

ครั้งที่ 7 (3.1)  
Malocclusion



# Age assessment Classification

- Morphological age
- Skeletal age
- Mental age
- Sexual age
- Chronological age
- Dental age



## *Age assessment Classification*

Morphological  
age

growth and development

Skeletal age

studying radiographs of the progress of ossification of the epiphyseal cartilages of the bones in the hands of a young patient (the carpal index) and comparing this with average data values for children of his age, we are in a position to assess the child's skeletal age.



## *Age assessment Classification*

### Sexual age

the appearance of primary and secondary sexual features.

### Mental age

(intelligence quotient, or IQ, tests)

an assessment for behaviours and another to measure the **child's self-concept**.

### Chronological age

calculated directly from the child's birth date. It is usually used for comparing to **other age assessment**

### Dental age

stages of development of the teeth, from **initiation of the calcification process** through to the **completion of the root apex of each of the teeth**.



# Dental age

- The initiation of calcification of the cusp tips
- Crown formation
- Degrees of root formation (fractions)
- Fully closed root apex.

drawn up tables and diagrammatic charts of stages of development of the teeth, together with the average chronological ages at which each stage occurs.



30 weeks in-utero

34 weeks in-utero

38 weeks in-utero

Birth<sup>+</sup>

1.5 months<sup>+</sup>

4.5 months<sup>+</sup>

7.5 months<sup>+</sup>

16 - 23 year olds  
3<sup>rd</sup> molar



8.5 yr

9.5 yr

10.5 yr

11.5 yr

# Atlas of Human Tooth Development and Eruption

Dr. Sakher J. AlQahtani<sup>©</sup>

- midpoint of one month
- + midpoint of two weeks
- midpoint of 3 months

Thereafter midpoint of each year  
Solid lines represent alveolar bone level  
Teeth are spaced for clarity

12.5 yr

1.5 yr

7.5 yr

15.5 yr

13.5 yr

14.5 yr

2.5 yr

6.5 yr

5.5 yr

4.5 yr

3.5 yr

16.5 yr

17.5 yr

18.5 yr

19.5 yr

20.5 yr

21.5 yr

22.5 yr

23.5 yr



Queen Mary and Westfield College 2009  
Dentistry and The London School of Medicine and Dentistry  
<http://www.smd.qmul.ac.uk/dent/>

Sakher J. AlQahtani<sup>©</sup> March, 2009  
All rights are reserved.

The author would like to acknowledge the funding assistance of the  
Ministry of Higher Education, Saudi Arabia.

No use or reproduction may be made other than  
by written arrangement with the author.  
The author hereby asserts his moral rights.

© Sakher J. AlQahtani

# Dental Age Assessment

## Eruption of teeth

this may be influenced by local factors, which may cause premature or delayed eruption with a wide time-span discrepancy.

## Root development

the use of root development as determined by an examination of periapical or panoramic X-rays, is a far more accurate tool.



# Eruption of teeth and Root Development

Premature eruption

erupted tooth have less **root development** (6/6, L/1)

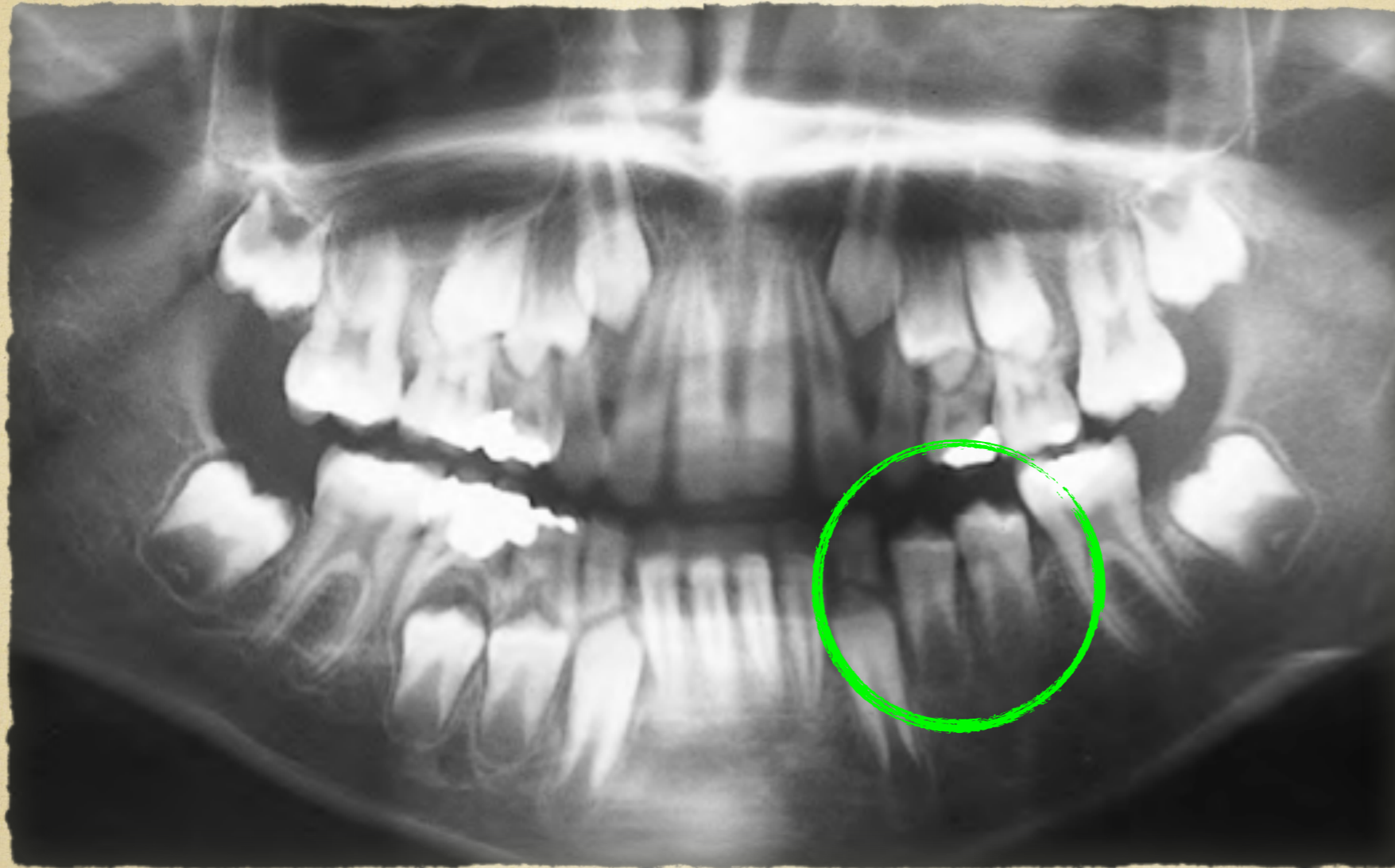
Delayed eruption

tooth which exhibits a more **completely developed root.**  
(7/7, -/3)





# Premature eruption

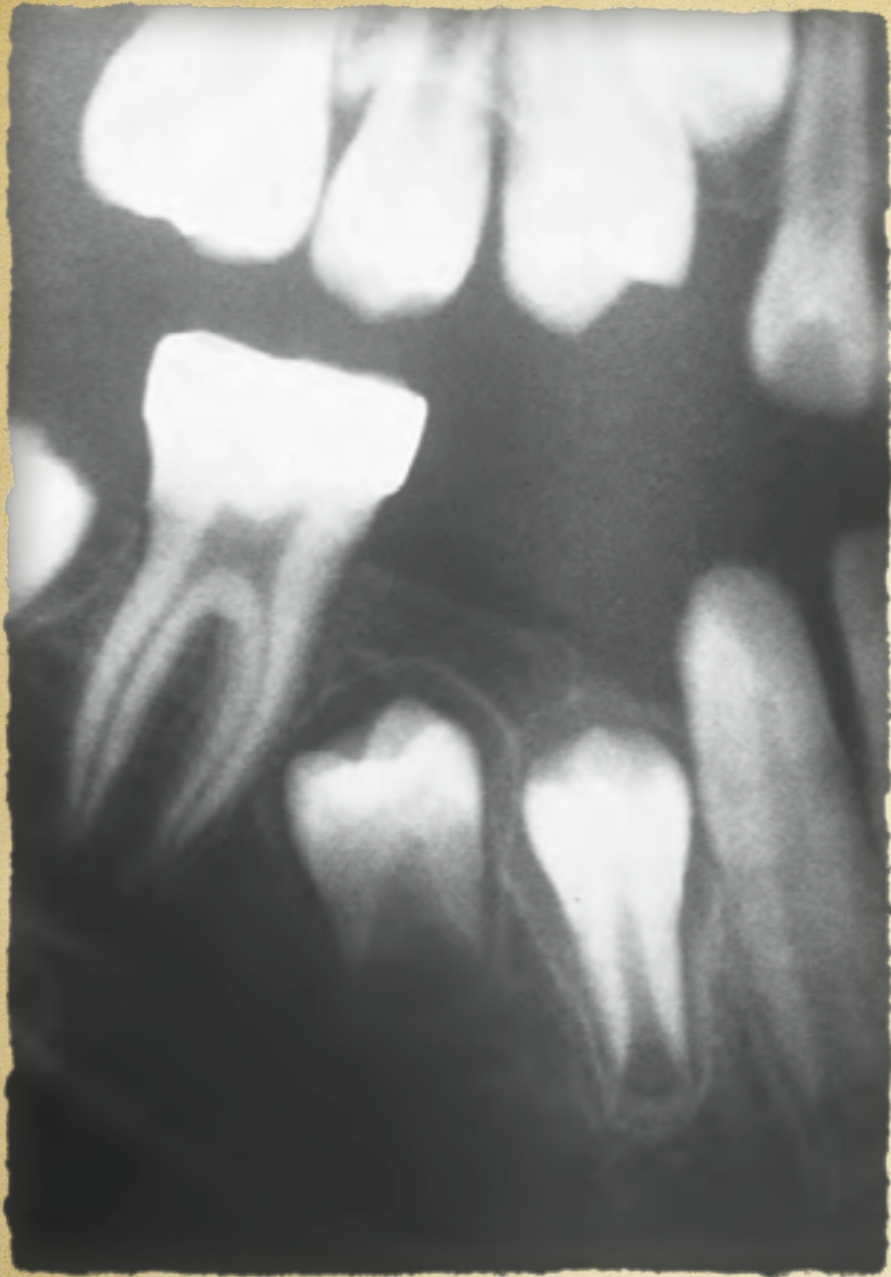


The left mandibular premolars are prematurely erupted, with insufficient root development

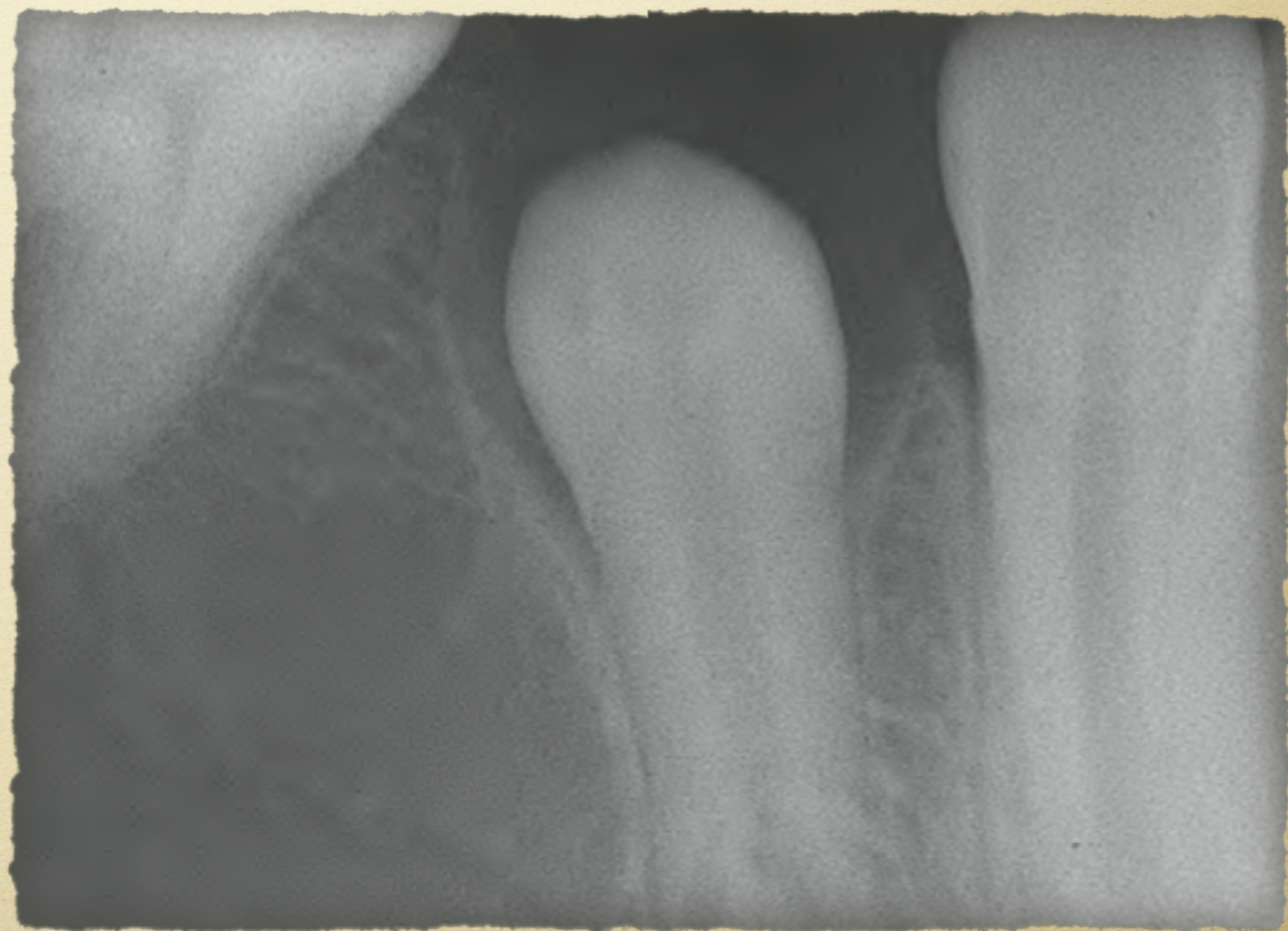


## Delayed eruption

The right mandibular second premolar was extracted at age 8.5 years.



Seen at age 11, the root of the unerupted first premolar is almost completed.



# The stage of root development

Tooth developing

As long as the **dental papilla** is discernible at the root end, the apex is open

Tooth development completed

The **papilla** disappears and a continuous **lamina dura** is seen to intimately follow the root outline

Root development of the permanent teeth is completed approximately **2.5–3 years after normal eruption** (Nolla CM, 1960)



# Dental age & Root development



Advanced  
root development

Root development  
goes beyond relative  
to overall dental age

Delayed  
root development

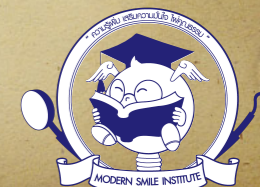
Root development  
goes behind relative  
to overall dental age



10-year-old child

## Advanced root development

- **Advanced** root development of the canines and premolars defines these teeth as exhibiting **delayed eruption**.
- The overall dental age is 12–13 years
- Extraction of deciduous teeth is **indicated**.





12-year-old child

## Delayed root development

- **Delayed** root development defining dental age as 9 years.
- Extraction of deciduous teeth is **contraindicated**.

# Classification of Dental Age for Orthodontic treatment oriented

- 1) **Retained Deciduous** (A delay-developing dentition).
- 2) **Over-retained deciduous** teeth (Complete developing permanent tooth).



# Retained Deciduous

(A late-developing dentition).

-A deciduous tooth that remains in place **beyond** its normal, chronological shedding time due to the **absence or retarded** (late) development of the permanent successor.

-The dental age lags behind the chronological age, by less root formation than is to be expected at a given age, in the entire dentition.

-A normal dental age with single or multiple late-developing permanent teeth.





*Retained Deciduous*  
*(A late-developing dentition).*

- Typically, **symmetrical presence** of all the deciduous molars and canines on each side of each jaw.
- **The extraction of deciduous teeth is contraindicated**
- Commonly found in relation to the maxillary lateral incisor and the mandibular second premolar teeth.
- Normal shedding of the tooth is to be expected when the root of the permanent tooth reaches **two-thirds to three-quarters of its expected length.**



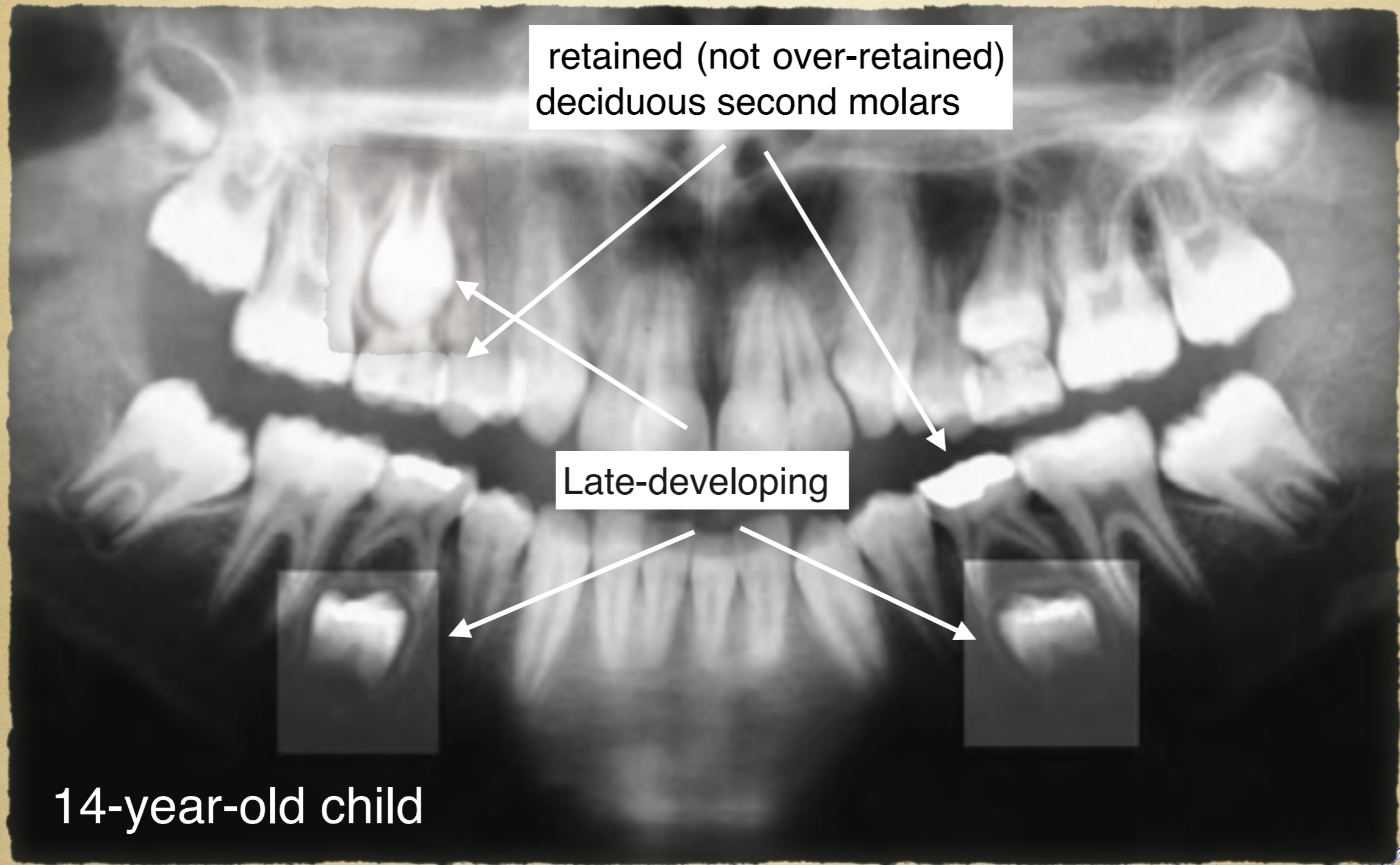
*Retained Deciduous  
(A late-developing dentition).*



12-year-old child



*Retained Deciduous  
(A late-developing dentition).*



## Over-retained deciduous teeth (Complete developing permanent tooth)

- A deciduous tooth that remains in place **beyond** its normal, chronological shedding time due to unerupted permanent successor exhibits a root development in **excess of three-quarters** of its expected final length.
- The dental age positively correlated with the chronological age, but the radiograph shows an **individual** permanent tooth or teeth with well-developed roots, which **remain unerupted**.

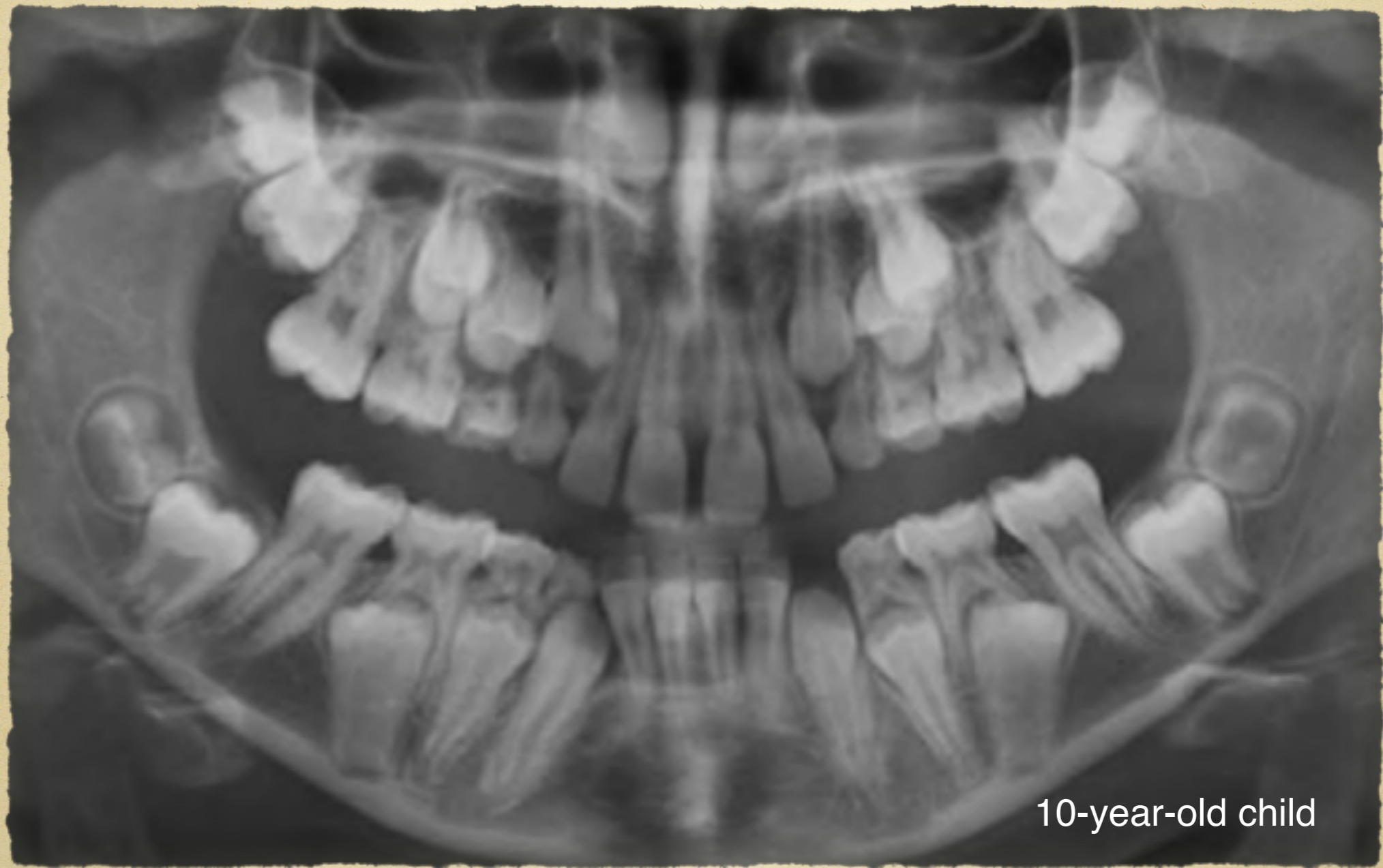


*Over-retained deciduous teeth  
(Complete developing permanent tooth)*

- **Ectopic** siting of the permanent tooth bud, and shedding has not occurred due to the persistence of the remaining part of the root unresorbed root.
- Nevertheless, the condition may occasionally be found **symmetrically** in a single dental arch or in both arches.
- **Extraction** of the over-retained tooth or teeth is **indicated**.

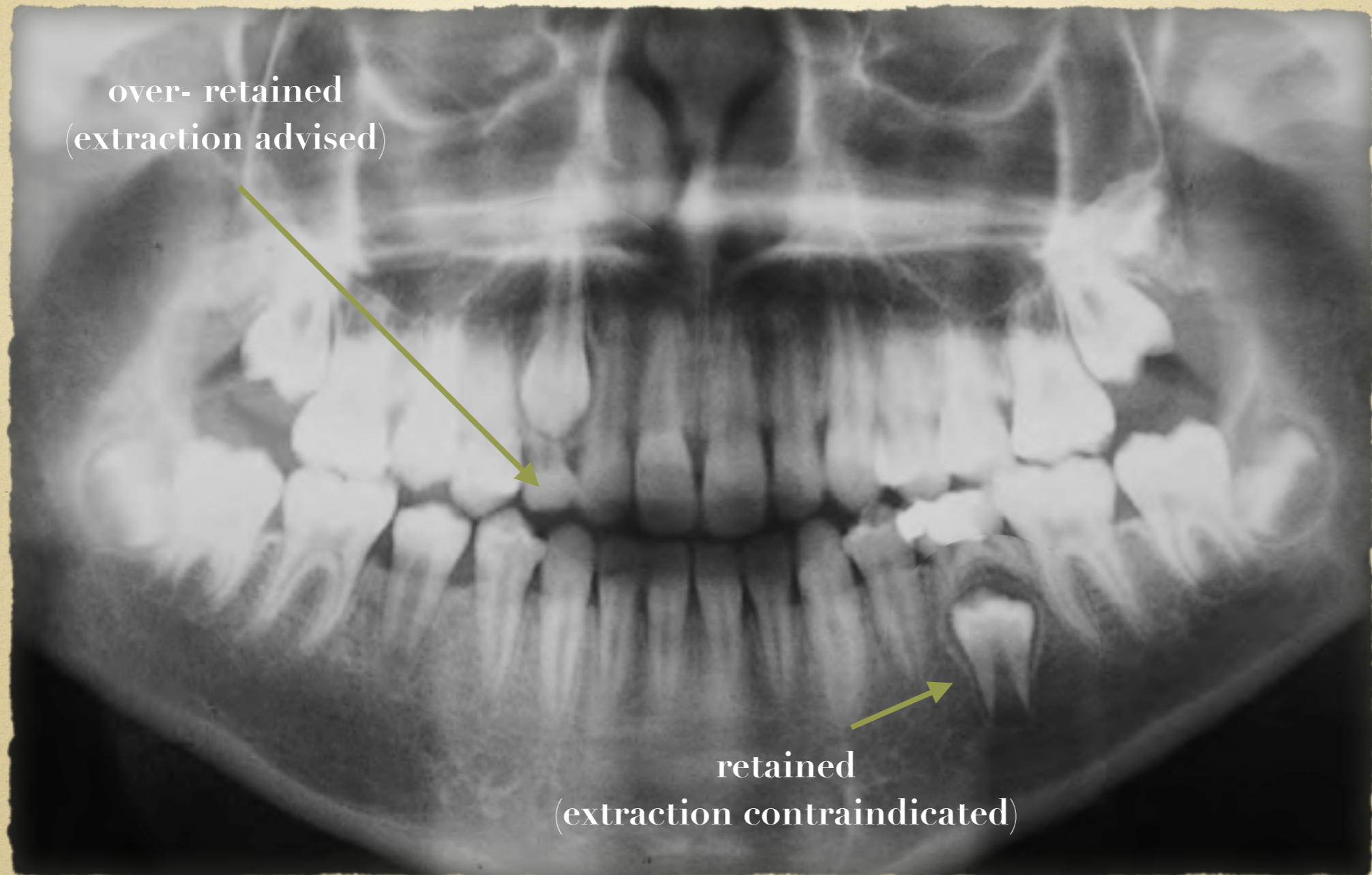


*Over-retained deciduous teeth  
(Complete developing permanent tooth)*



10-year-old child

*(Over)-retained deciduous teeth  
(Complete developing permanent tooth)*



*Retained deciduous teeth  
(No successor)*





# Unerupted permanent tooth

Unerupted tooth

The tooth whose root is developed in excess of this length and whose **spontaneous** eruption may be expected in time.

Impacted tooth.

The tooth whose root is developed in excess of this length and which is **not expected to erupt** in a reasonable time



## *Unerupted permanent tooth*

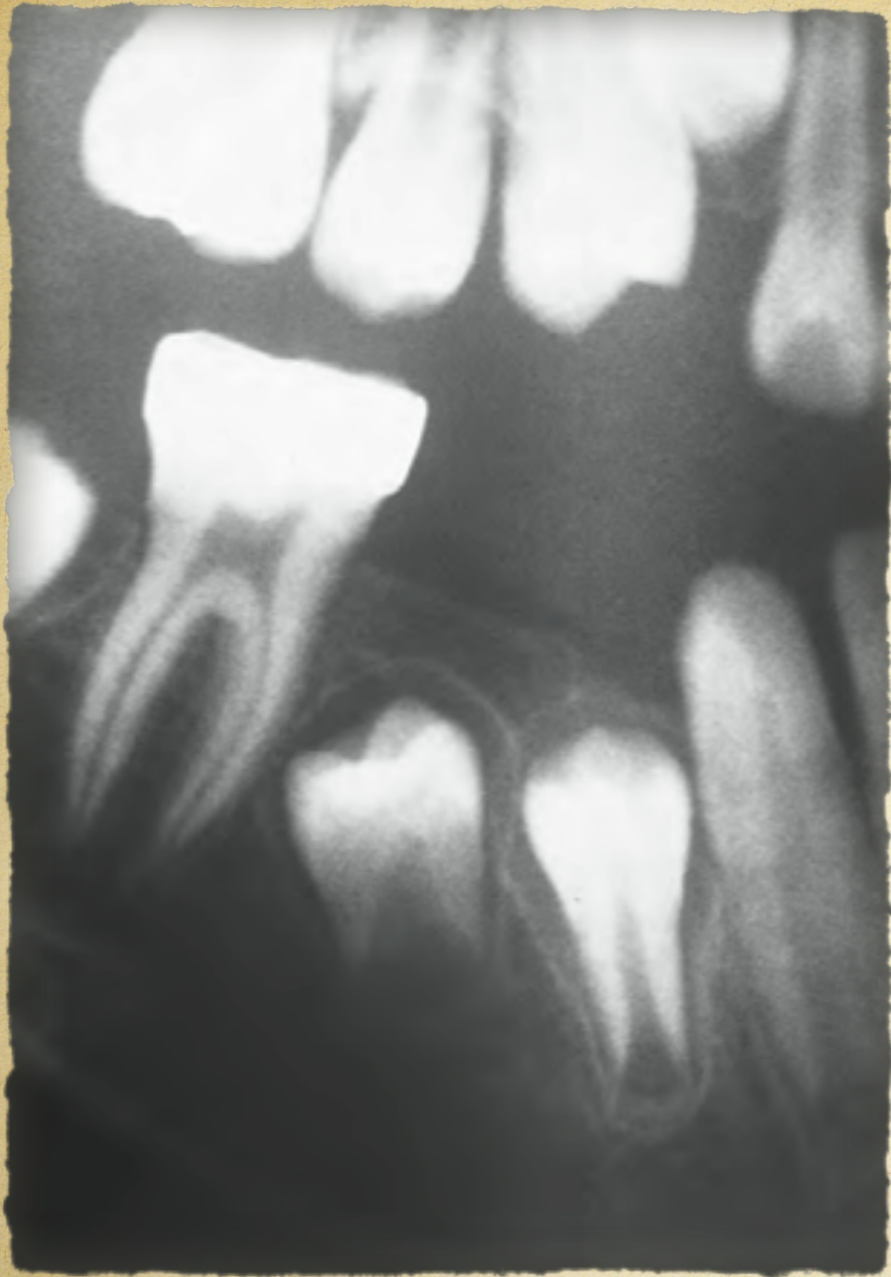
### **The aetiology**

- a failure of the roots resorption of a deciduous tooth,
- an abnormal eruptive path
- a supernumerary tooth
- dental crowding
- a much enlarged dental follicle/dentigerous cyst
- soft tissue pathology or a disturbance in the eruption mechanism of the tooth.
- a thickened post-extraction or post-trauma repair of the mucosa
- space loss and tipping of the adjacent erupted teeth.

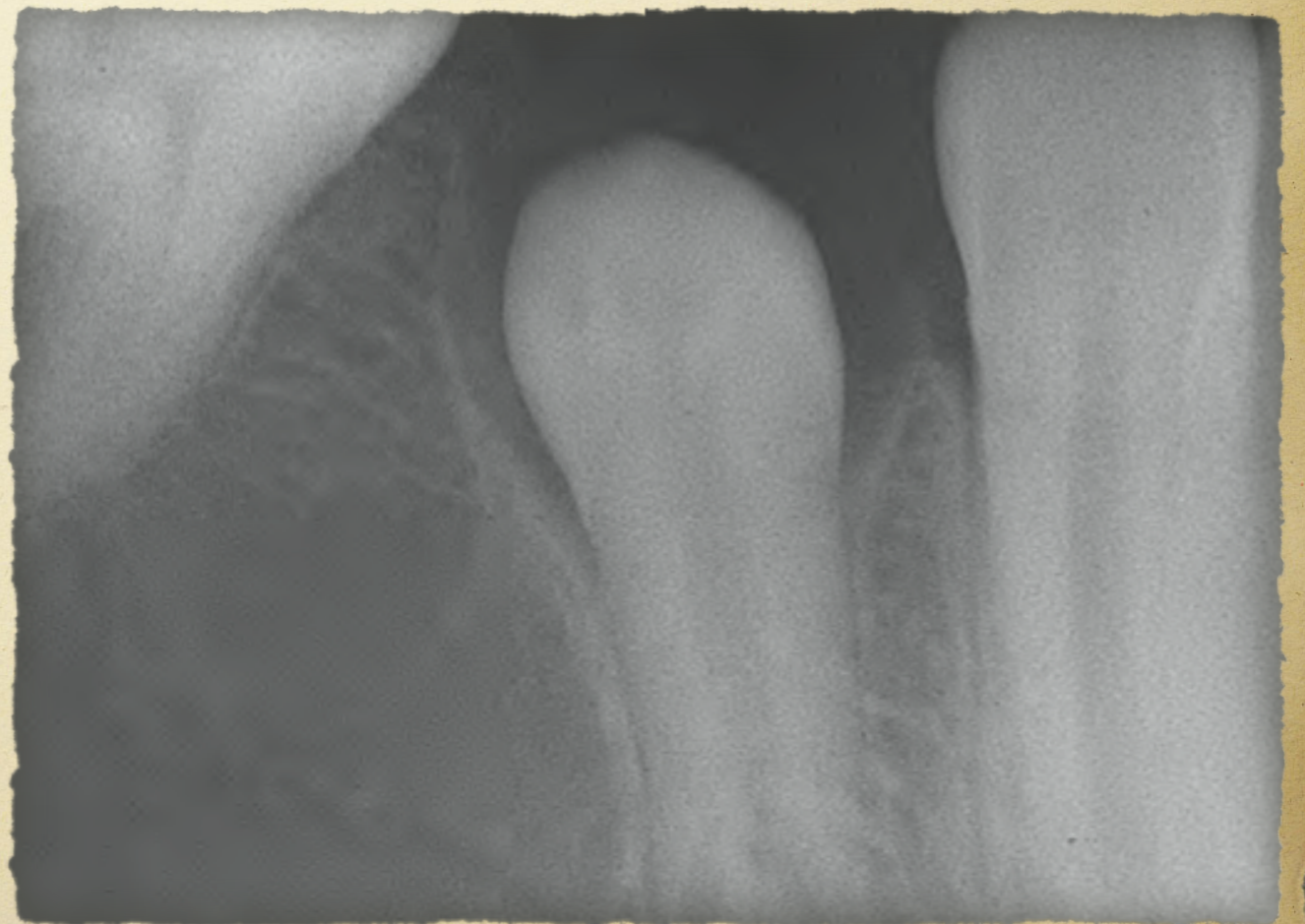


*Unerupted tooth*

The right mandibular second premolar was extracted at age 8.5 years.



Seen at age 11, the root of the unerupted first premolar is almost completed.



# Impacted tooth and Orthodontic

- A radiographic survey of an orthodontic patient
- Reveal pathology (a supernumerary tooth, an odontome, a cyst or benign tumour) which appears likely to prevent the normal and spontaneous eruption of a neighbouring tooth.



# Treatment of Unerupted tooth

## Surgical approach

- a failure of resorption of the roots of a deciduous tooth
- a supernumerary tooth
- a much enlarged dental follicle/dentigerous cyst
- a thickened post-extraction or post-trauma repair of the mucosa
- soft tissue pathology or a disturbance in the eruption mechanism of the tooth.

## Orthodontic approach

- dental crowding
- an abnormal eruptive path
- space loss and tipping of the adjacent erupted teeth.



## Timing of surgical treatment of Un-erupted tooth

- **Do not encourage** the tooth to erupt before an adequate (half to two-thirds) root length has been produced.
- At that early stage of its development, the tooth cannot be considered as impacted and, given time and freedom to manoeuvre, will probably erupt by itself.
- Early exposure risks the possibility of damage to the crown and to the subsequent root development of the tooth.



# Orthodontic Treatment of Un-erupted tooth

- The extraction of **retained deciduous** teeth is **contraindicated** for a late-developing dentition.
- The extraction of **over retained deciduous** teeth is **indicated** for well-developed roots, which remain unerupted.
- Do not do orthodontic force to encourage the eruption of the impacted tooth **before an adequate (half to two-thirds) root length** has been produced.
- Open the space which is lost and tipping of the adjacent erupted teeth.



*Unerupted canine*

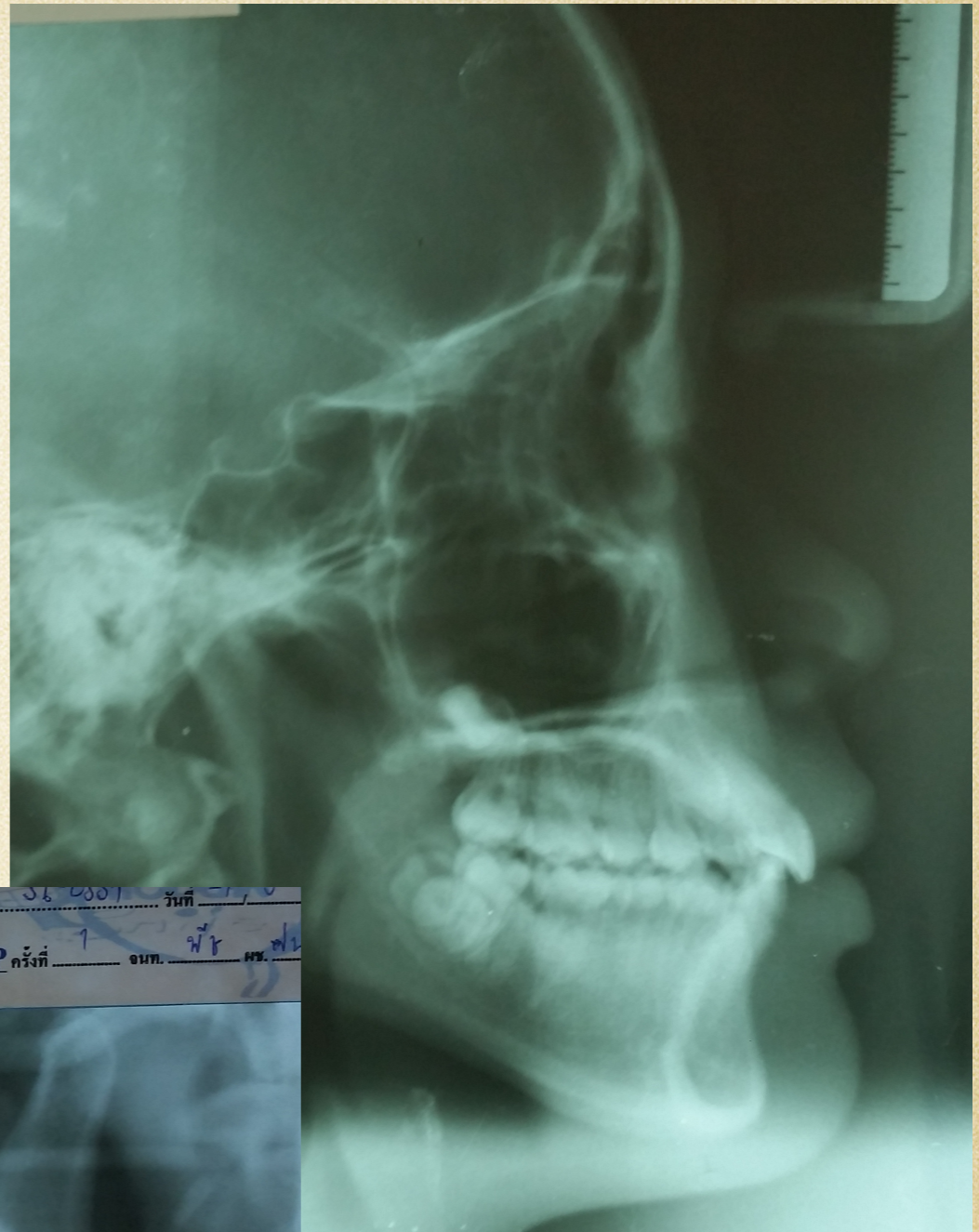


วรรณธนา 56-0531





# *Unerupted canine*



วรรณธนา เพาะปลูก 56-0531

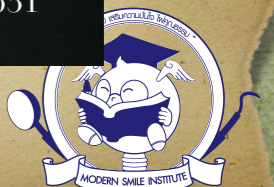


# Orthodontic Treatment of Un-erupted tooth

Open the space which is loss and tipping of the adjacent erupted teeth



วรรณธนา เพาะปลูก 56-0531



# Orthodontic Treatment of Un-erupted tooth

Open the space which is loss and tipping of the adjacent erupted teeth



พิกญา สมปิยะโชค 55-0575



# Summary

developing permanent root	chronological age	deciduous teeth	Dx	Tx
<1/2 developing permanent root	Match	-	Late developing root	-
	Late	retained	Late developing root with <b>retained deciduous</b> tooth	Xtn deciduous tooth Contra-Indicated
	Early	-	Premature Eruption	-
>2/3 developing permanent root	Match	-	Normal Eruption	-
	Late	over-retained	Late developing root with <b>over-retained deciduous</b> deciduous tooth. Unerupted permanent tooth Delay Eruption	Xtn deciduous tooth Indicated
	Early	-	Normal Eruption	-



The End

