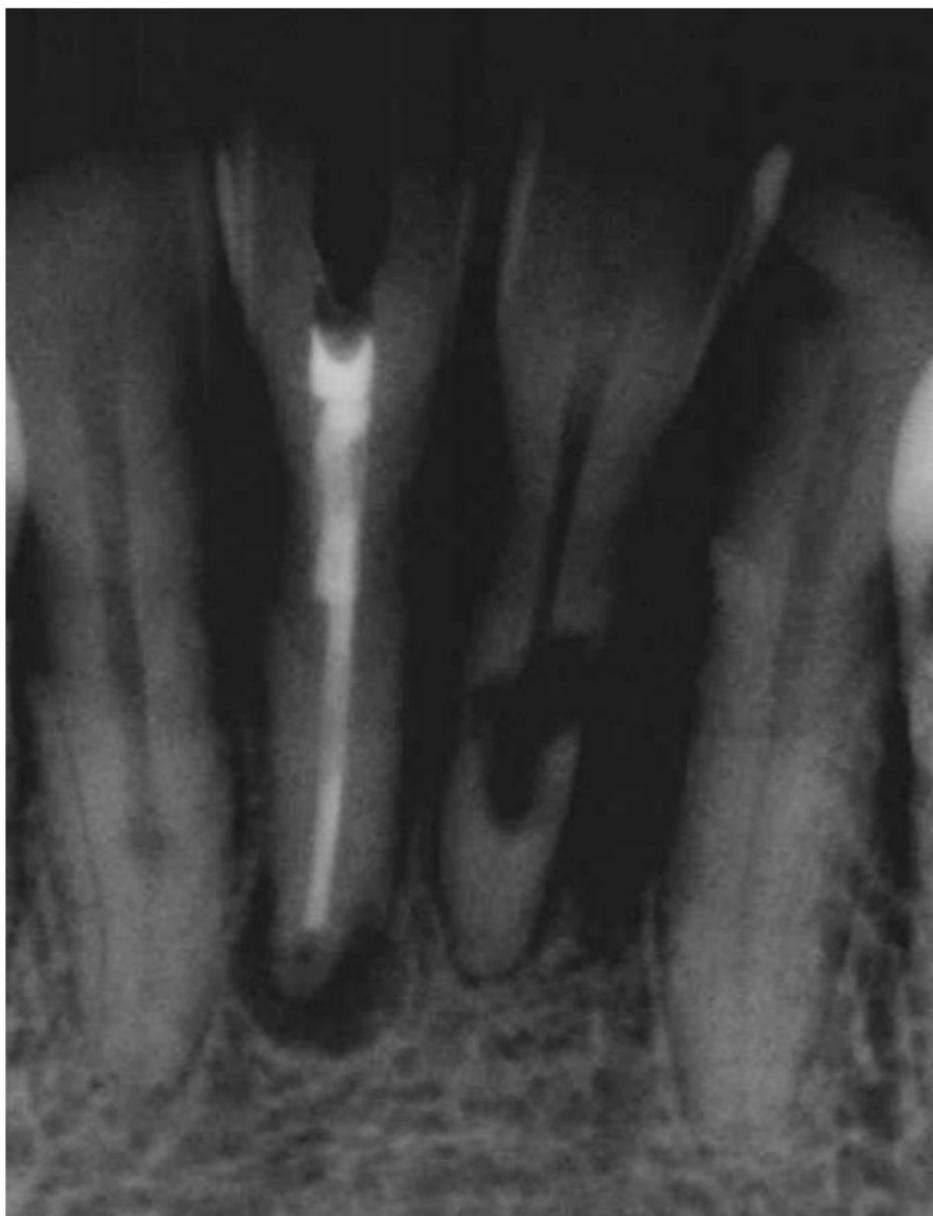








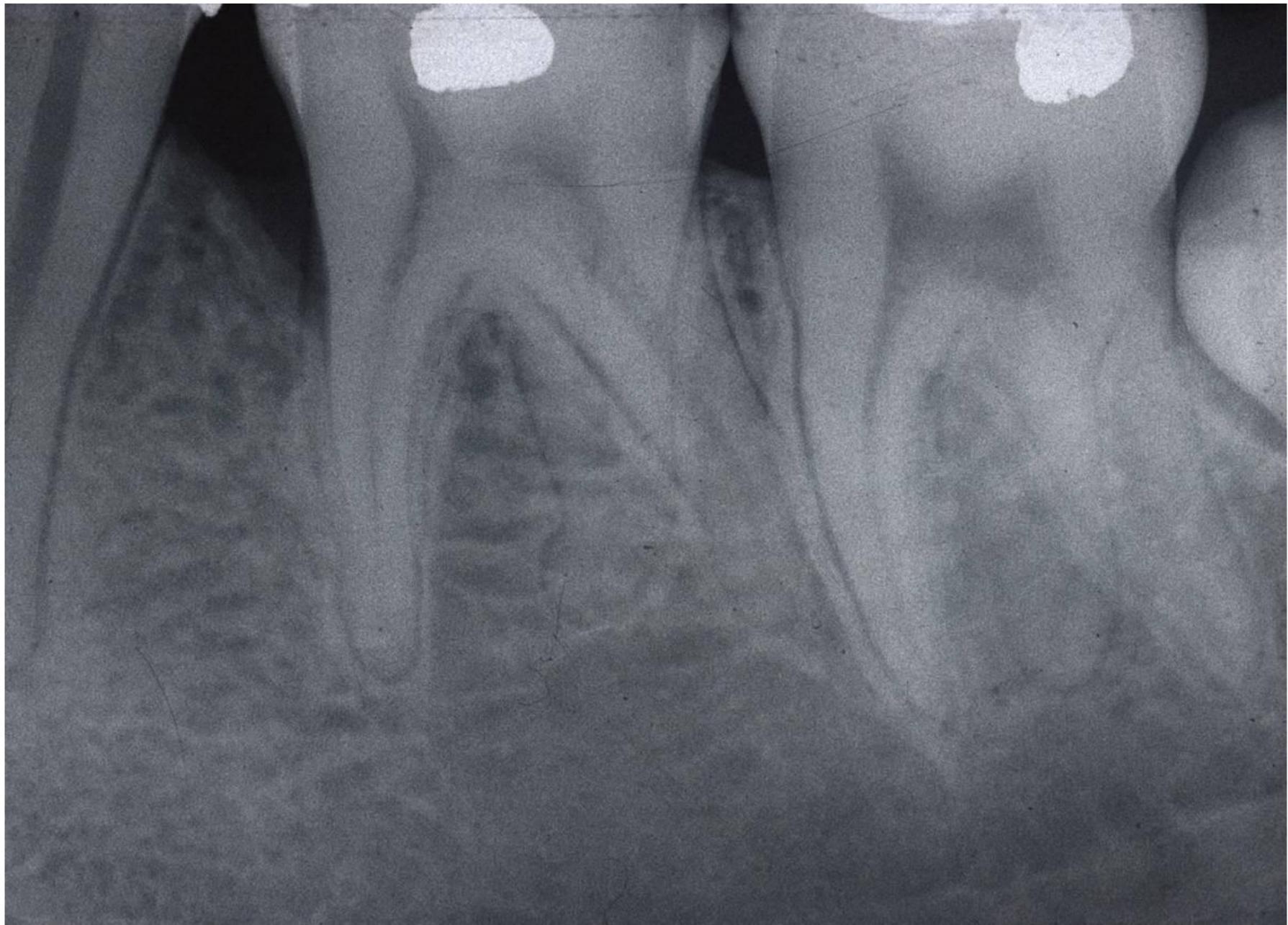


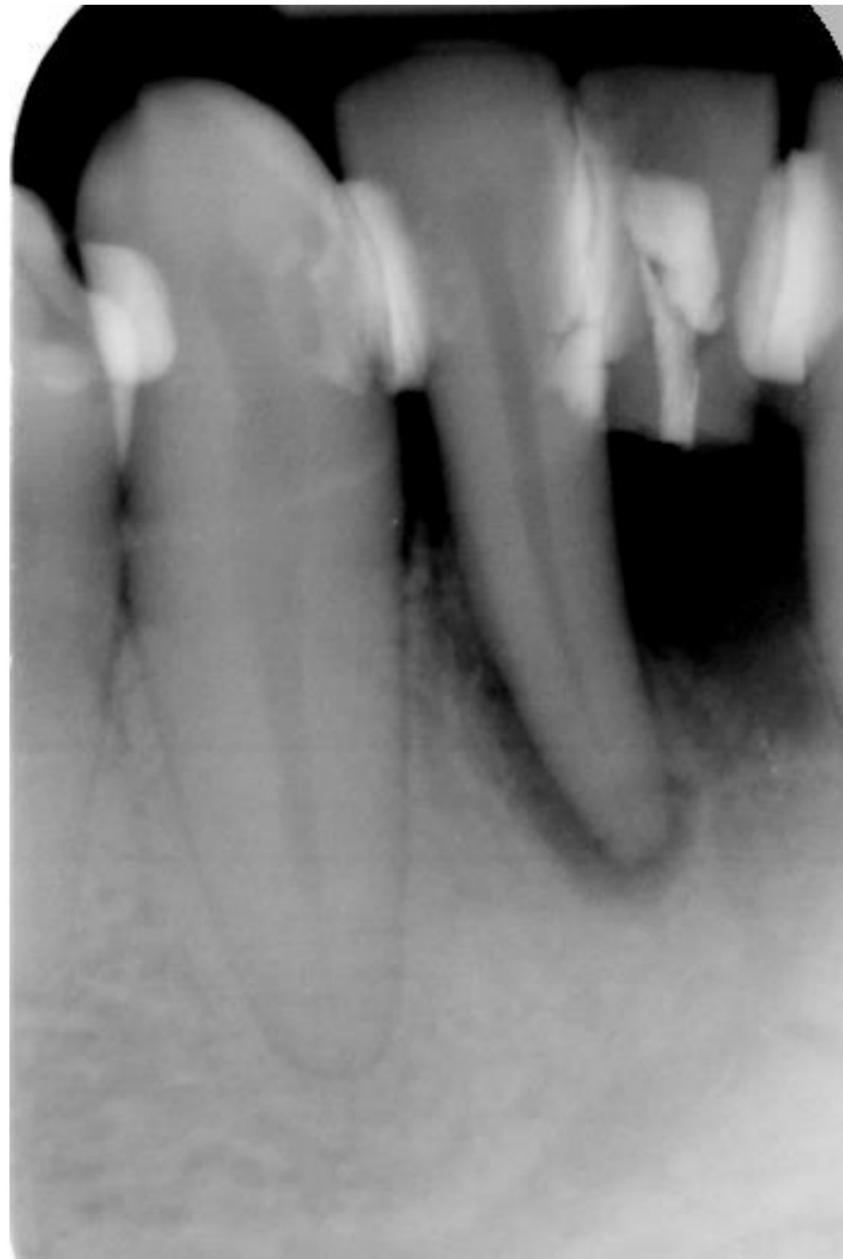










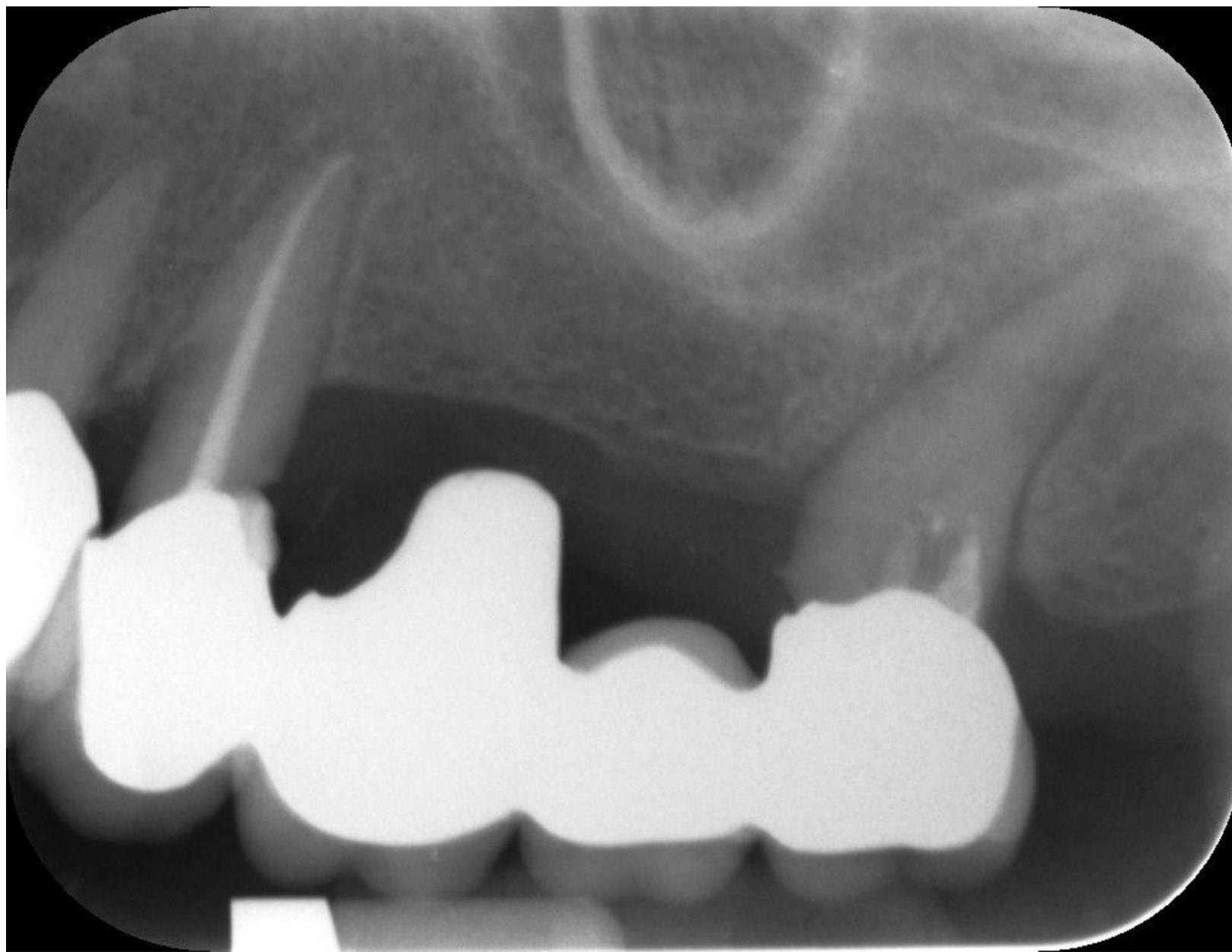


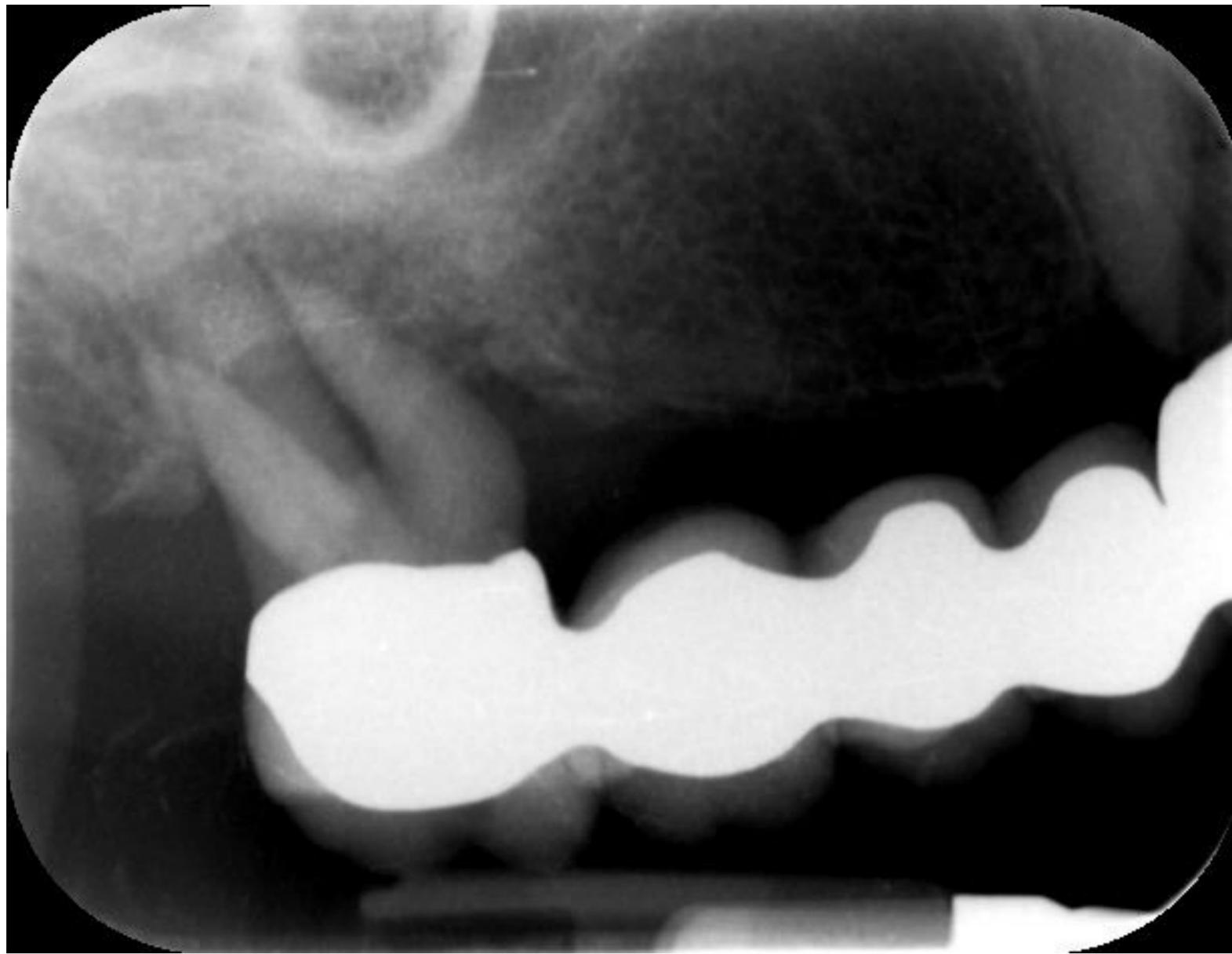


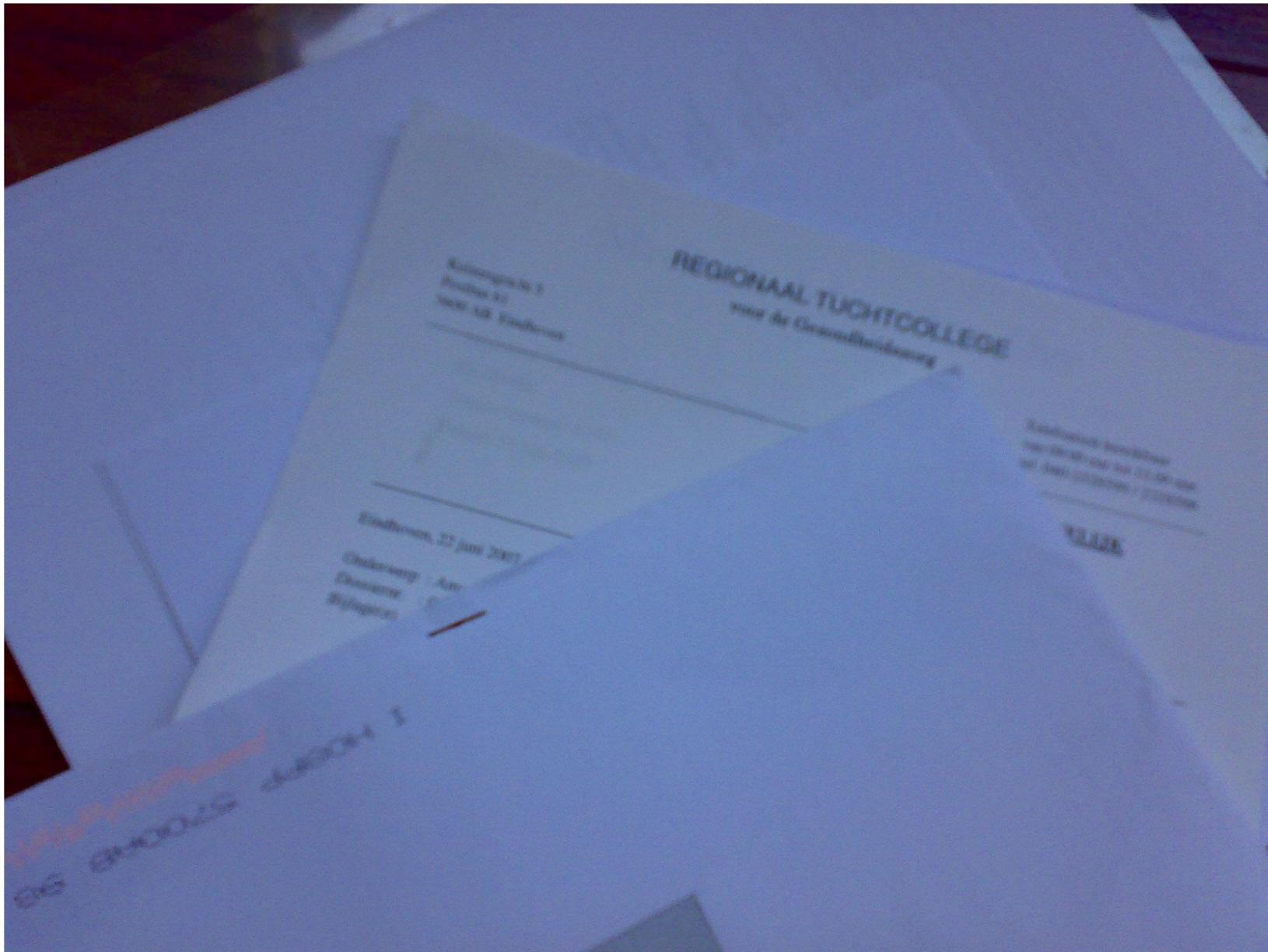




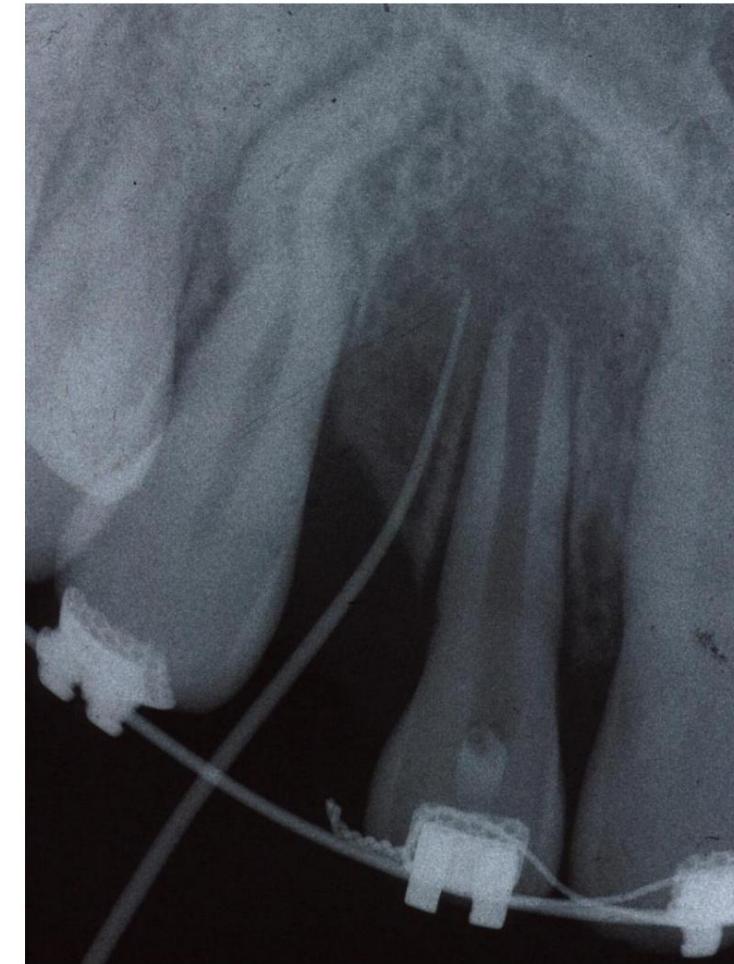








- Diagnosis
- Direction of opening •
- Estimated working length
- Stage of root deformation •
- Obliteration •
- Internal resorption •
- External resorption
- Apical resorption •
- Iatrogenic abnormalities
- Etc.



Everything clear?



Question in between

- How many roots does a 16 have?

- A 1
- B 2
- C 3

Question in between

- How many root canals does a 16 have?

- A 3
- B 4
- C 5
- D 6

Question in between

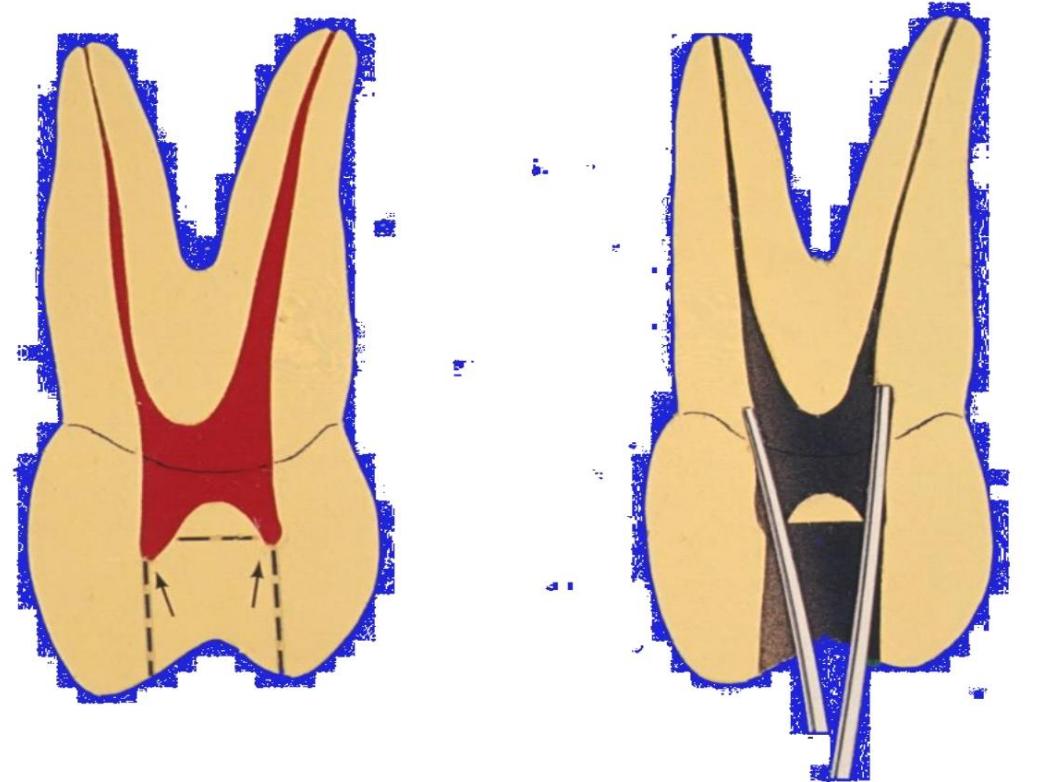
- How many root canals does a 15 have?

- A 1
- B 2
- C 3
- D 4

The endodontic opening

- What important conditions must an endodontic opening meet?

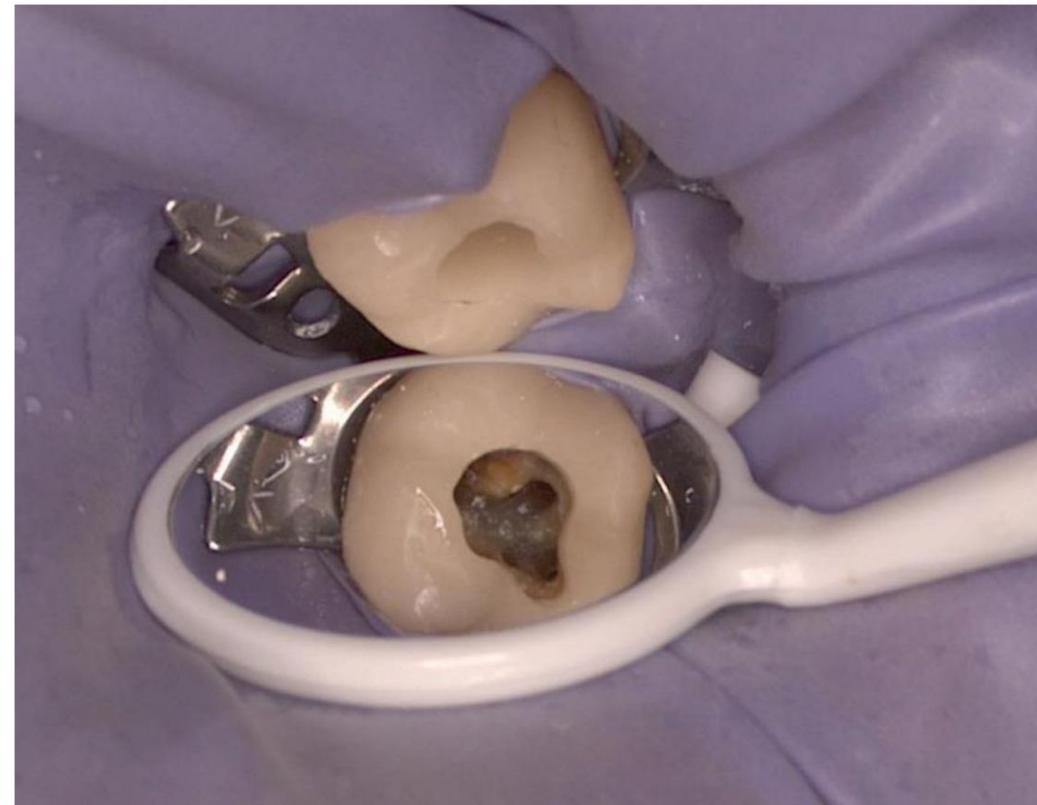
The endodontic opening



The location of the opening should be chosen so that the “roof” of the pulp chamber can be completely removed.

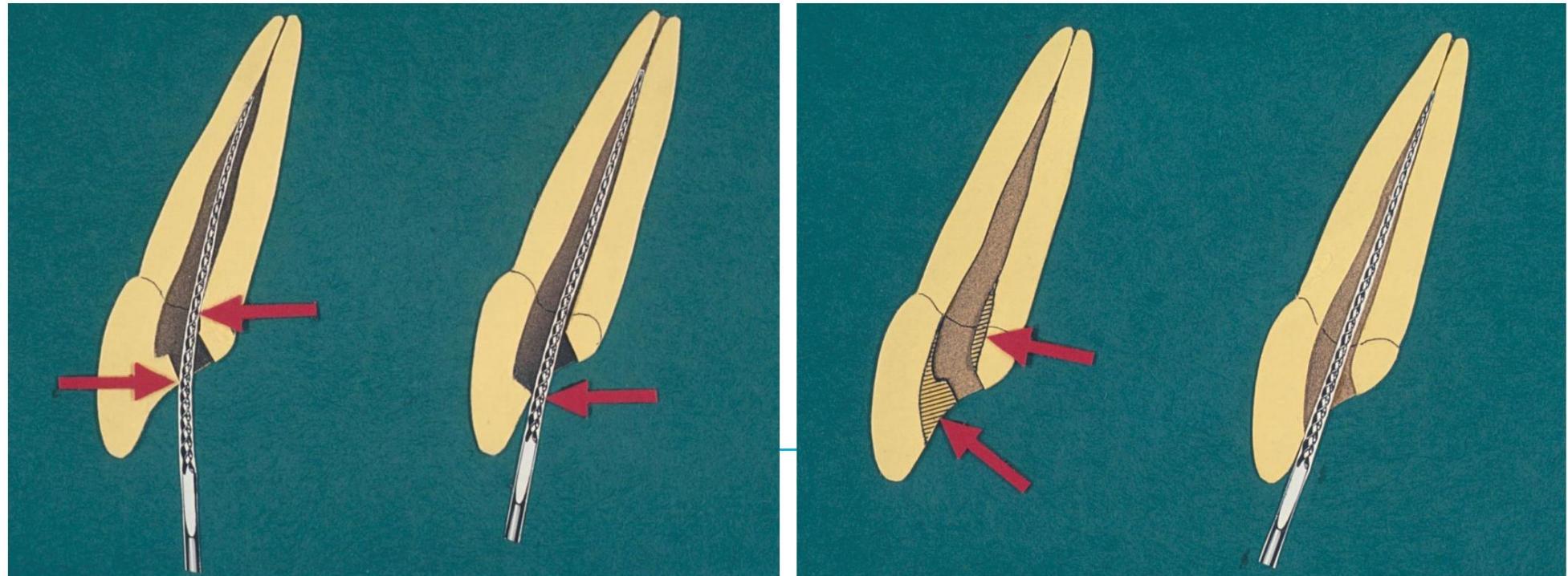
The endodontic opening

The orientation of the orifice walls should be such that a complete overview of the pulp floor and canal entrances is obtained (1)



Purpose of opening

Endodontic instruments can be inserted into the canal without tension.
(2)



Purpose of opening

- The element must
be • easy to restore •
and disinfect •
(chemical •
cleaning, 3)



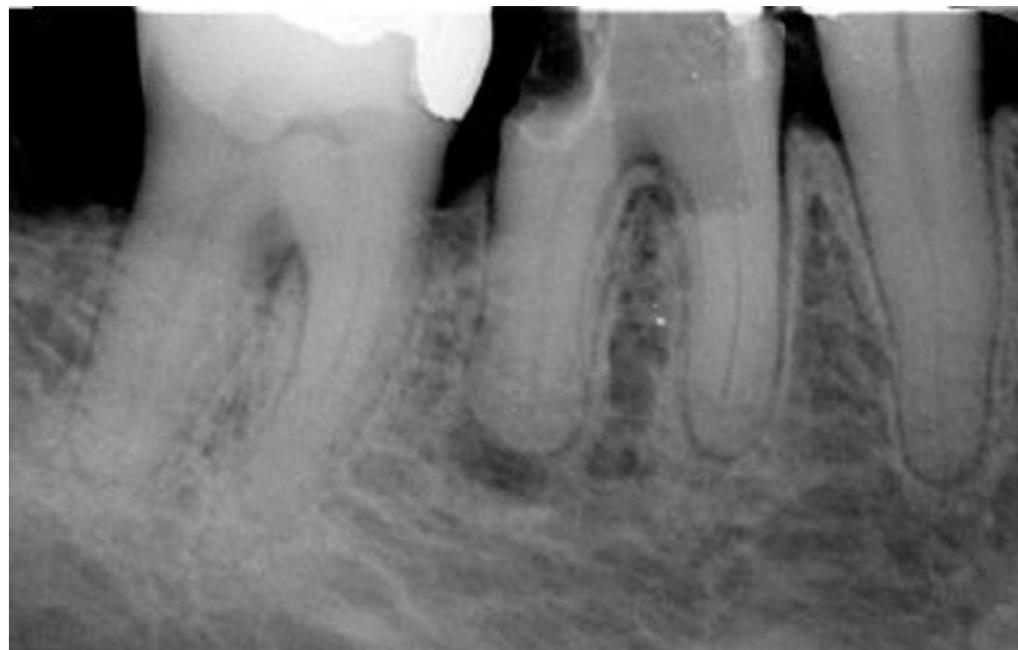
Purpose of opening

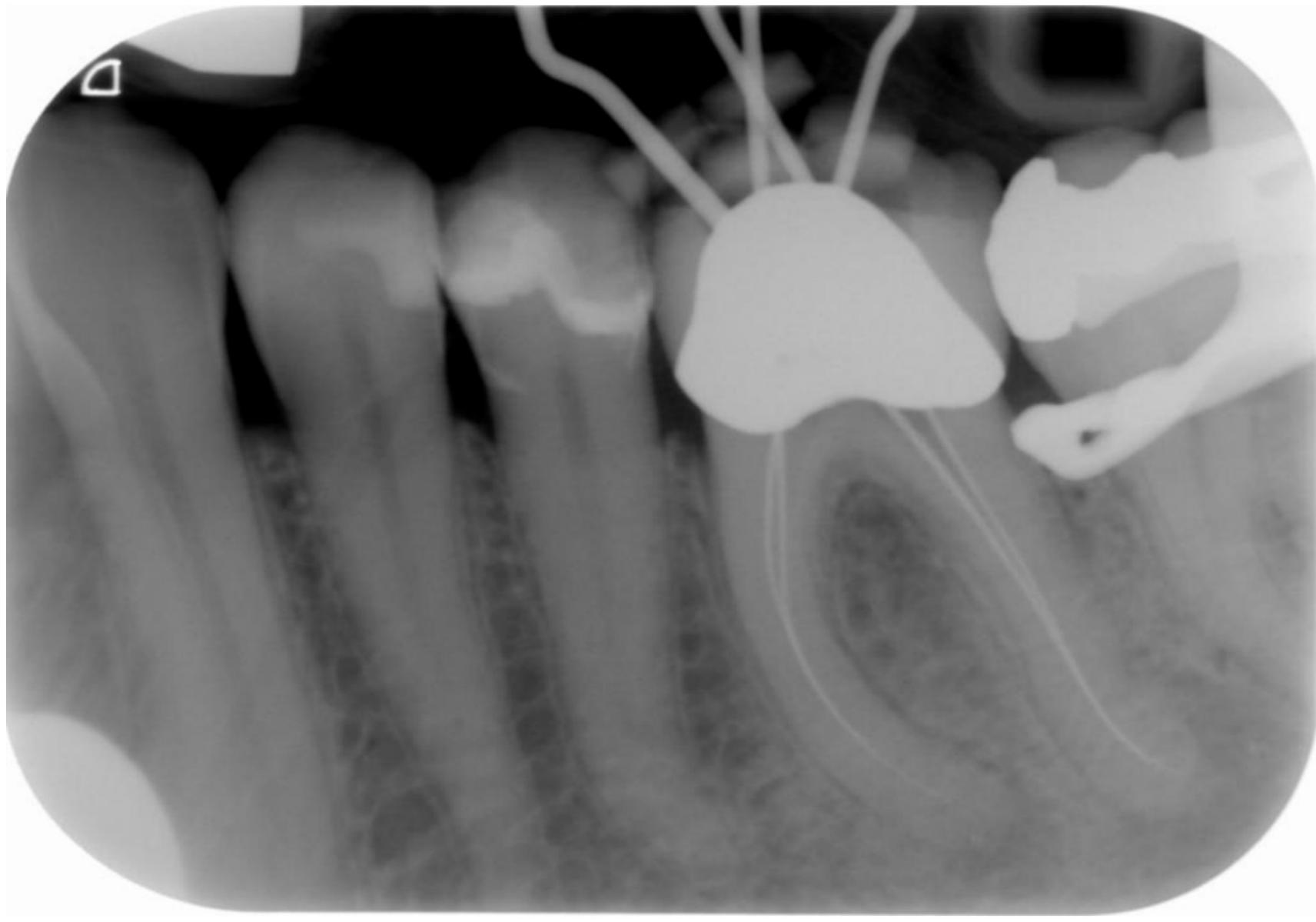
- The endodontic opening must have sufficient retention and resistance offer for a temporary restoration



Purpose of opening

No more dental tissue should be sacrificed than strictly necessary (4)





Purpose of opening

- It is important a good three-dimensional
Have an idea of the element you want to open.
- Then it's a matter of just doing it!

In summary

- Read the manual and background/theory •
- Choose elements to work with • Help each other
- It'll be fine....!

Phantom jaw procedure

- Selecting the necessary elements
- Create a phantom jaw •

Take x-rays

Selecting the necessary elements

• upper incisor • upper incisor • 2x out of hand / 2x in the jaw

“ “

upper premolar • lower incisor • lower

“ “

premolar • lower incisor • upper molar •

“ “

lower molar

“ “

“ “

“ “

“ “

Selecting the necessary elements

Anatomy: Differences C superior - C inferior

- Superior: cingulum and marginal ridge voluminous, inferior flat
- Inferior: narrower mesio-distally, almost parallel to the radix and appears more elongated
- Superior: asymmetrical seen from the incisal (Source: appendix Restoration 1)

Selecting the necessary elements

- A lower jaw • An upper jaw • Plaster mold is name-related and in possession of a maximum of 1 practical • Extra magnetic plate...

Selecting the necessary elements



Endodontic preparation1

Selecting teeth for the phantom jaw

Extracted natural elements
Restorations / cavities not objectionable

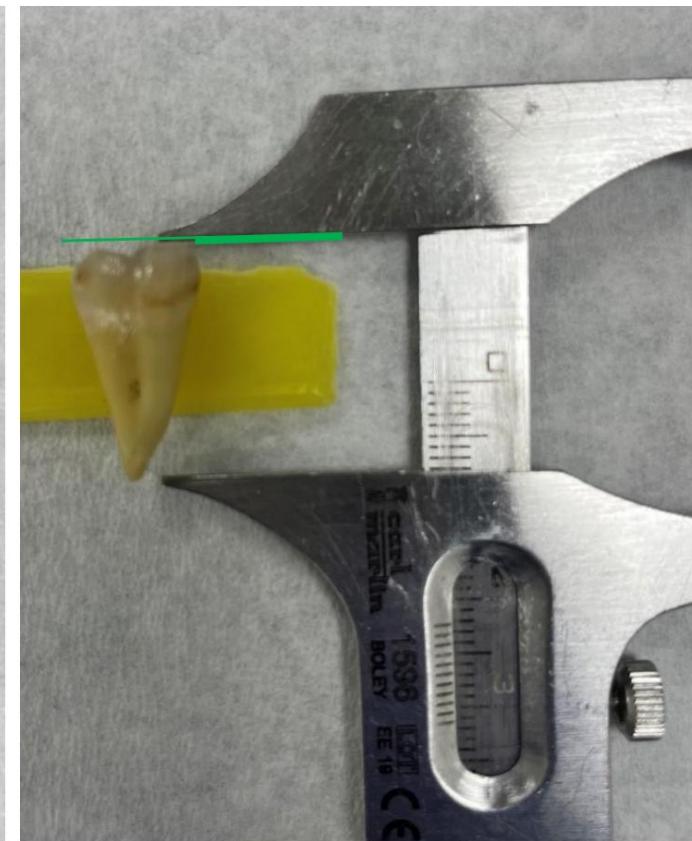
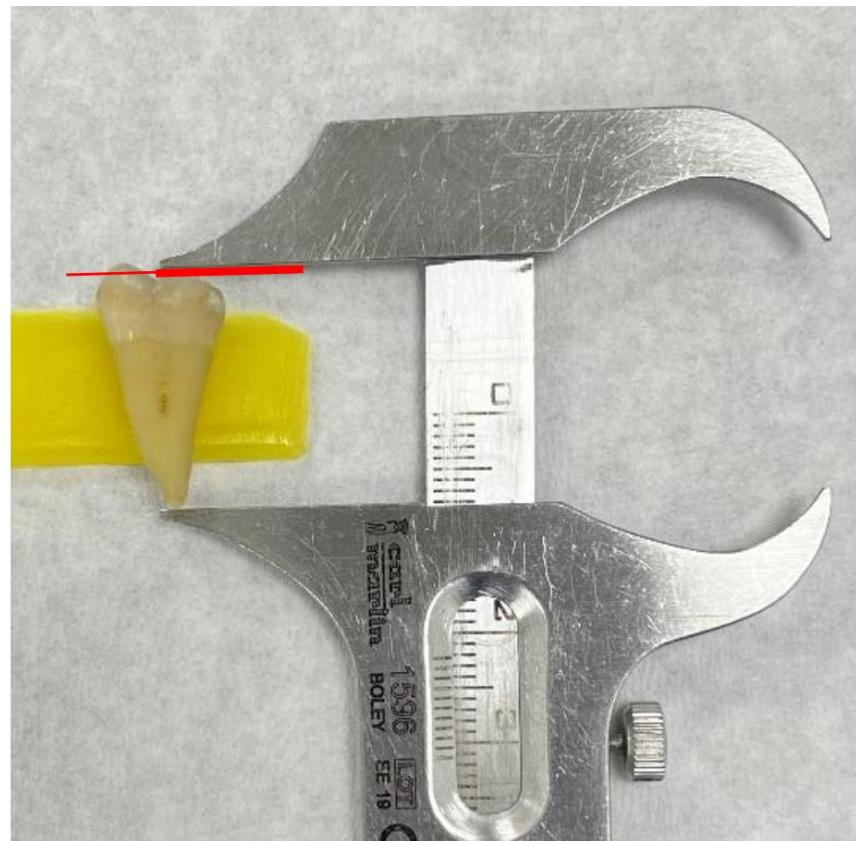
No milk elements
No stunted elements with open apex

Check in all
directions: no cavities
apical to enamel-
cementum interface



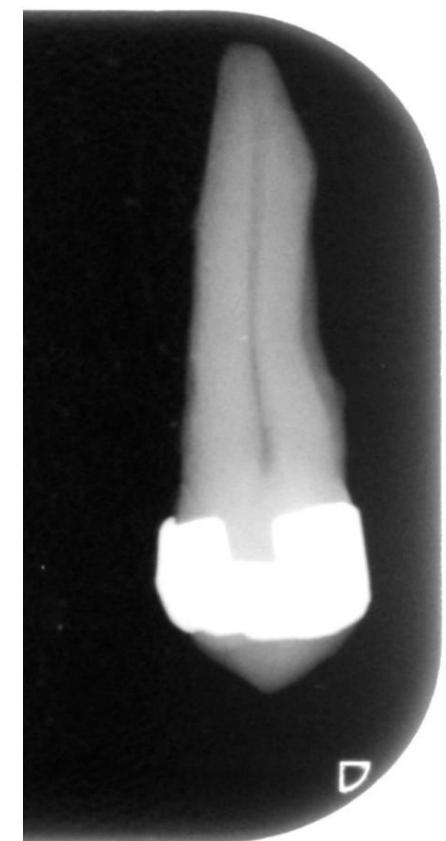
Measure the length in advance

Apex highest reference point (*you can easily recognize this on an X-ray*)



Measure the length in advance

Apex highest reference point (*you can easily recognize this on an X-ray*)



In the clinic, length is determined electronically, the 'provisional' working length is determined using the initial photo. A 'length photo' is taken in the clinic to assess the course of the canals and to see what the final photo will look like; If a file protrudes through the radiological apex in that photo, the electronic length determination is repeated and the length is corrected. If a file in that photo is more than 2 mm away from the radiographic apex, the electronic length determination is repeated; if the EAL (electronic apex locator) indicates the same length, the EAL is correct and you know that the final photo will also show a canal filling that is more than 2 mm away from the radiographic apex.

In the preclinic we spend as little time as possible on determining length because this is not clinically relevant; If the file protrudes through the radiographic apex, the length is corrected. By measuring the extracted element in advance, the 'provisional' working length will never be too short.

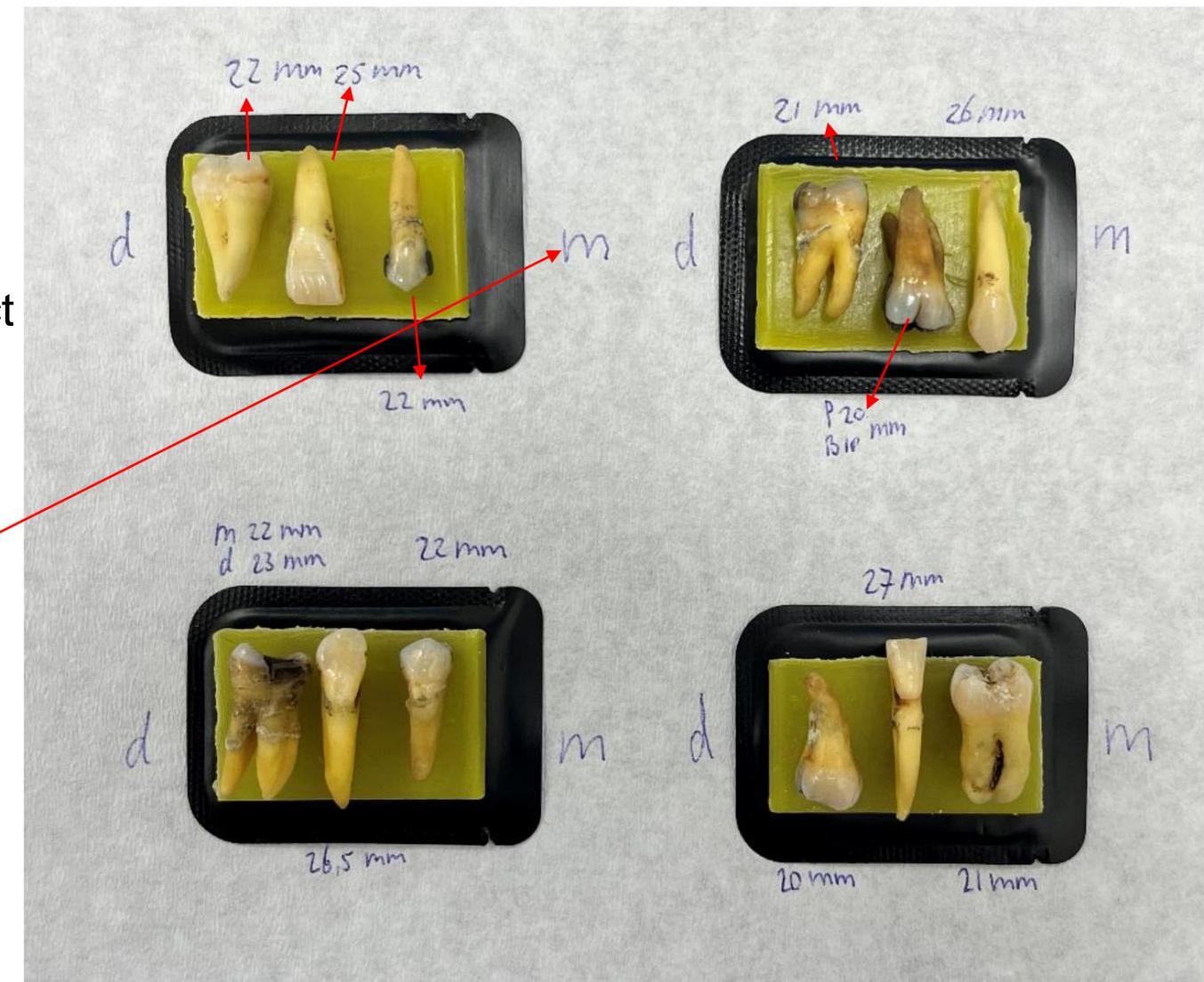
Element van 29,5 mm?

Too long for a preclinical jaw, periapex not on
the X-ray: not suitable!

Maximum length: 26 mm



- Create 'sets' that will be easy to recognize on your X-rays
- Arrange directly in the correct direction: upper and lower jaw teeth, mesial side to the right
- Note the working lengths
- Take a photo of these sets with lengths

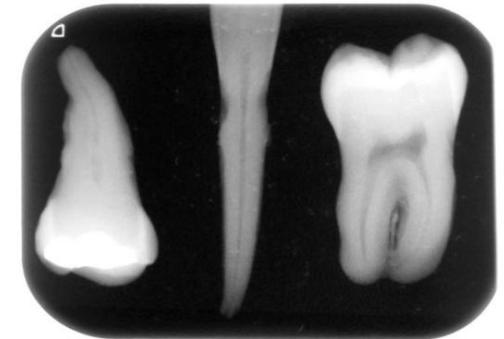
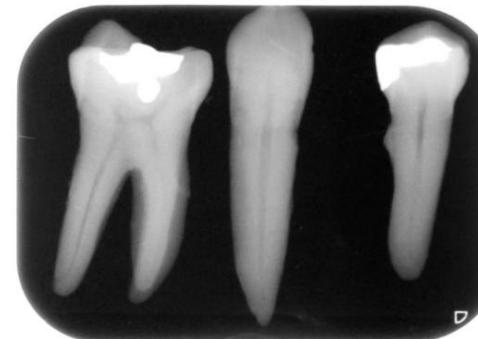
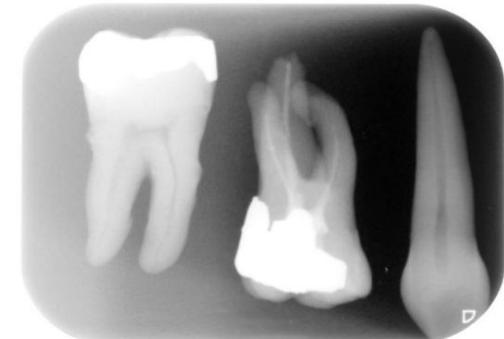
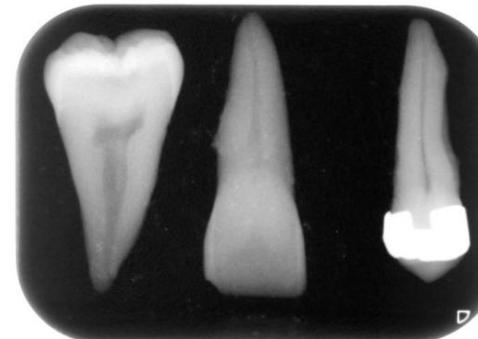


- Take x-rays of the sets
- Shoot as straight as possible
- Waxed by the elements

They are easy to lay down
straight



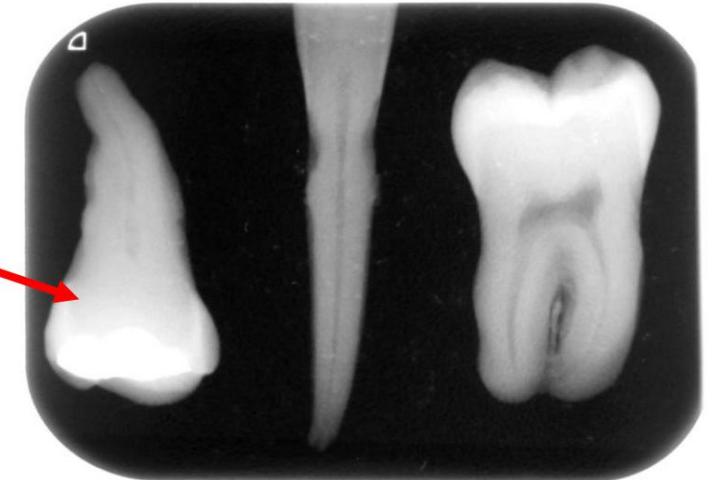
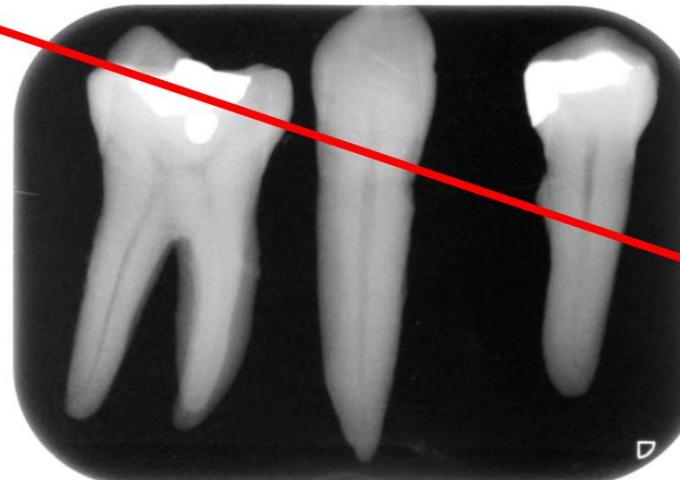
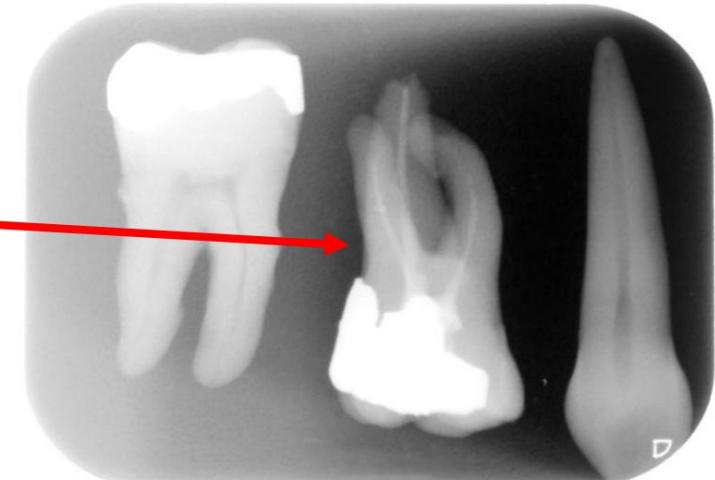
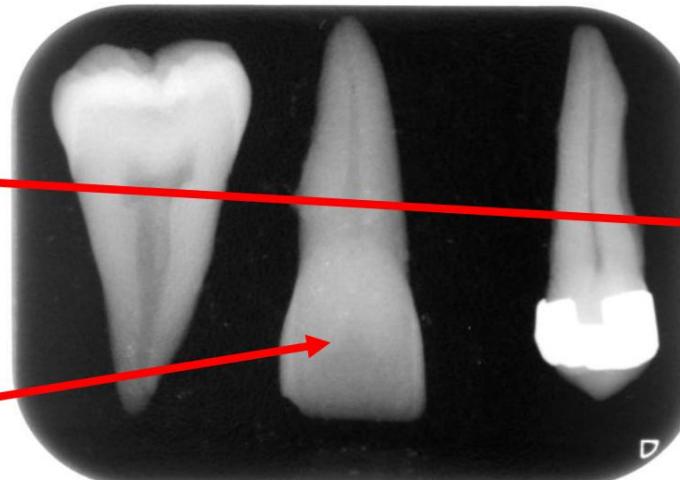
Save the sets!



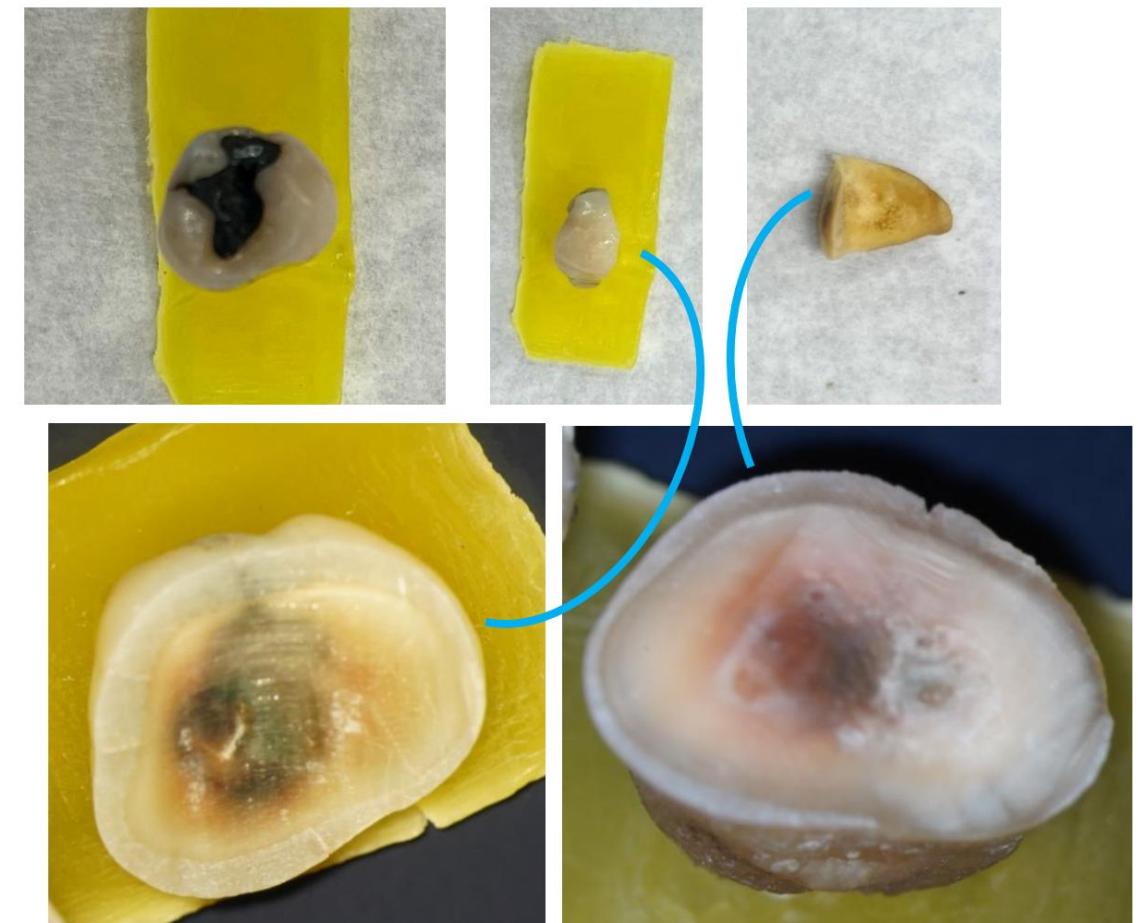
Unsuitable:

Channel filling present

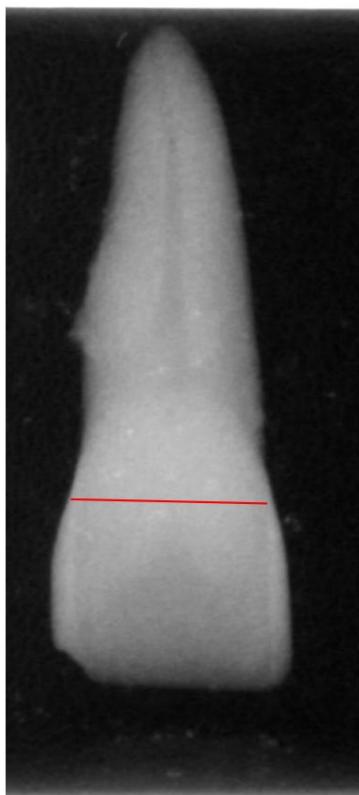
No pulp chamber
visible



No pulp chamber visible means that the pulp chamber is obliterated, then there is no longer any pulp chamber and the endodontic opening becomes complicated, time-consuming, frustrating with a high risk of perforations > not suitable!

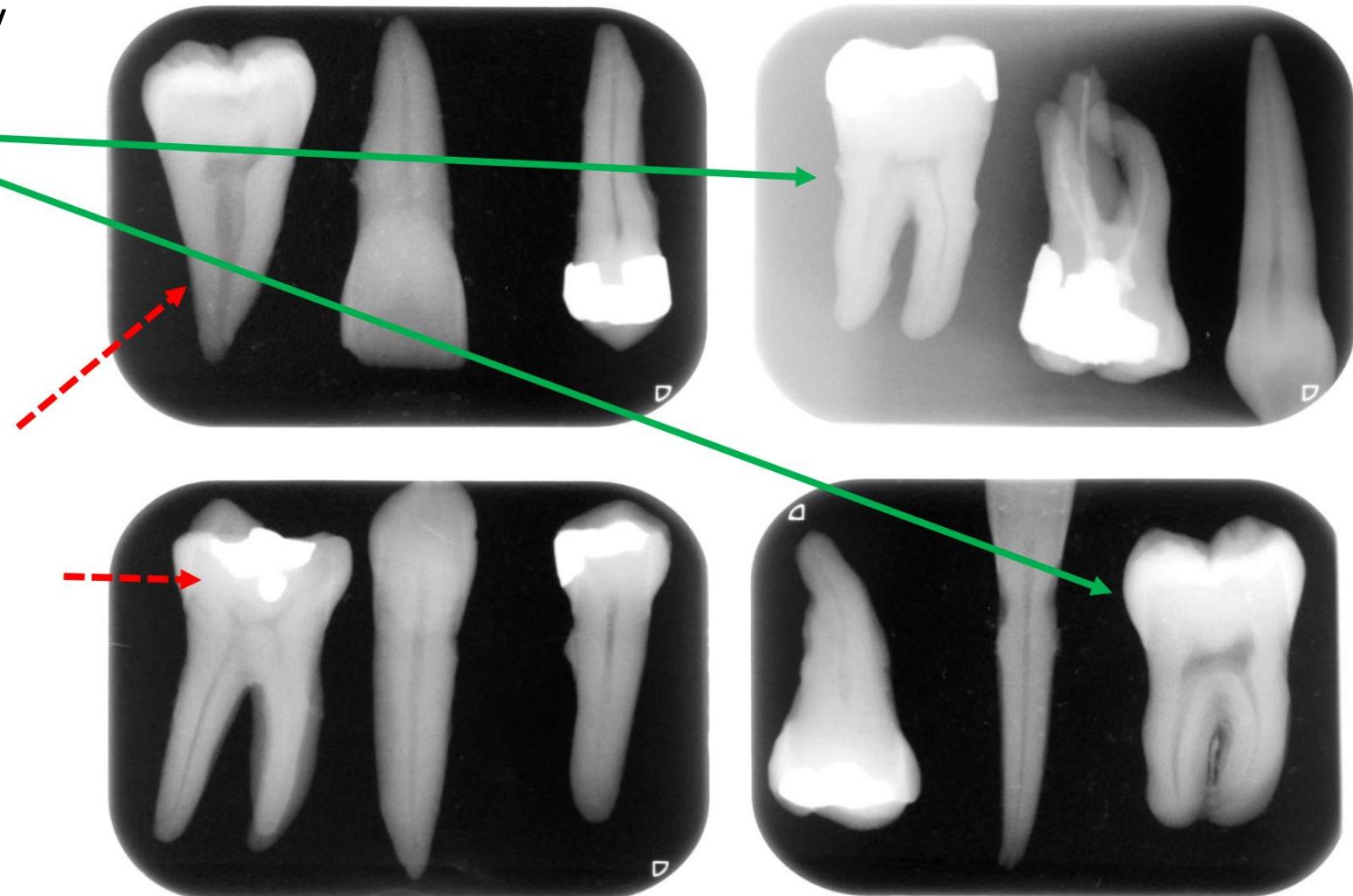


No radiolucent pulp chamber visible means that there is obliteration, then there is no more pulp chamber and the endodontic opening becomes **complicated, time-consuming, frustrating with risk of procedural errors > not suitable!**

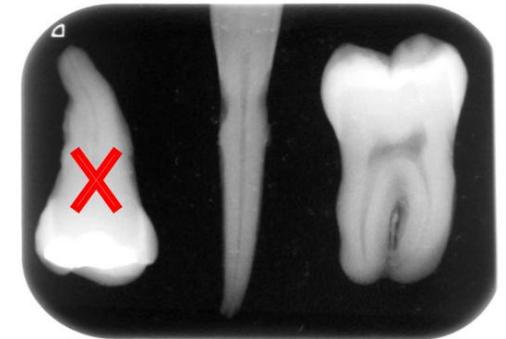
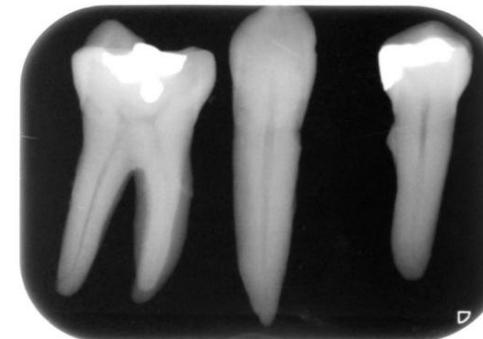
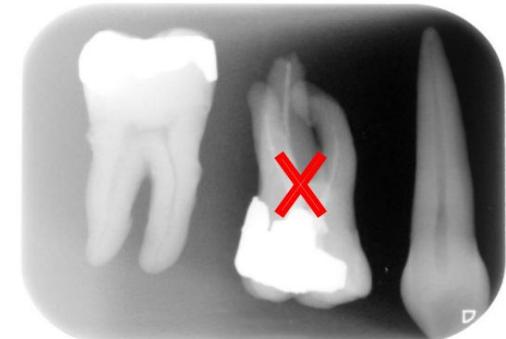
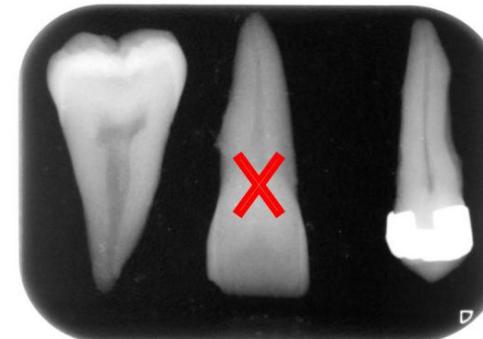
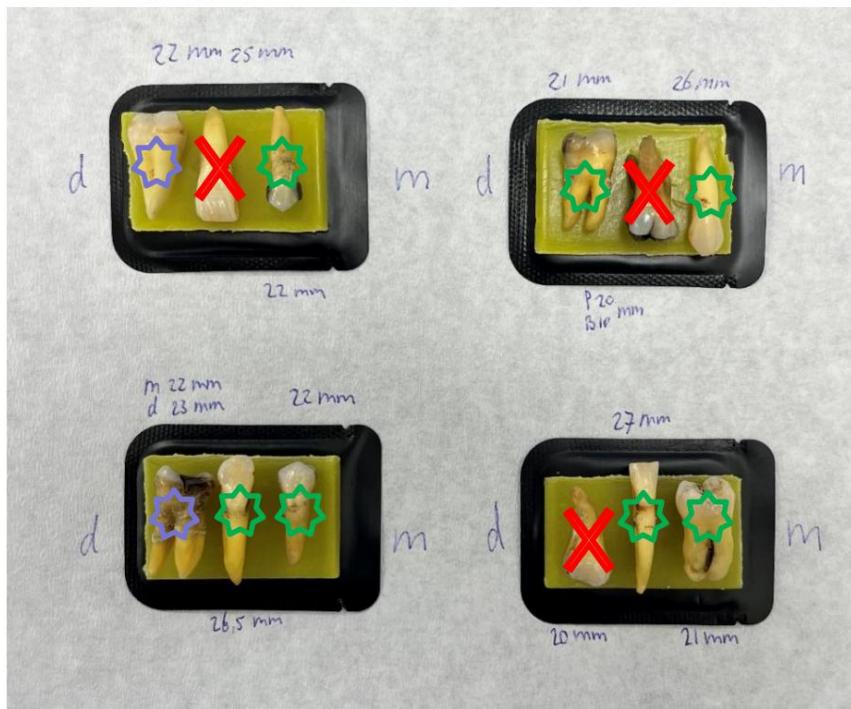


Most suitable: clearly visible pulp chamber and individual roots

Moderately suitable:
Fused roots
less visible pulp chamber



Save the sets!



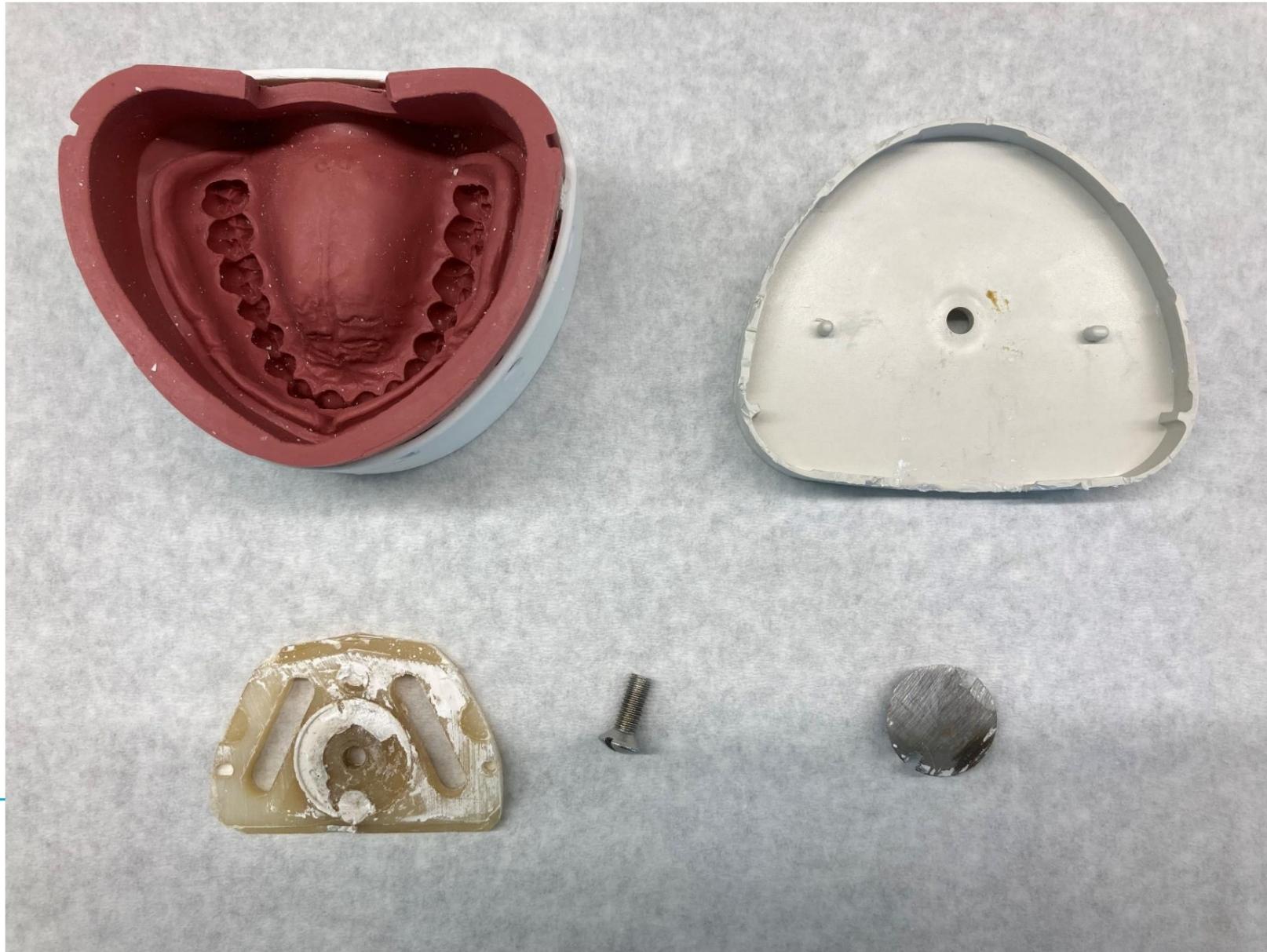
Store the sets in water and remove unsuitable elements immediately



Naam:

Element Fase	Incisief Bk----S	Incisief Ok----I	Cuspidaat Bk----S	Cuspidaat Ok----I	Premolaar Bk----S	Premolaar Ok----I	Molaar Bk----S	Molaar Ok----I	Element
I Hand Snel									Hand I Snel
II Hand: beoordeling									:Hand II beoordeling
III Kaak Openen									Kaak III Openen
IV Kaak Toets									Kaak IV Toets
Fase Element	Bk----S Incisief	Ok----I Incisief	Bk----S Cuspidaat	Ok----I Cuspidaat	Bk----S Premolaar	Ok----I Premolaar	Bk----S Molaar	Ok----I Molaar	





Radboudumc





Radboudumc







Radboudumc



-
- Free the cervical edges of the teeth from plaster.
 - Thin out the edges with a plaster cutter.
 - Clean up the mess!
 - Store jaw wet!

Röntgenfoto's

- Save in DiGora in DigiFan: only use the rear computer! • Complete crown with apex, from which the contour is clearly distinguishable
the
plaster • Tip! Place multiple elements on 1 photo

In summary

- Read the manual and background/theory • Choose elements to work with • Help each other • Use your time effectively, you really need it...
- Progress is monitored at several times
- It'll be fine....!

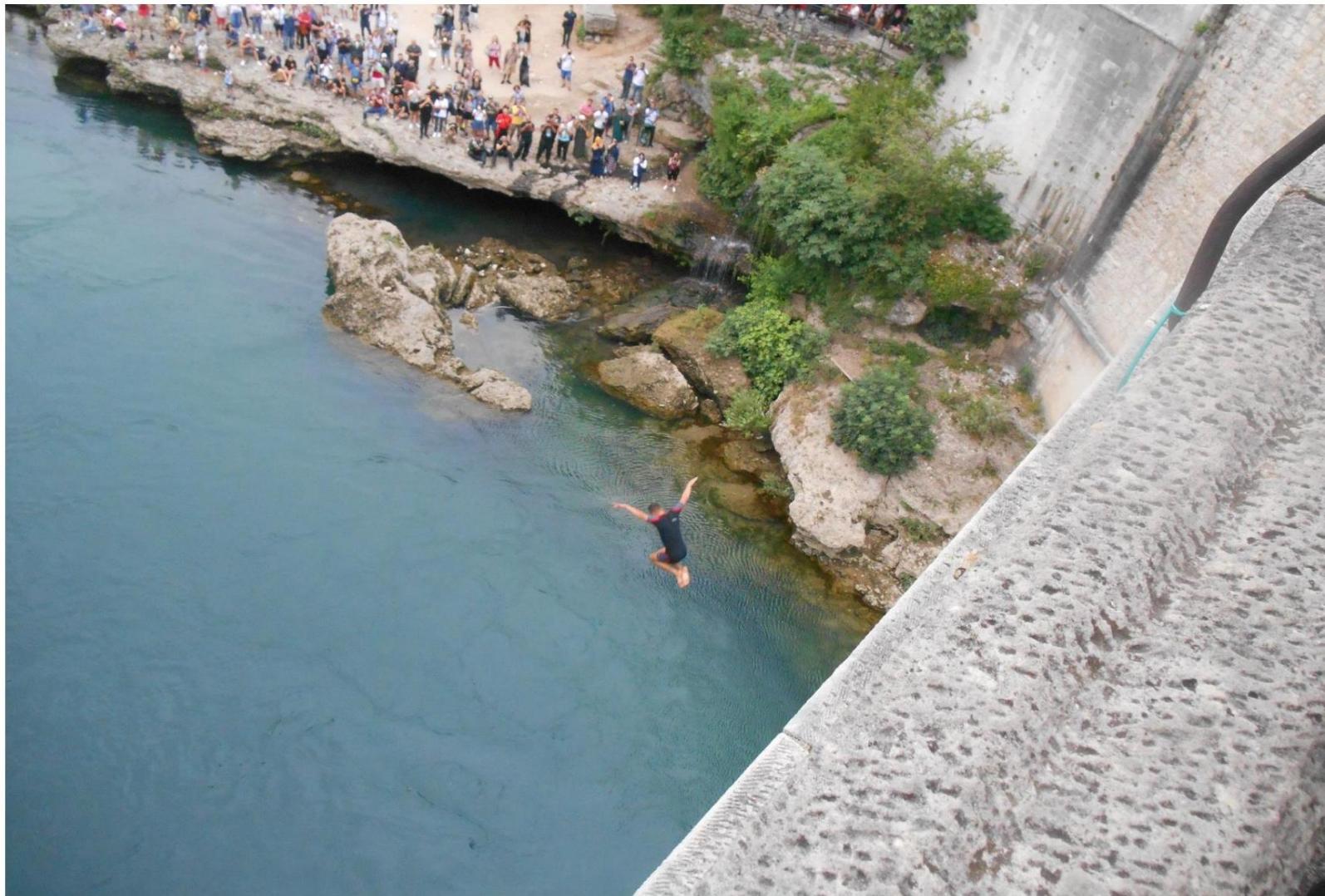
The endodontic opening

- It is important a good three-dimensional
Have an idea of the element you want to open.
- Then it's a matter of!

And do; a leap into the deep?



Just do it!





Sitting in a 3.8-metre sea kayak and watching a four-metre great white approach you is a fairly tense experience