

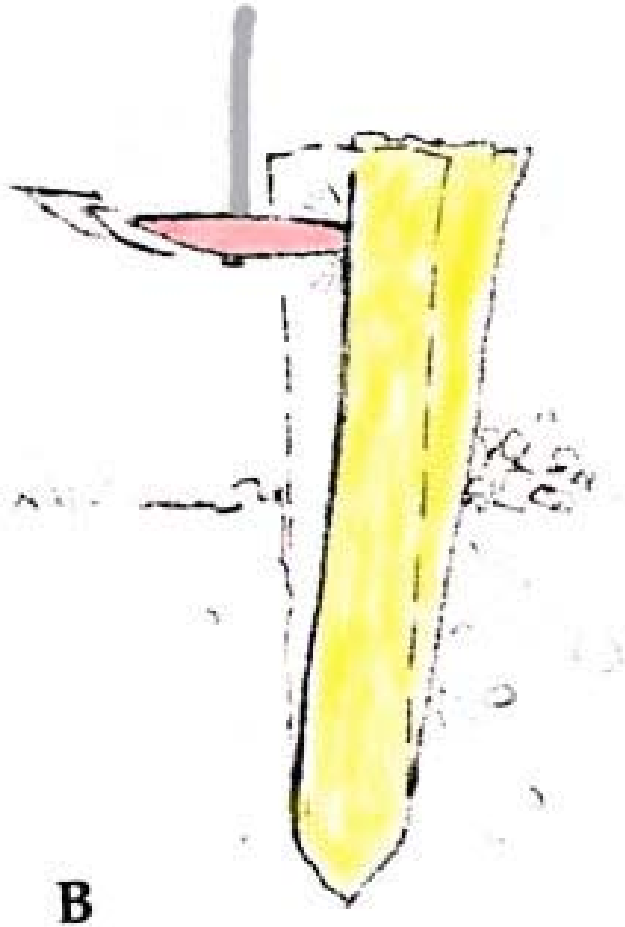
Consequences of not meeting  
all the requirements.

Consequence #1

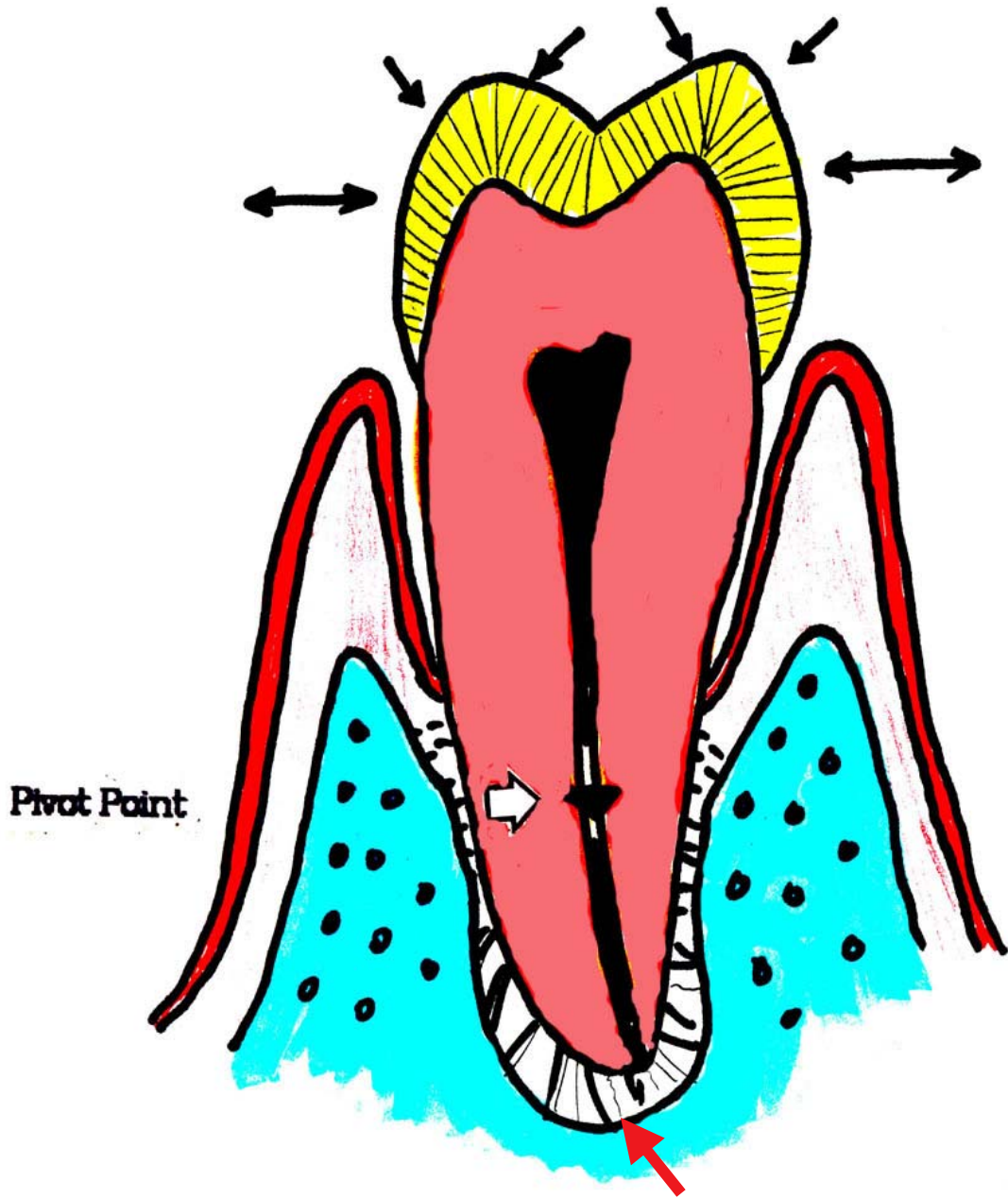
Bone loss

# Some of the reasons for bone loss.

- Bone weak / unhealthy. Smoking can impact.
- Position of the tooth in the bony dental arch.
- Poor oral hygiene.
- Low pivot center within the tooth.
- Whole tooth moves in the socket. Similar to rocking post in the ground to loosen it.
- Thickened periodontal ligament.
- Periodontal pockets deepen and get increased invasions of micro-organisms.



Simple illustration demonstrating how by just tapping a post lightly on the side over a long period of time can eventually loosen the post. The same thing can happen to a tooth.



## Bone loss illustration

Small lateral forces hitting the tooth from many different directions, in a tooth with a low pivot point, may eventually loosen the tooth.

B4 Thickened periodontal ligament.

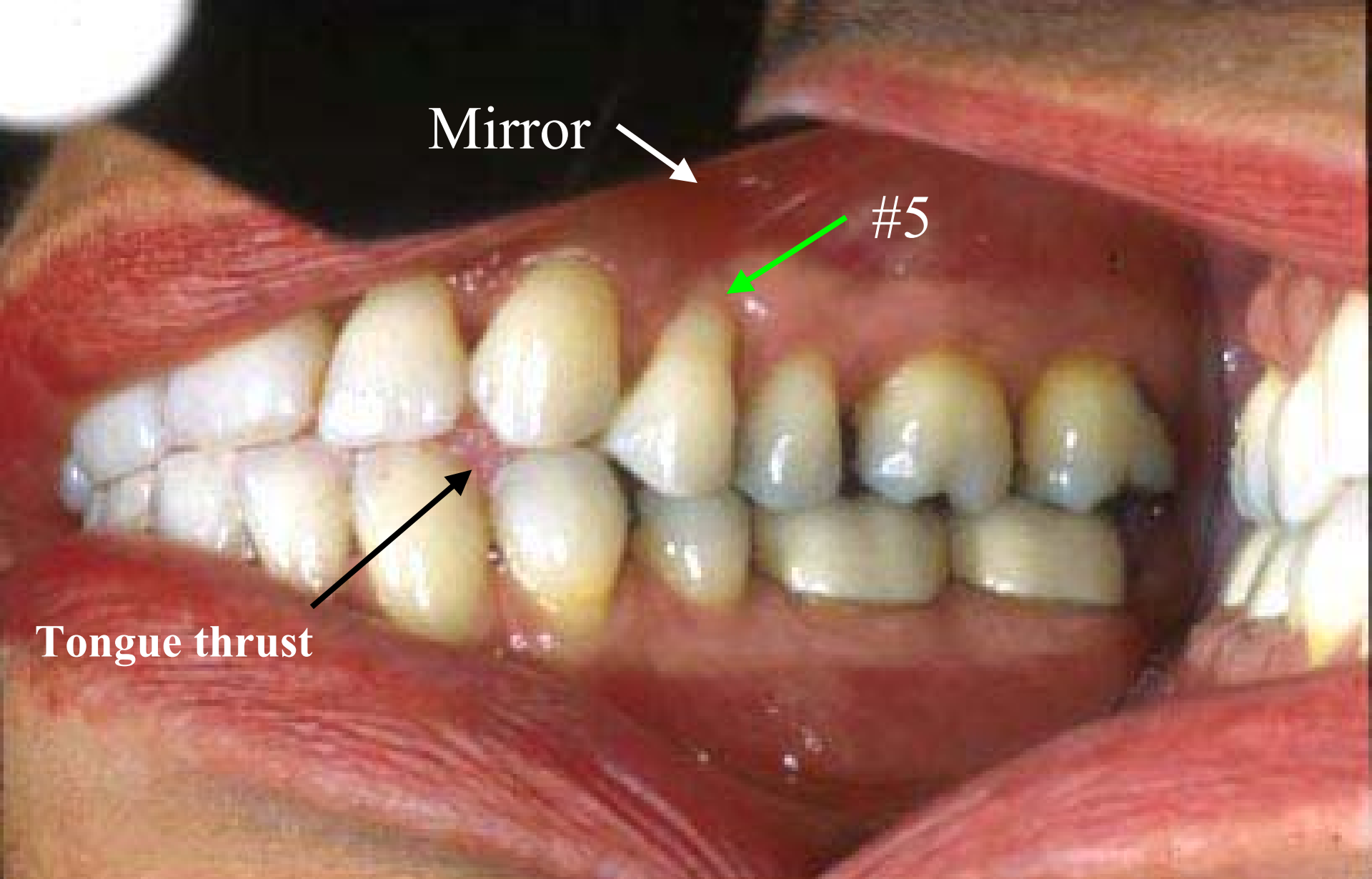
# Bone loss cases

## Case #1

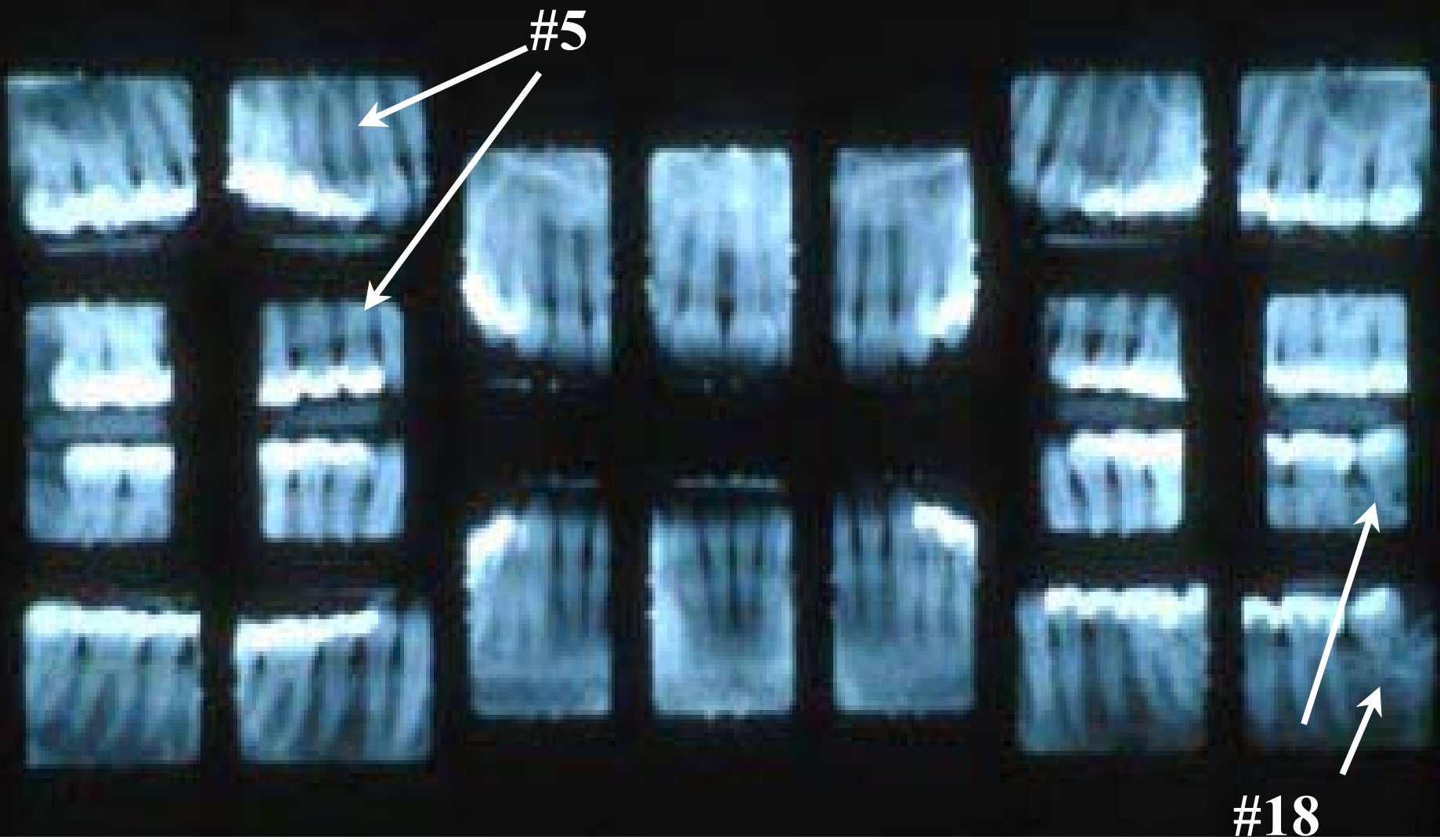


B6

Anterior view. Very shallow bite.

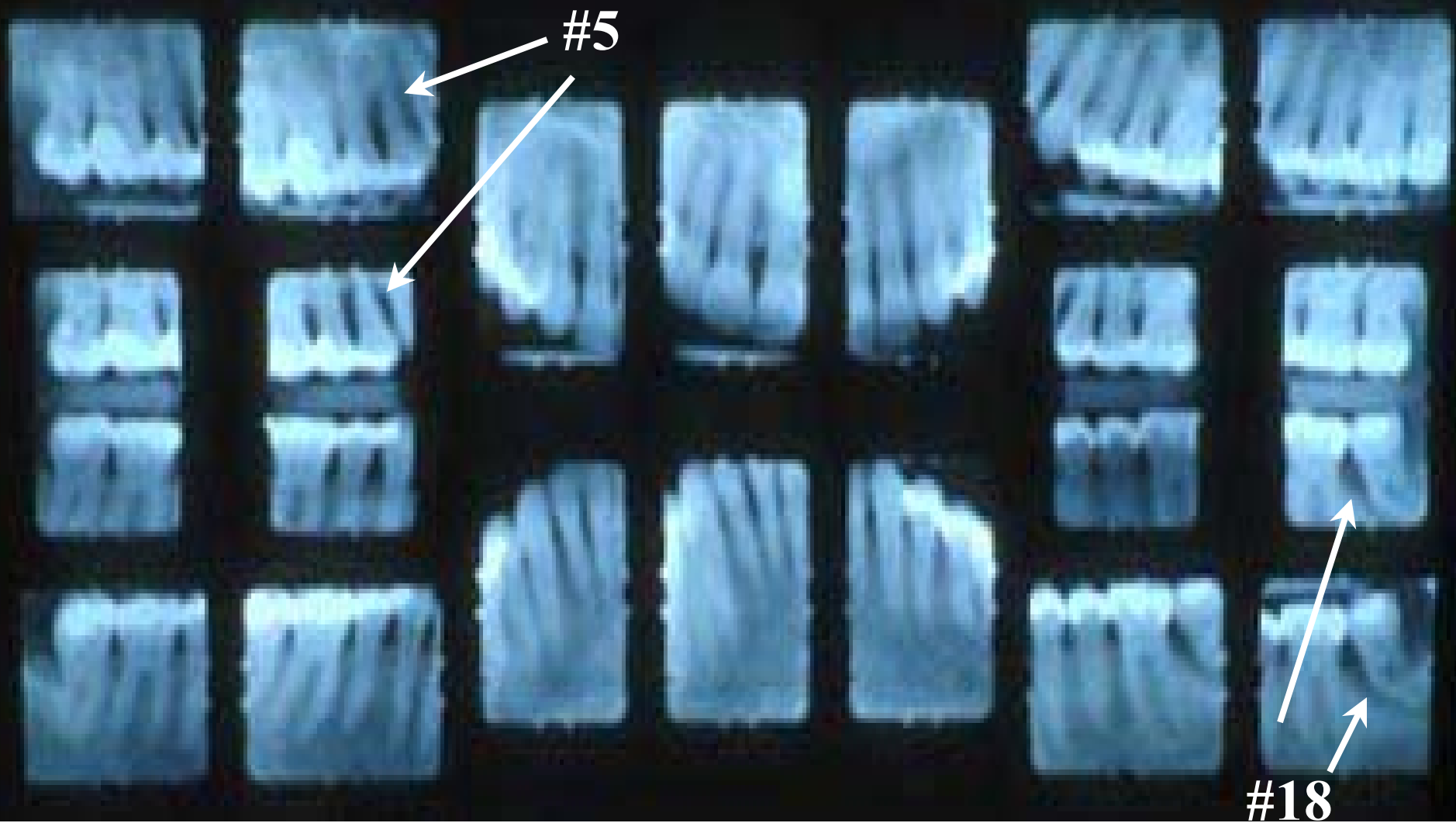


Right side (reflective). Note tongue thrust & recession #5.



1983 FMX. Note bone level around #s 5 and 18.





1990. FMX. Note bone level around #s 5 and 18.

Most significant bone loss on these 2 teeth.



#18

Bone around #18 in 1983.

B10

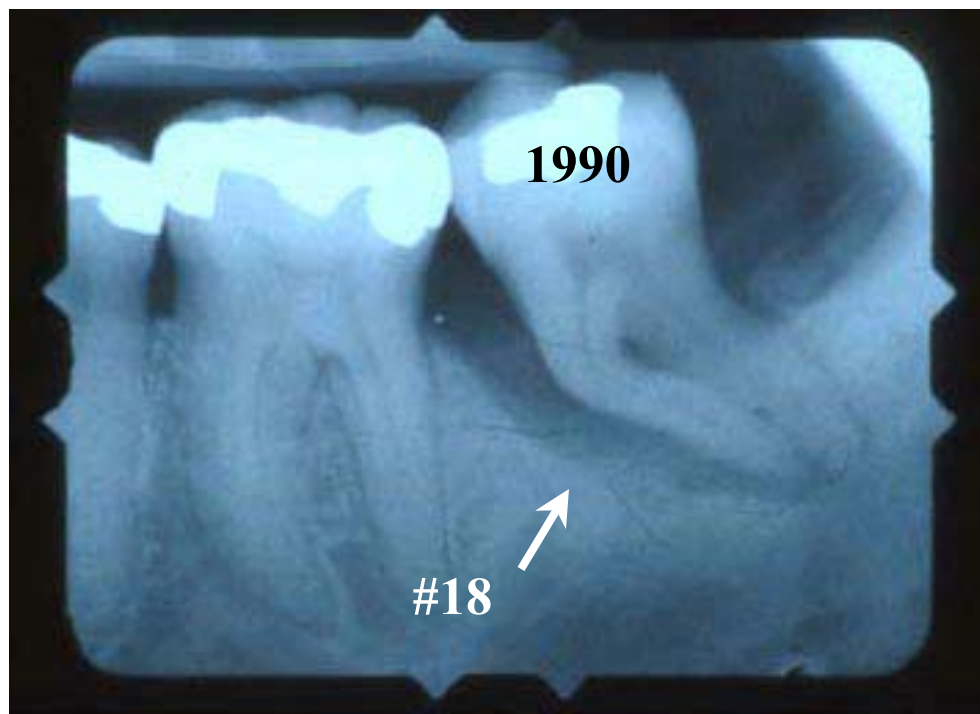



Bone around #18 in 1990.

**B11**

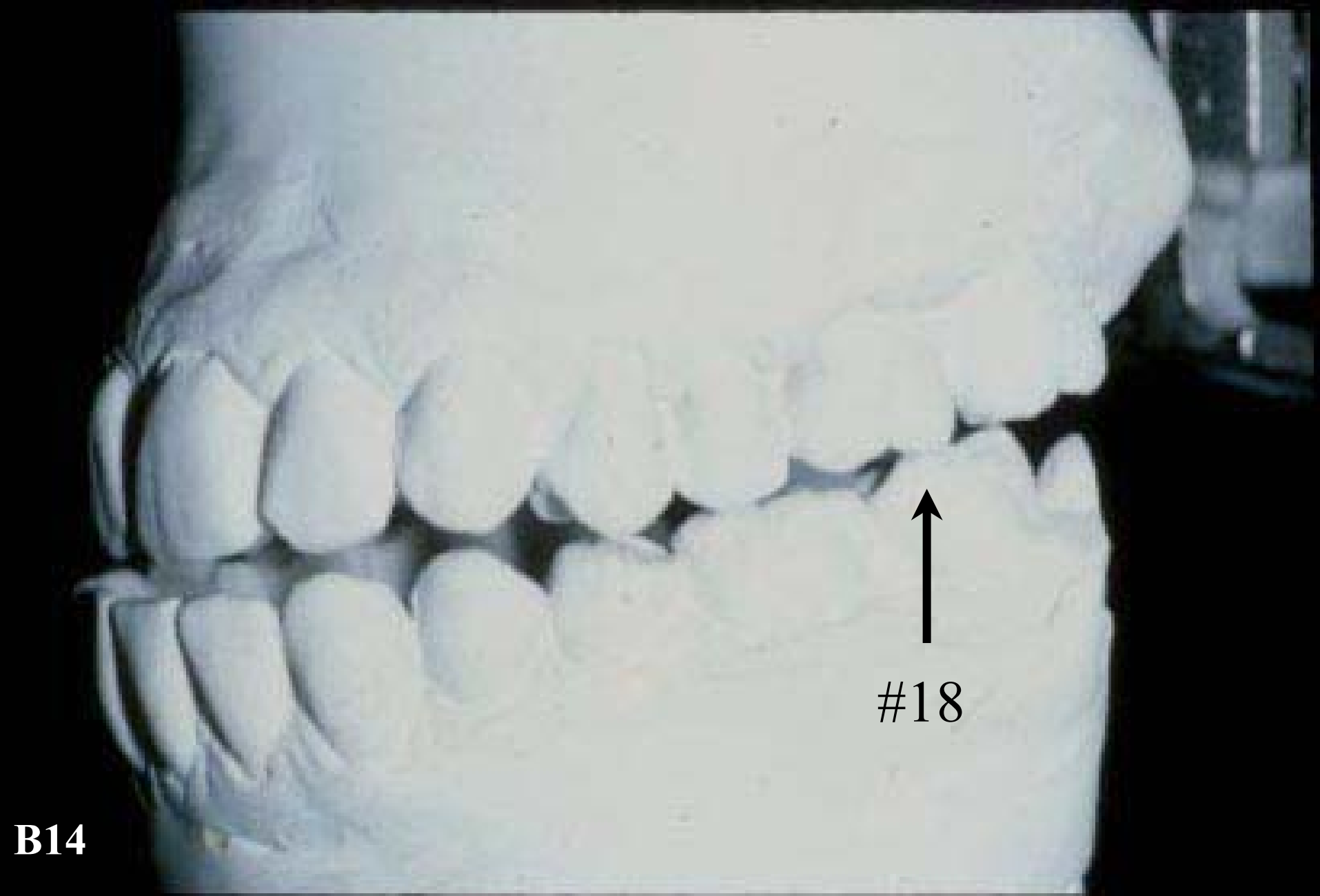


Bone loss that occurred over 7 years was the result of traumatic occlusion.



A semi-adjustable dental articulator is shown against a black background. A white wax bite registration is mounted on the upper part of the articulator. The articulator has a metal frame with various adjustment knobs and a central vertical axis. The wax registration shows the upper and lower dental arches in contact.

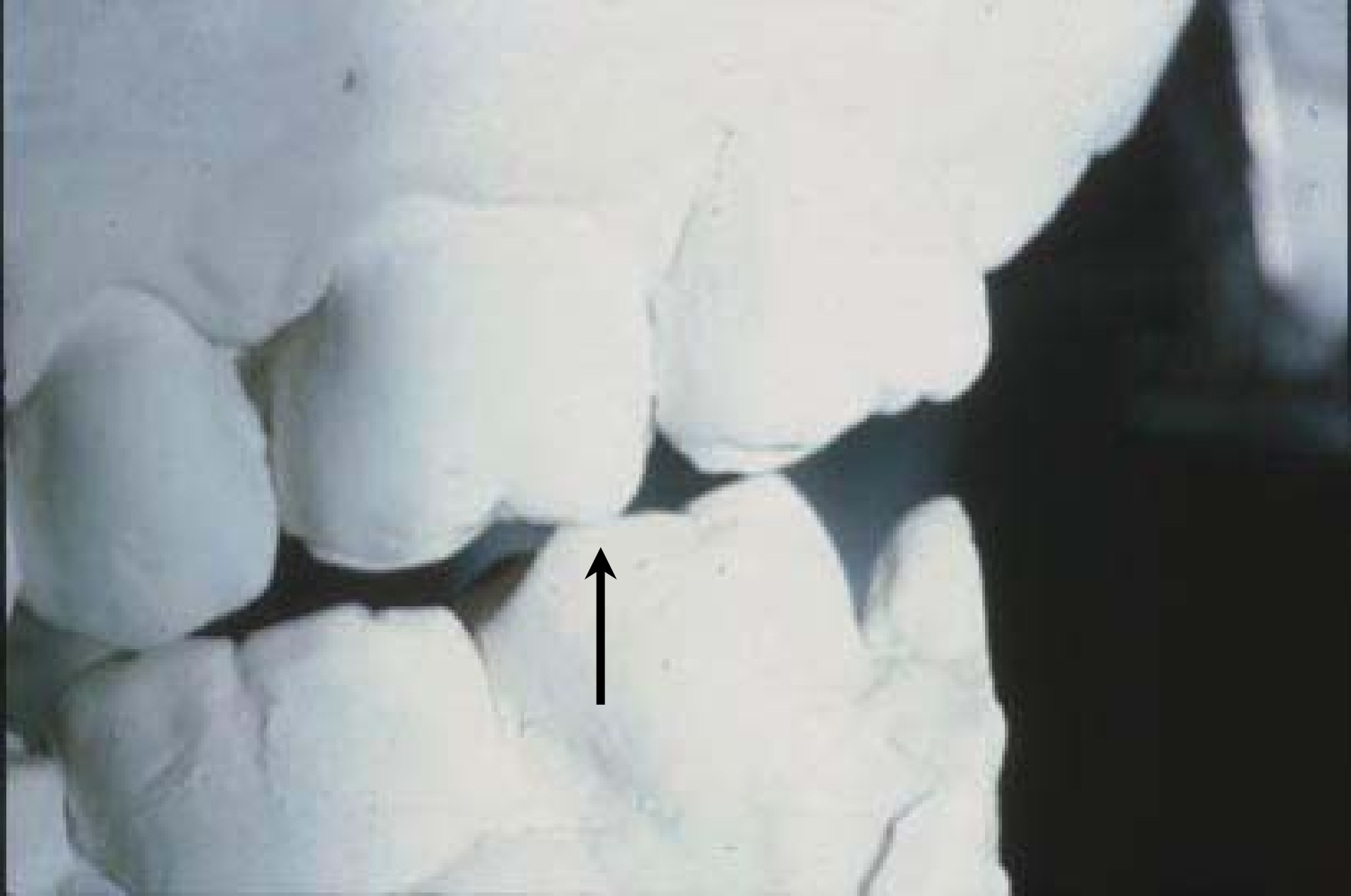
Case mounted on  
semi-adjustable  
articulator in  
Centric Relation.



#18

**B14**

Note posterior contact on #18 during excursion.



B15

Close up of contact on #18.



#5

Bone level on  
#5 in 1983.

B16

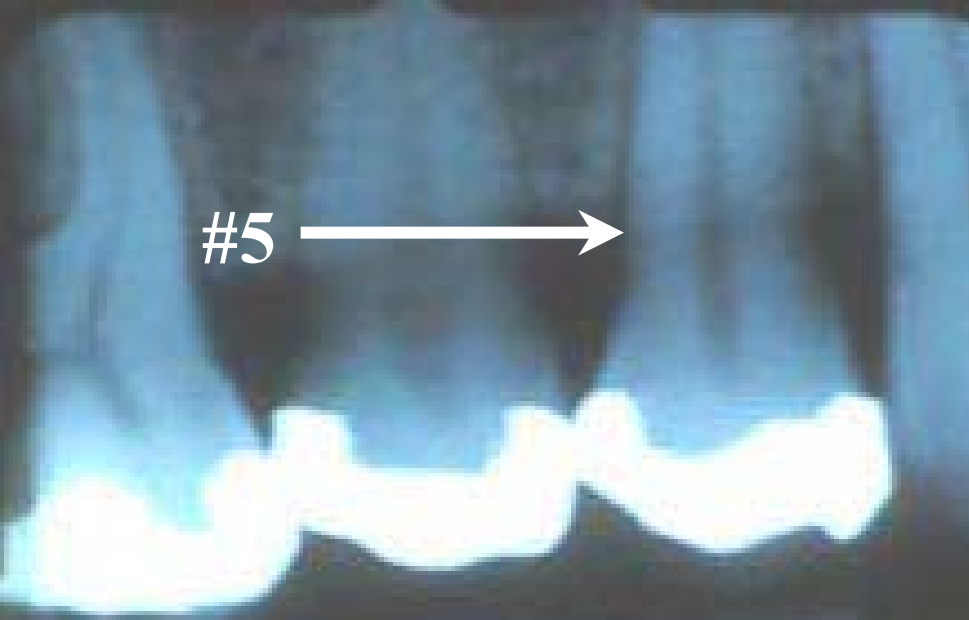




#5

Bone level on  
#5 in 1990.

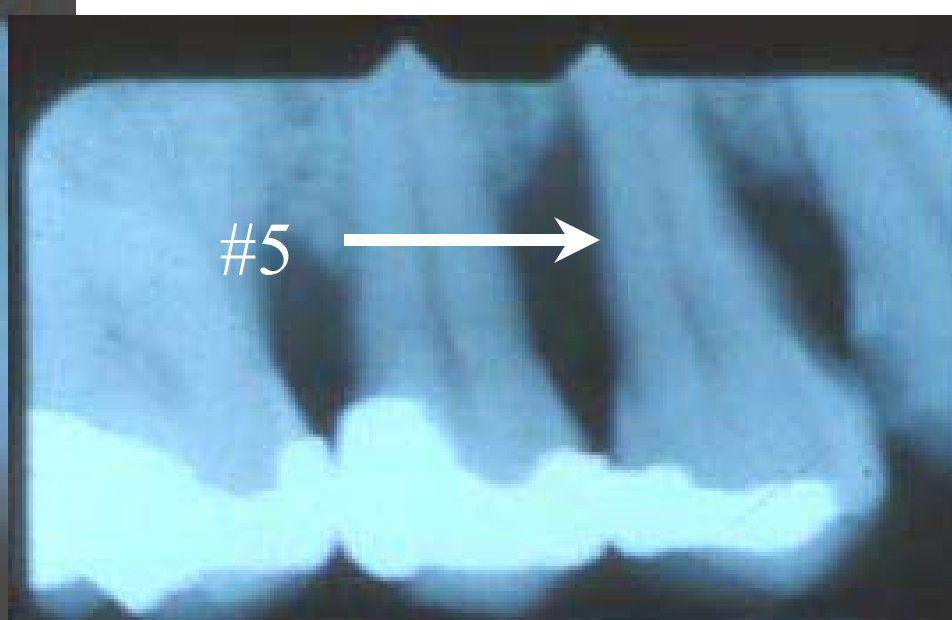
B17



#5



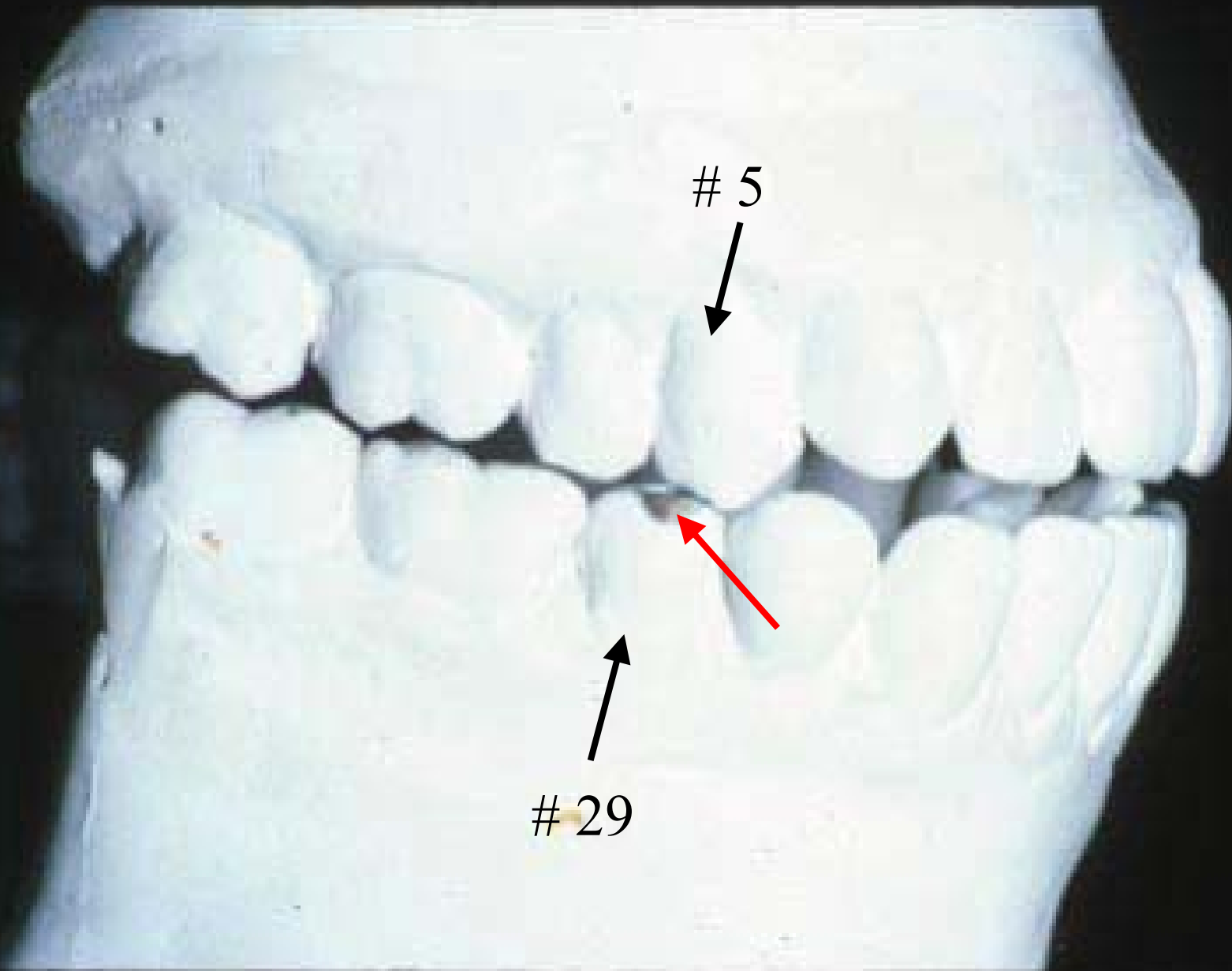
Bone level on  
#5 in 1983.



#5



Bone level on  
#5 in 1990.



Note contact between #s 5 & 29.

# Reason why maxillary first bicuspids most prone for breakdown.

High cuspid.

1) First bicuspid is usually the first tooth that hits, or guides, if there is no cuspid rise.



2) First bicuspid usually has a weak root structure

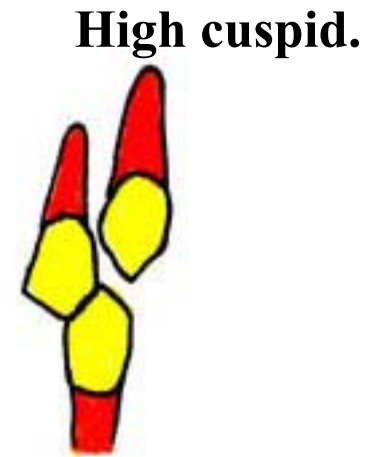
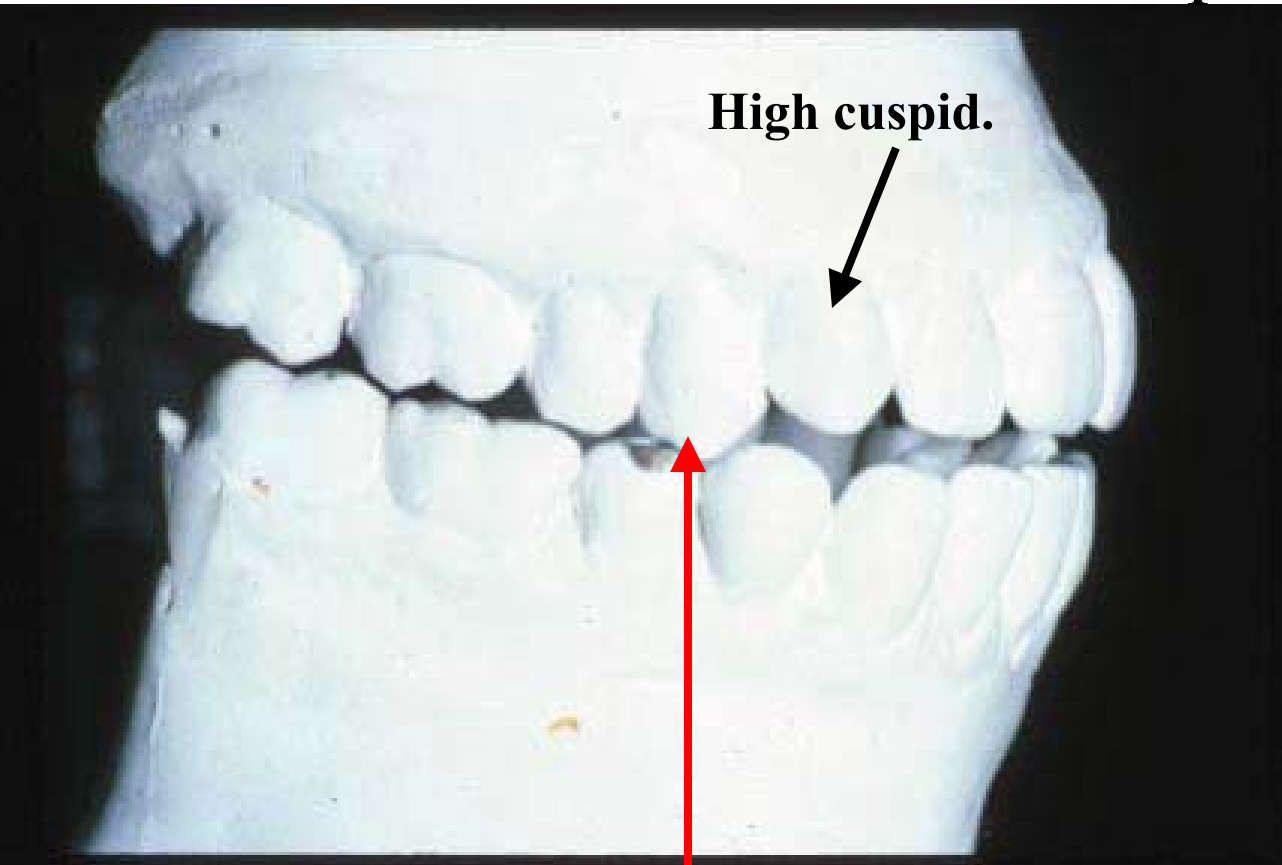


3) First bicuspid usually has a proximal concavity that also makes it a weak tooth.

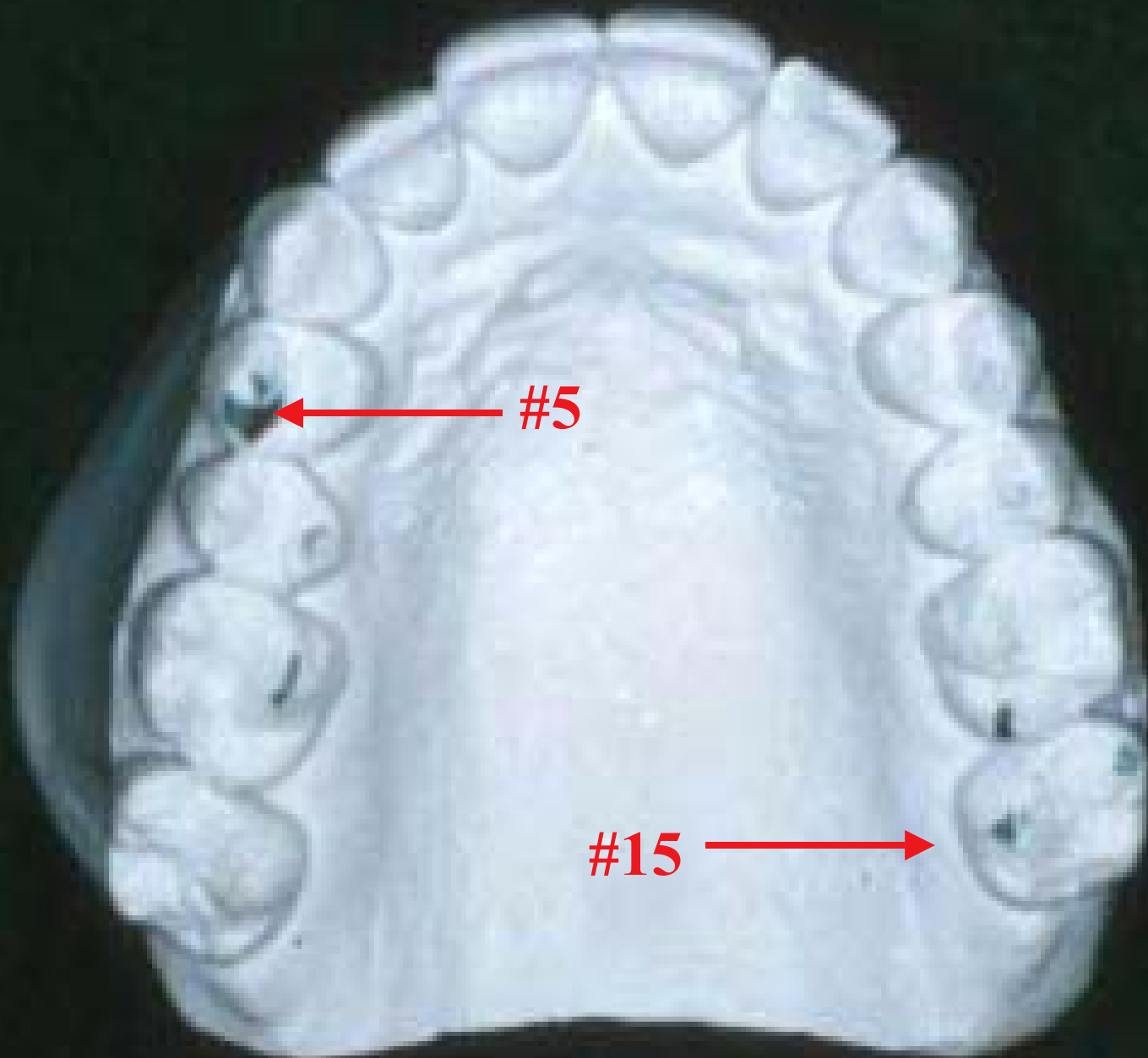


4) Maxillary bone less dense than mandibular bone.

Drawing somewhat depicting the situation.

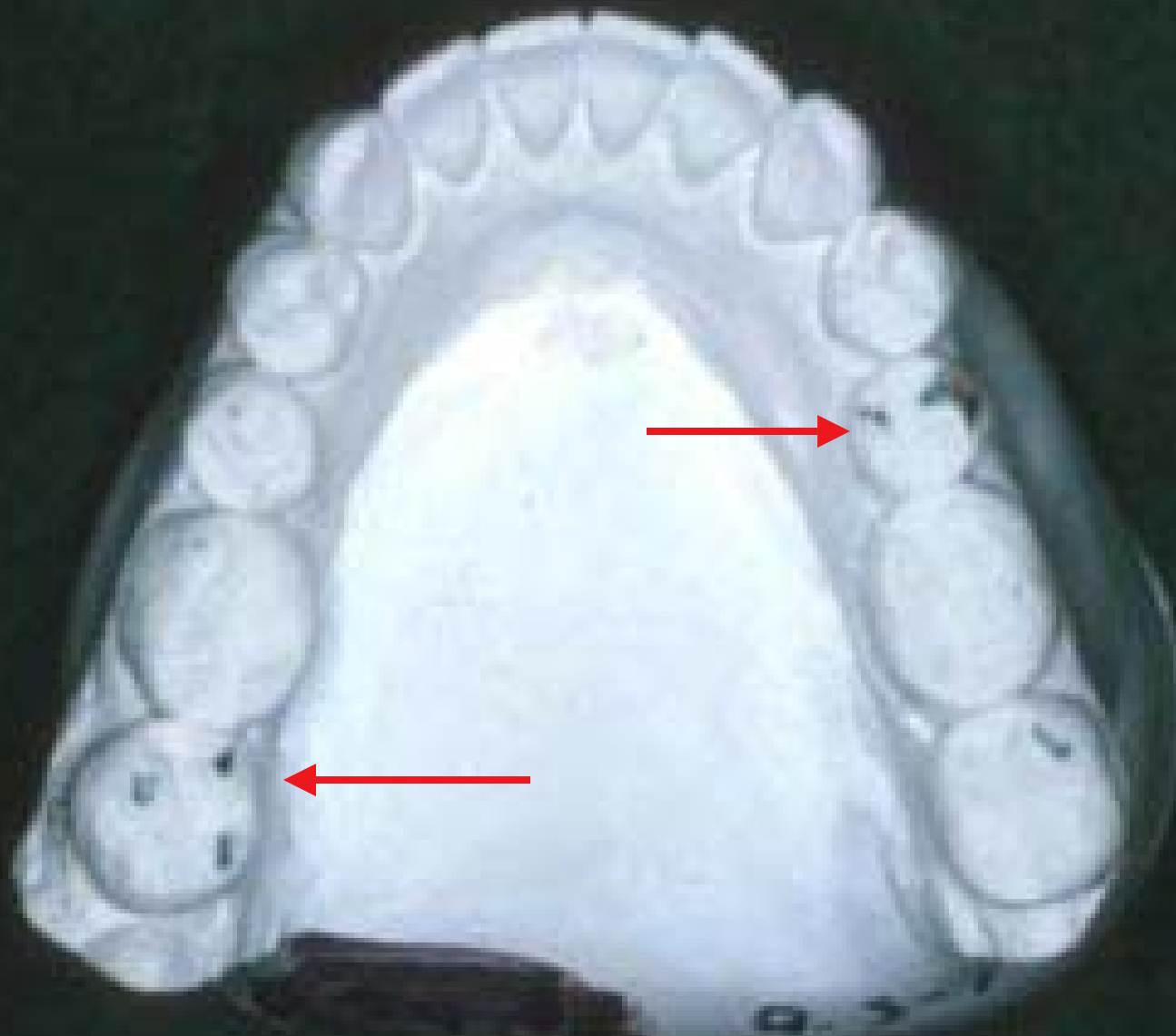


Bicuspid rise instead of cuspid rise.



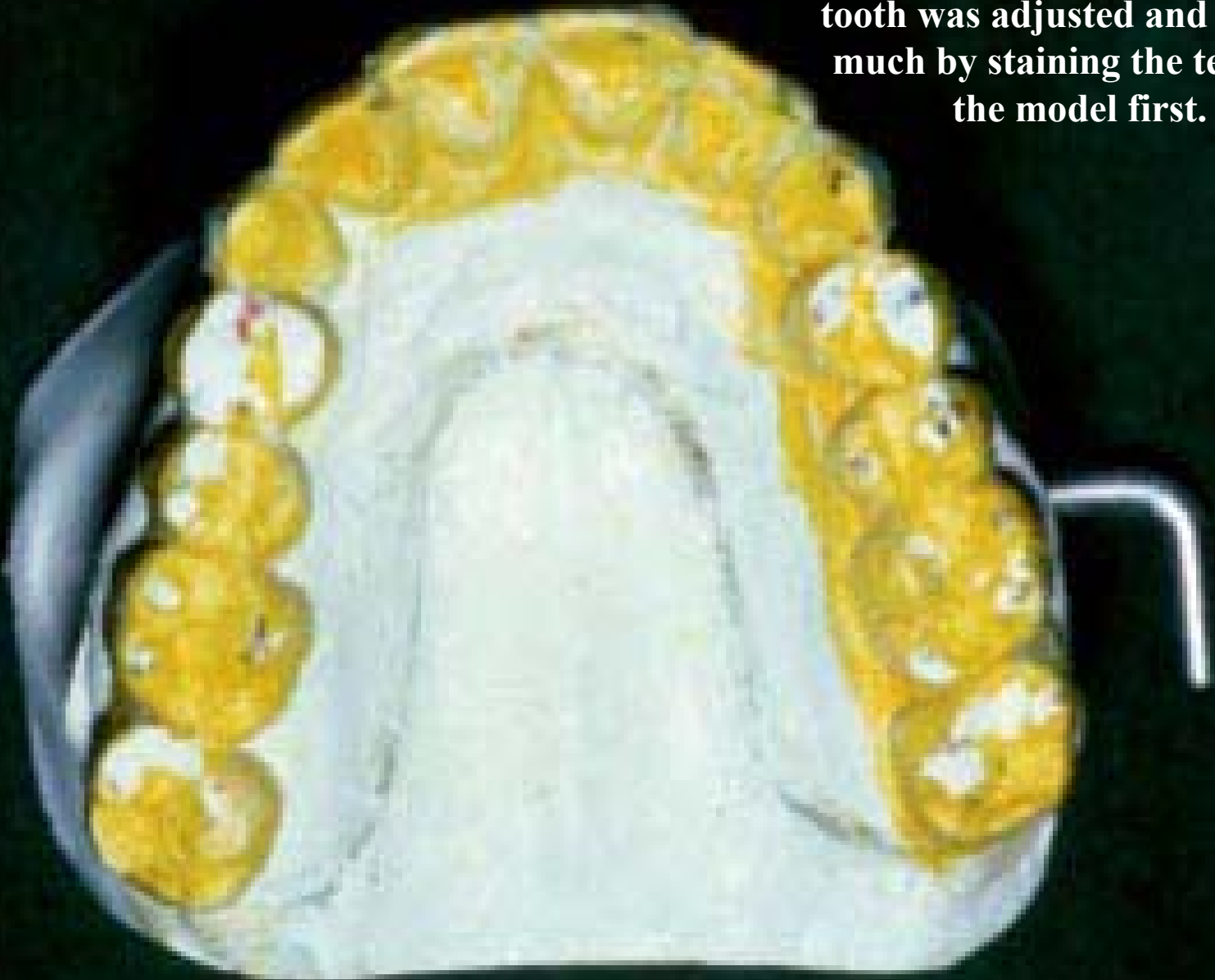
B22

**Note markings on #s 5 and 15.**



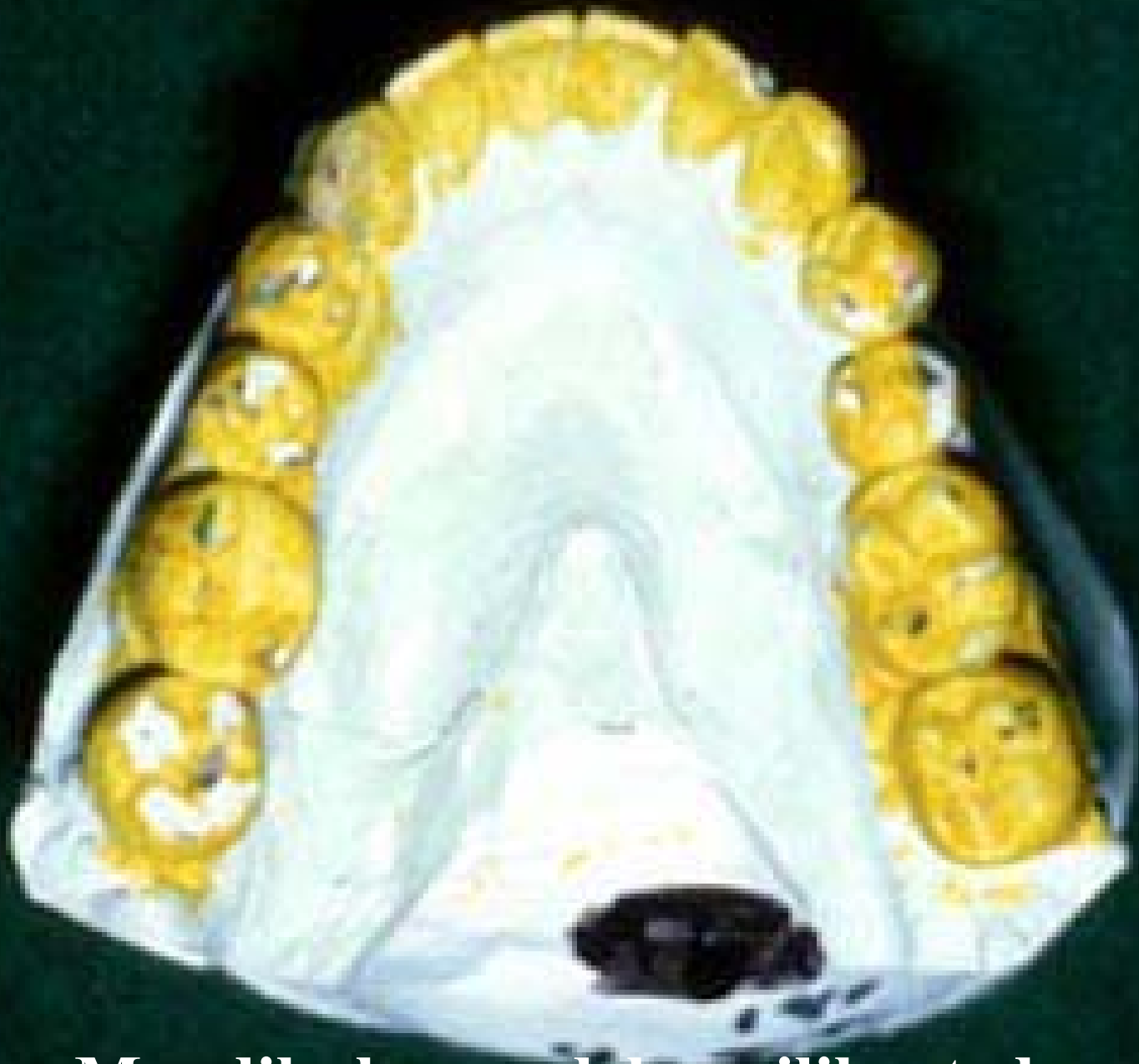
**Note markings on #s 18 and 29.**

**It can be determined where a tooth was adjusted and by how much by staining the teeth on the model first.**



**Maxillary model equilibrated.**





B25

**Mandibular model equilibrated.**

Mandibular flat-planed hard acrylic splint fabricated demonstrating centric stops (dots) and cuspid rise guidance (green line),

# Bone loss

## Case 2

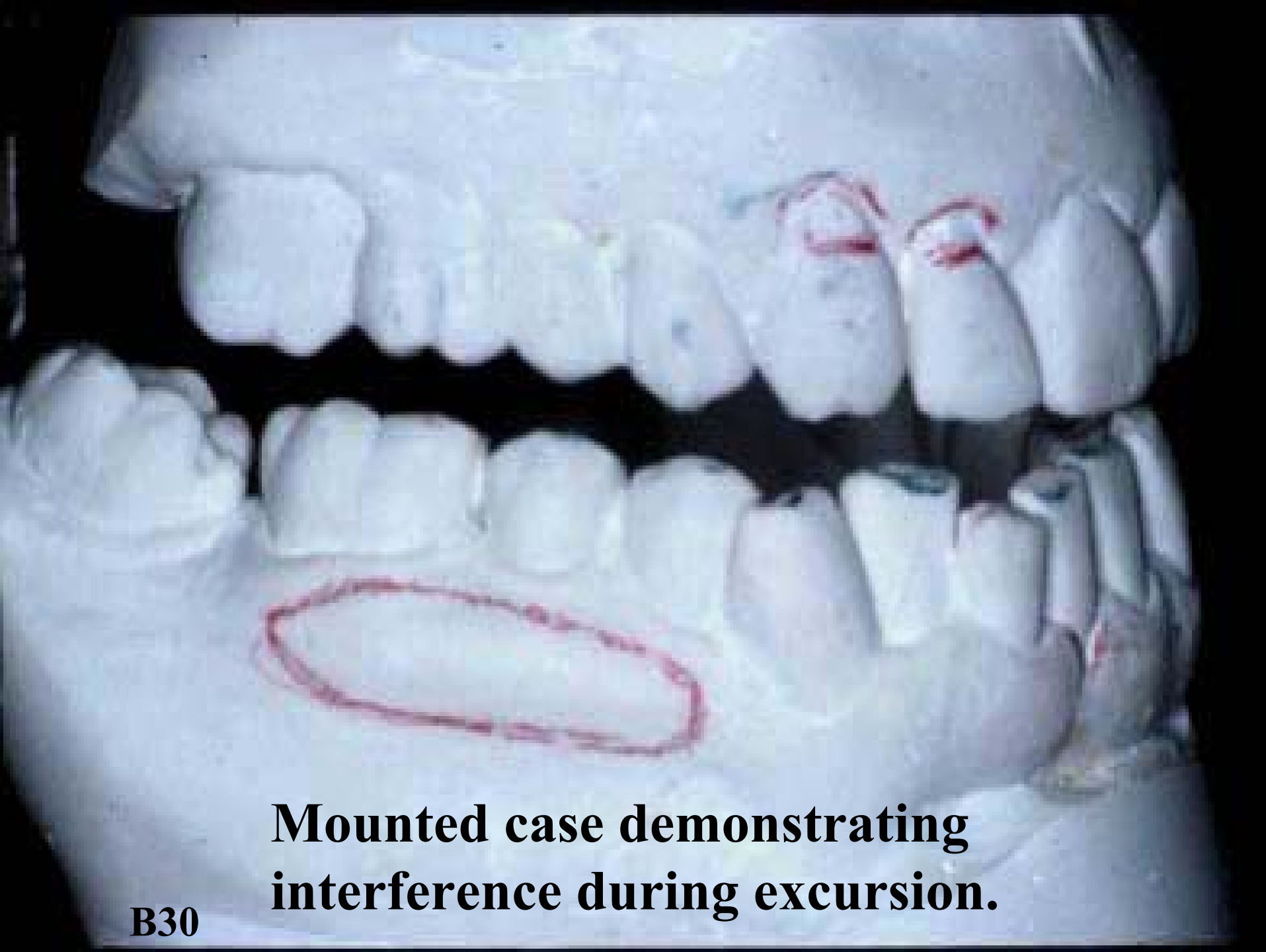


Panoramic radiograph. Note bone loss around #15.

Do not have that extensive bone loss in rest of mouth.

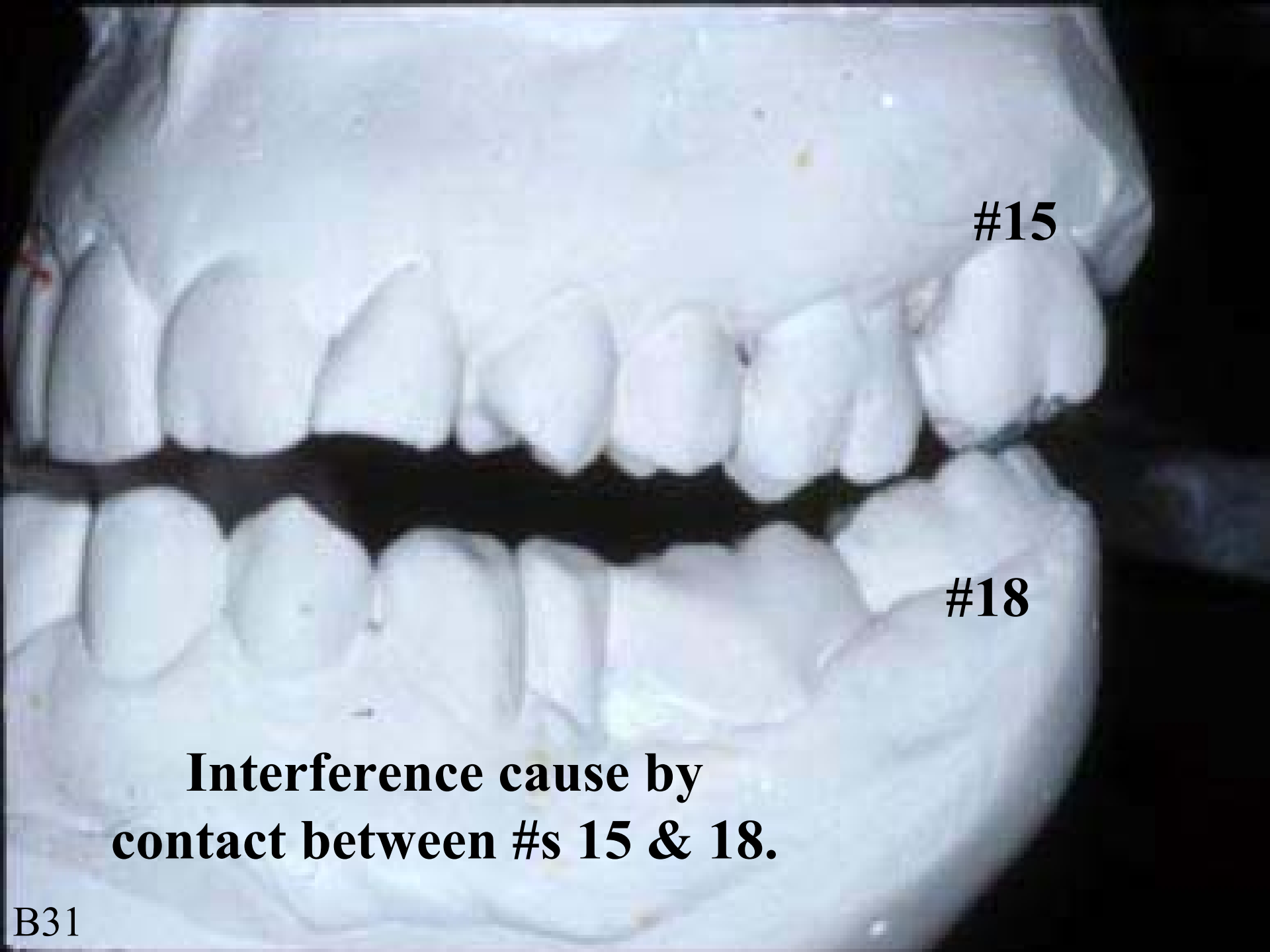


Bone loss around #15.



**Mounted case demonstrating  
interference during excursion.**

**B30**



**#15**

**#18**

**Interference cause by  
contact between #s 15 & 18.**



**#15**

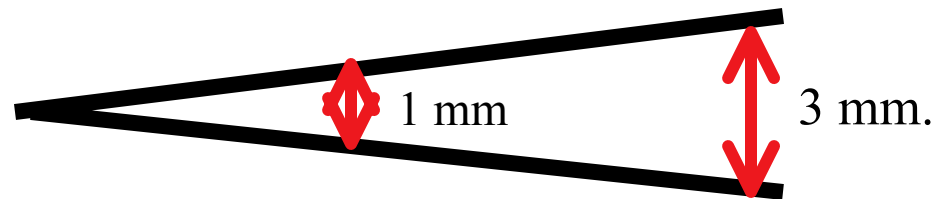
**#18**

**Close up of interference.**

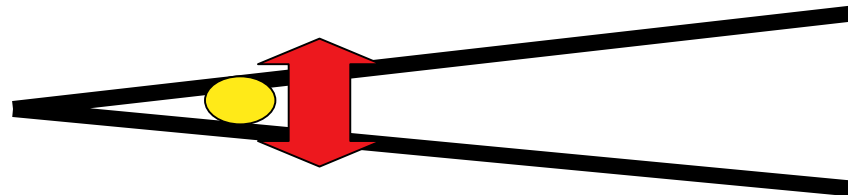


## Reason for more breakdown around maxillary second molars.

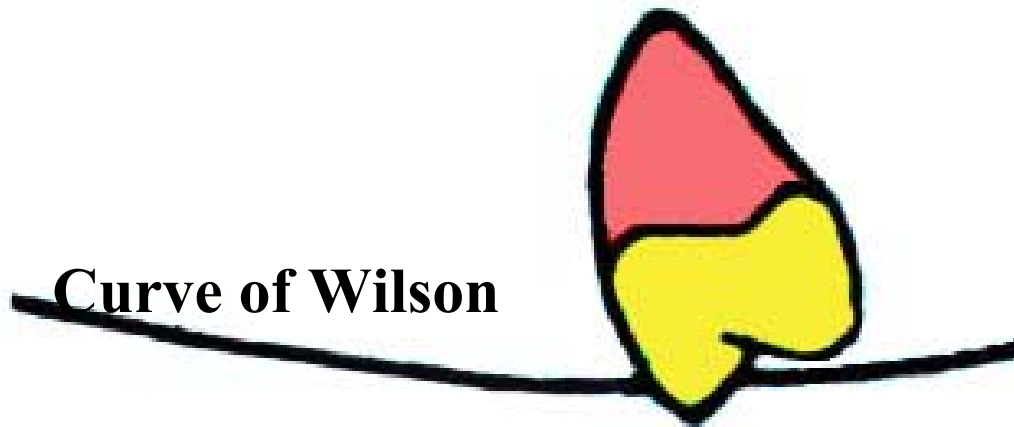
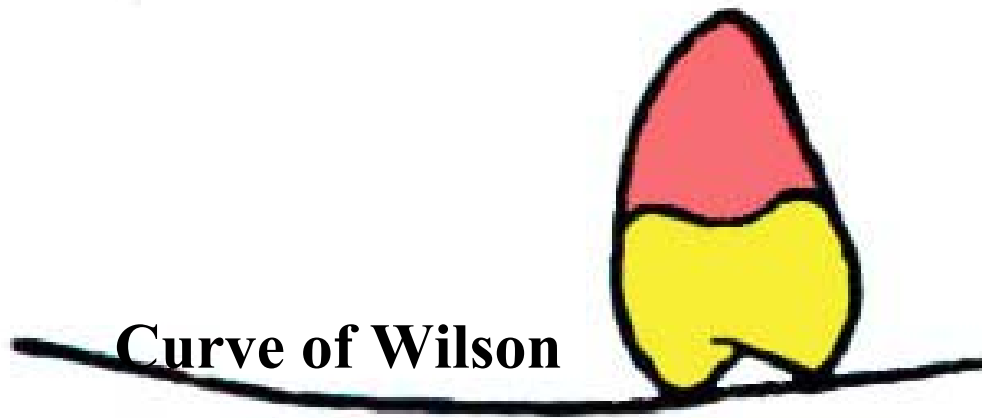
- 1) Closest tooth to the TMJ fulcrum. Less chance for error - about 1:3 ratio to anterior teeth.



- 2) Receives strongest force on it because of muscle position.



- 3) Maxillary bone less dense than mandibular bone.



Maxillary lingual cusp tip below the curve of Wilson. Interferes during excursions.

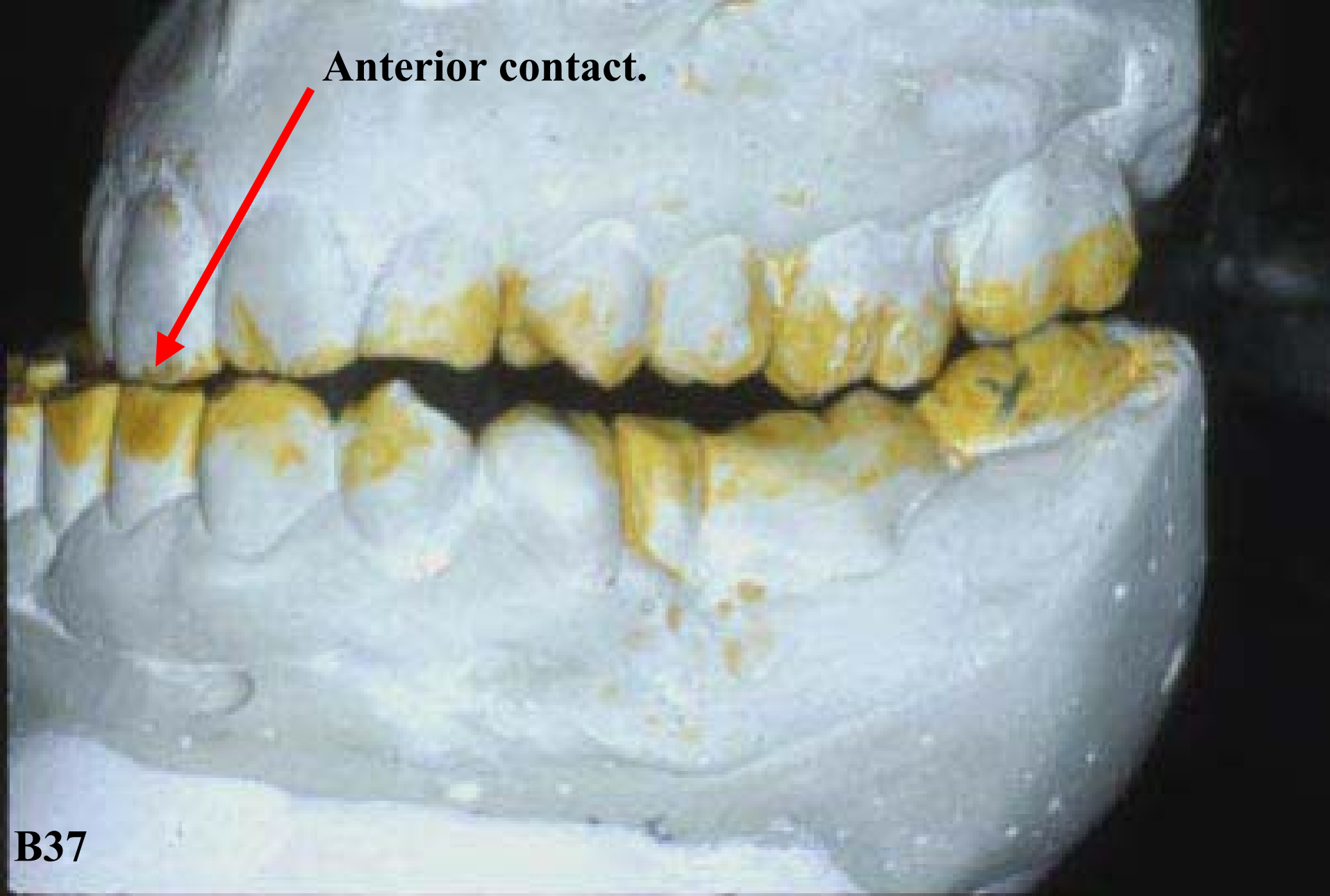


B35

Mandibular model equilibrated.

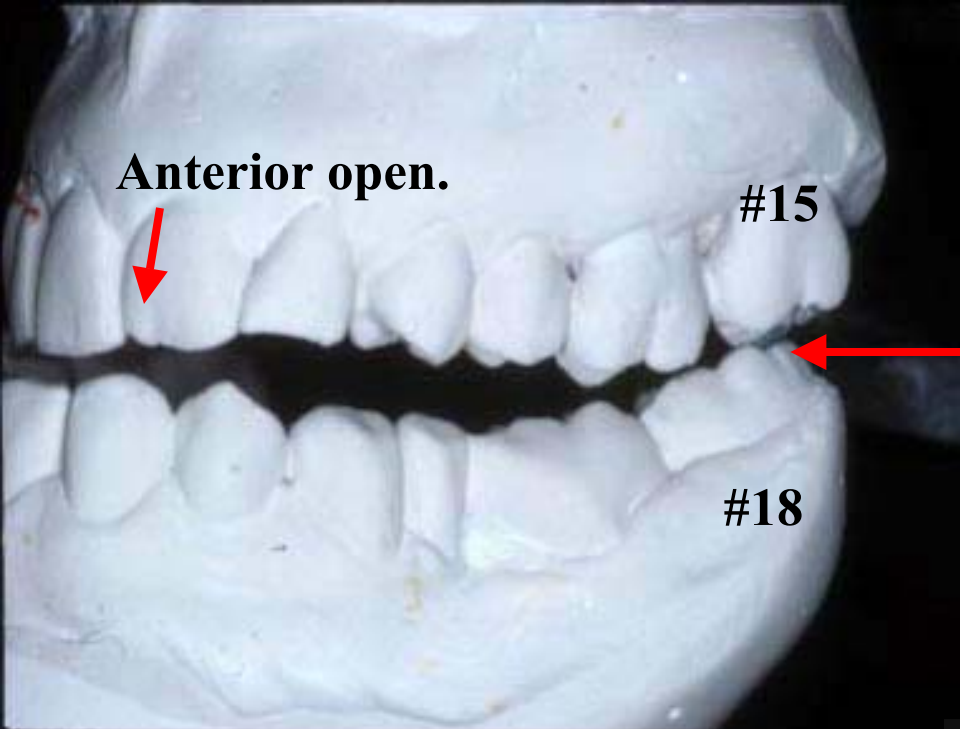


**Maxillary model equilibrated.**



Mounted models equilibrated. Note anterior contact.

## Correction of posterior interferences.

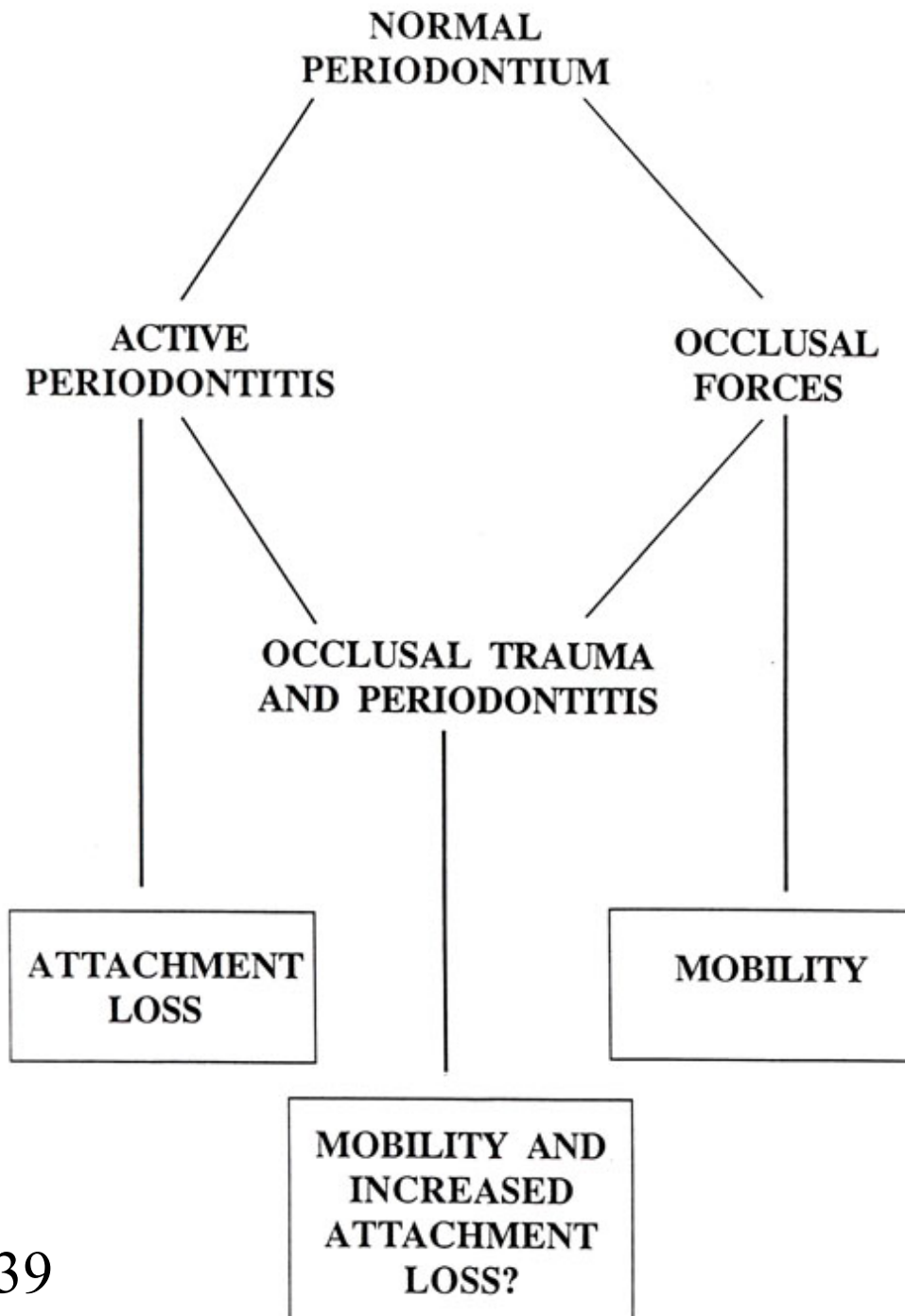


Original posterior interference between 15 and 18 during excursion..

Anterior contact.

Mounted models equilibrated so as to have anterior contact **before** equilibrating in the mouth..





# Perio chart.

Progression of disease.

Because of equilibration and improved oral hygiene, teeth have stabilized and are healthy.

# Consequence #2

## Abstractions

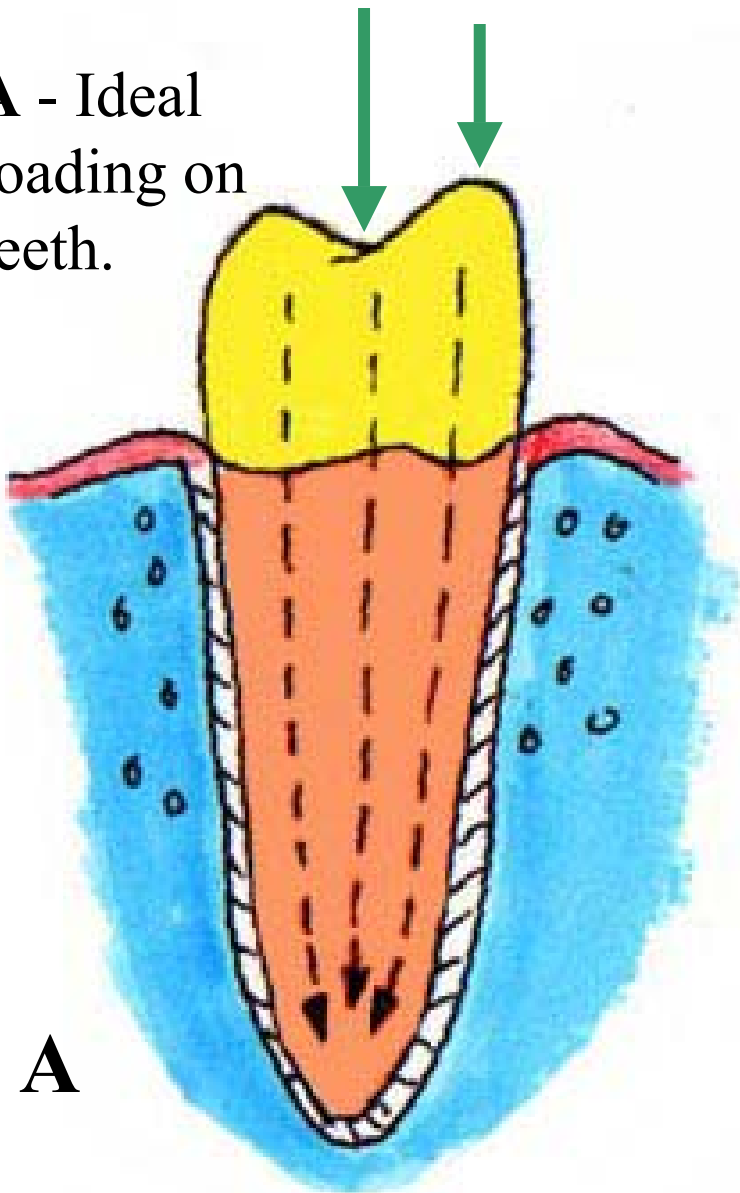


# Definition of an abfraction

Due to the stresses resulting from biomechanical loading forces exerted on the teeth (static, as in swallowing and clenching or cyclic, as in chewing) both enamel and dentin can chip or break away. This loss of tooth substance, which shall be termed **Abfraction**, is dependent on the magnitude, duration, direction, frequency, and location of the forces. These abfraction lesions are caused by flexure and ultimate material fatigue of susceptible teeth at locations away from the point of loading.

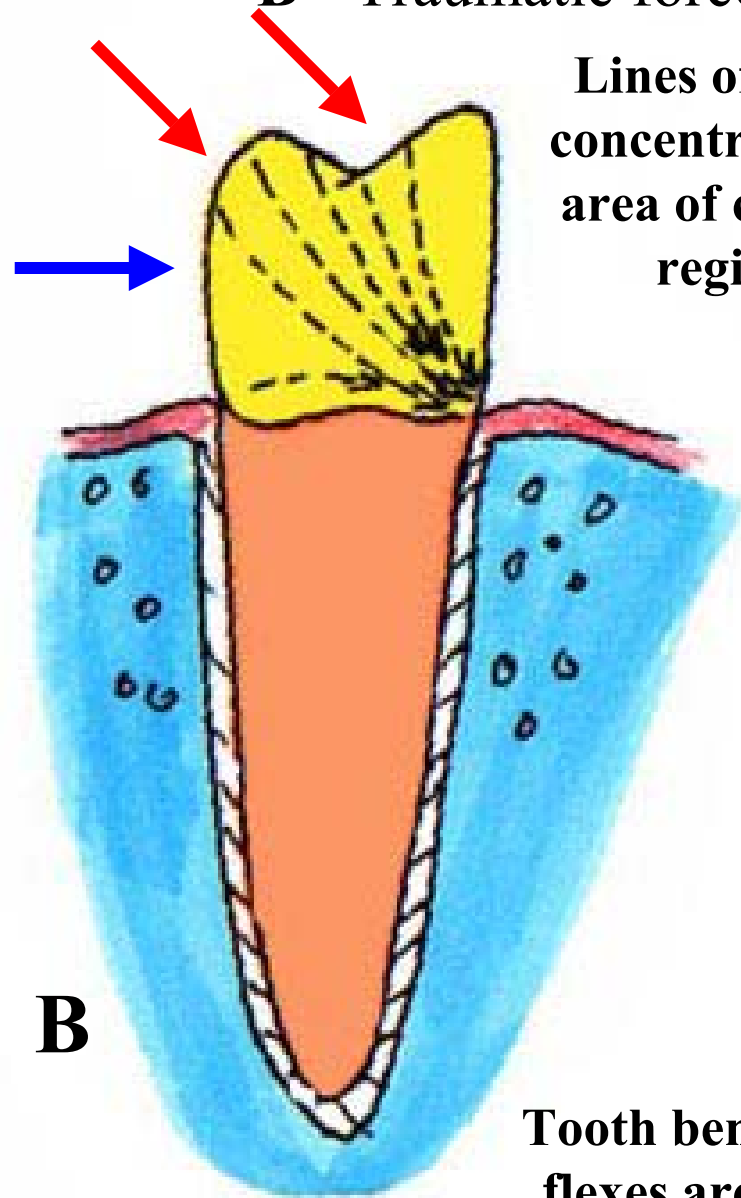
Grippo J. Abfractions: A new classification of hard tissue lesions of teeth. J Esthetic Dent. Jan/Feb 1991:14-18

**A** - Ideal loading on teeth.



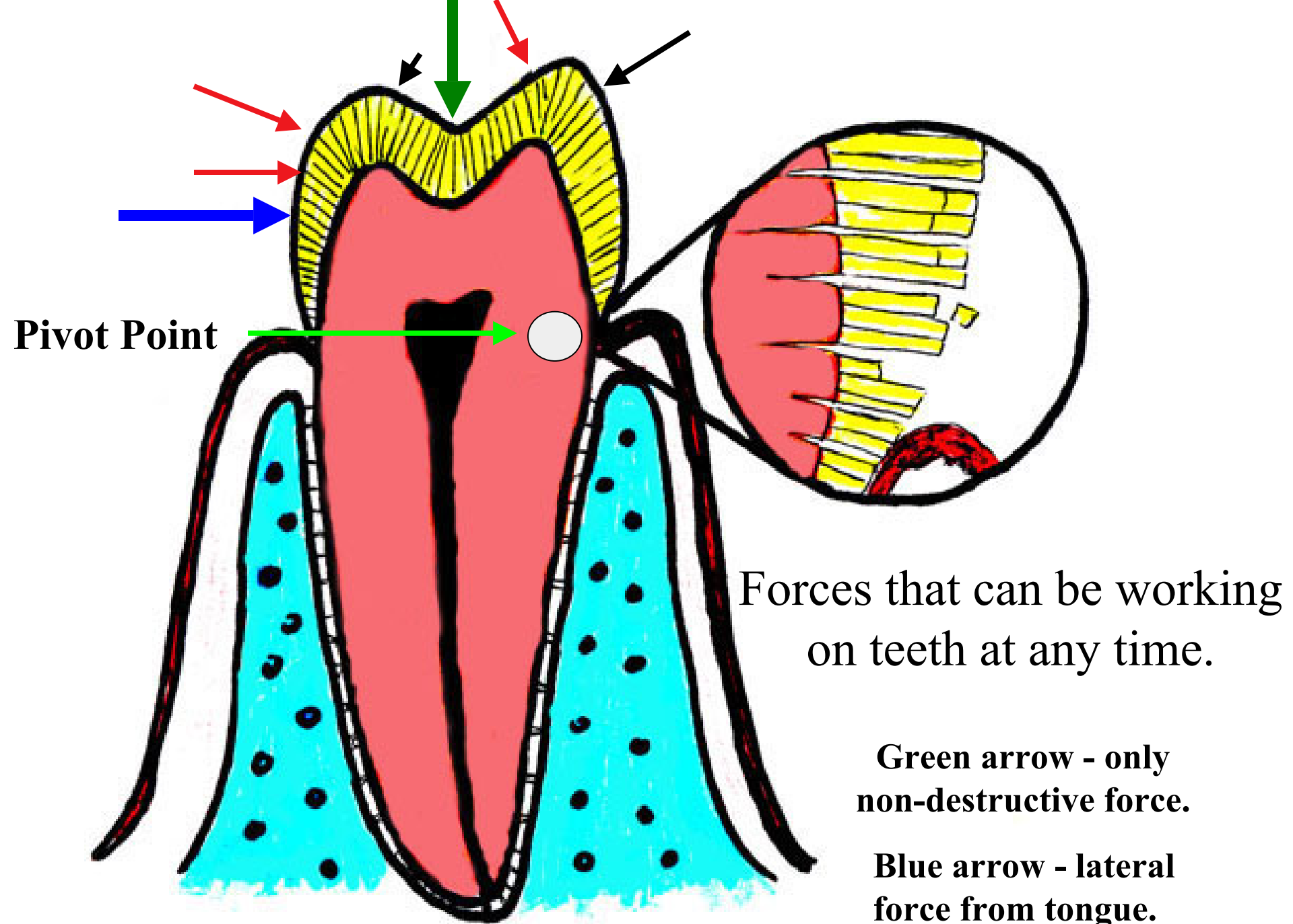
**A**  
Lines of stress directed down to apical area.

**B** - Traumatic forces.



Lines of stress concentrating in area of cervical region.

**B**  
Tooth bends or flexes around pivot area.

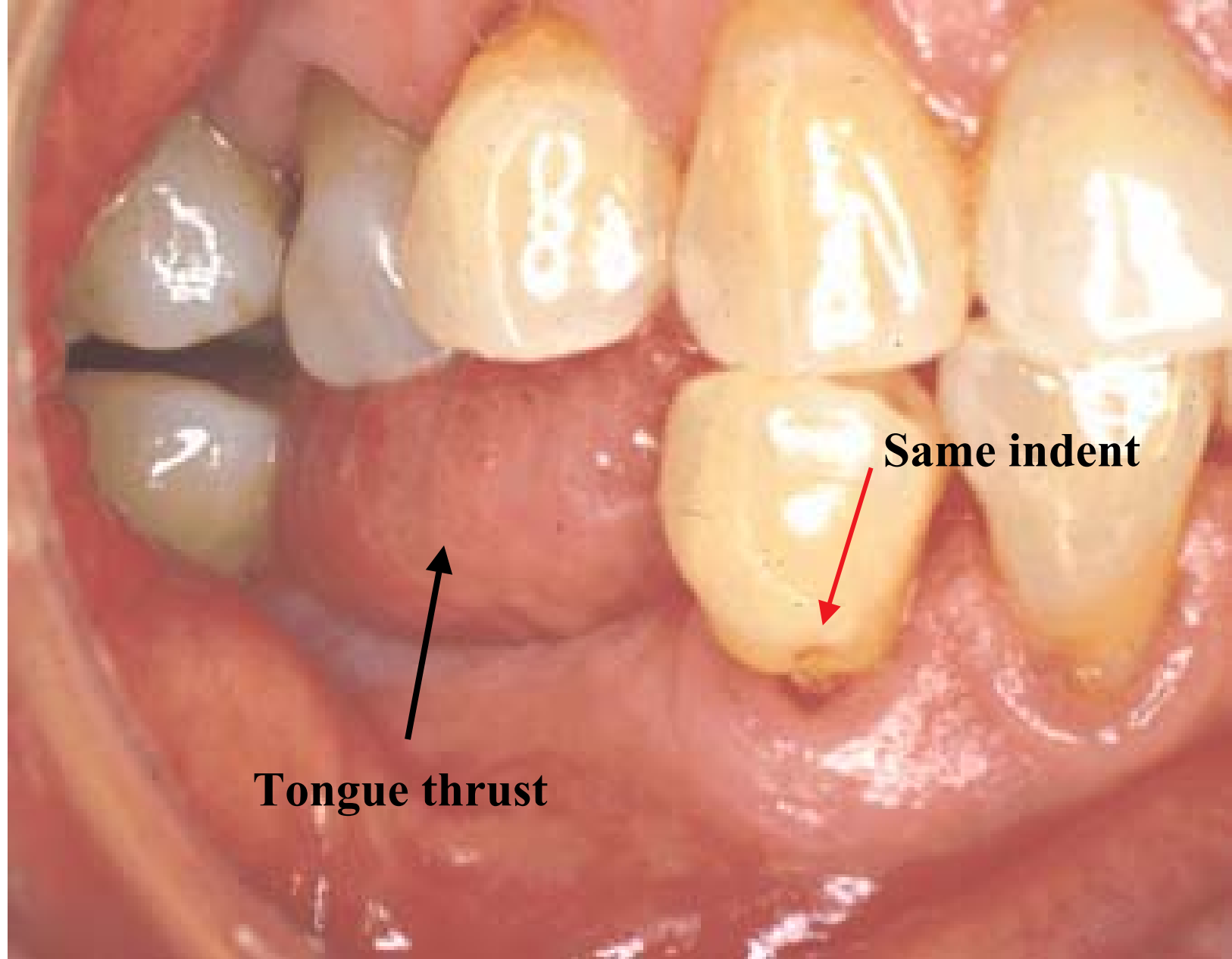


# Reasons for abfractions, cervical erosion, clefts, recession.

- Fairly high pivot point.
- Root solid in the bone.
- Crown flexes.
- Enamel rods split and fracture off.
- Thinness / health of bone in the area.
- **Key point:** Abnormal lateral forces that tooth was not designed to withstand flex and eventually fracture off parts of tooth.



Extracted tooth with abfraction. Note size of abfraction and marked indent. Tooth was unrestorable because of sub gingival depth of defect and patient's desire not to spend any money on the tooth.

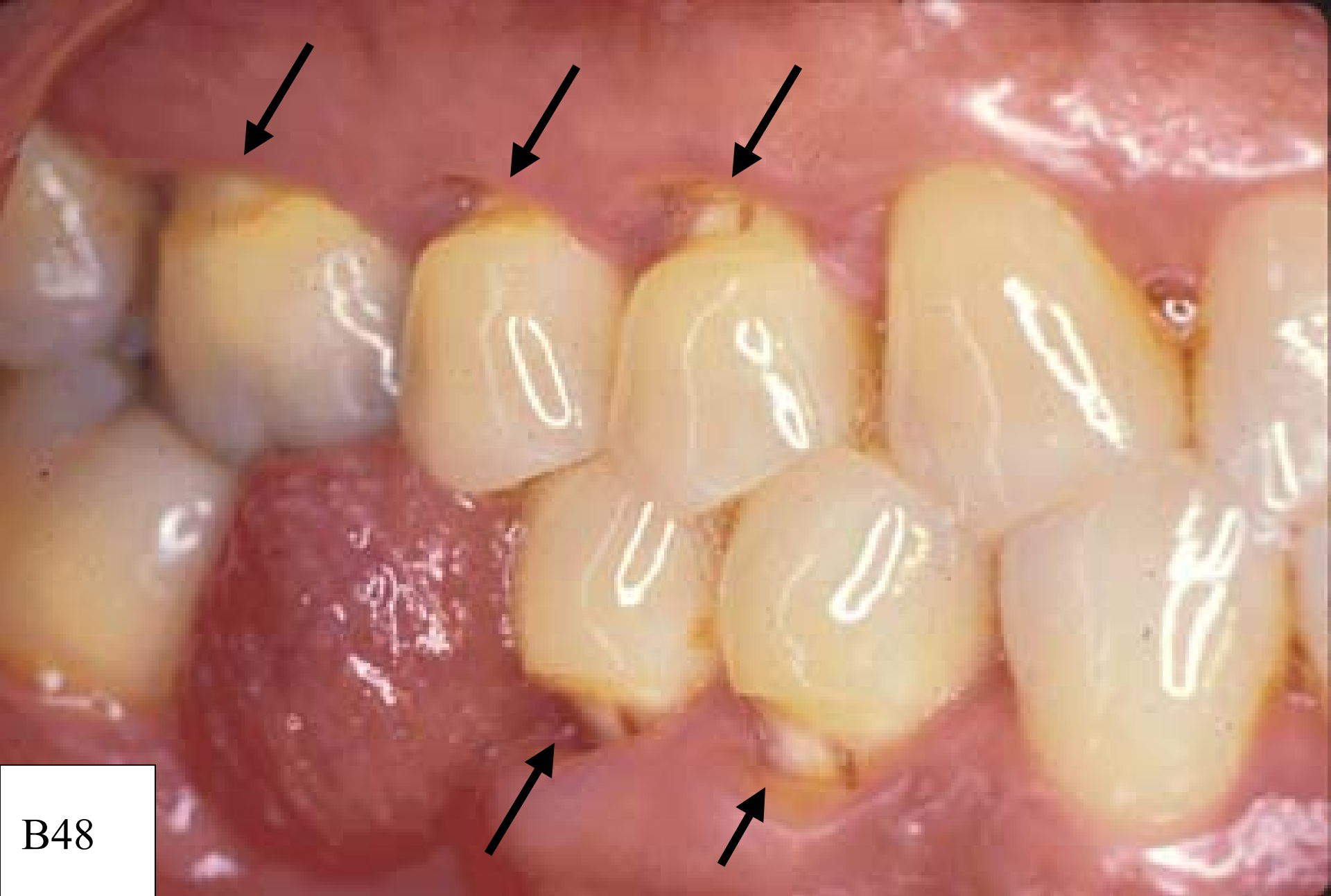


B46 Same tooth prior to extraction. Abfraction **TOTALLY** SUBGINGIVAL. Tooth brushing could not have caused it!

B47



Abfractions are seen on a daily basis in dental offices today. Abfraction on right was only tooth I could find during research at Smithsonian.



Similar to other case but with multiple abfractions. Note tongue thrust.





B49 Multiple abfractions. Note different angulations of each defect. Tooth brushing could not have caused these defects. The abfraction was so deep that one tooth actually fractured in half.



These abfractions were due to the traumatic lateral forces created by this tongue thrust.

B50

# Abfractions: in summary

Abfractions are due to the traumatic lateral forces created by either a malocclusion or a tongue thrust - or both.

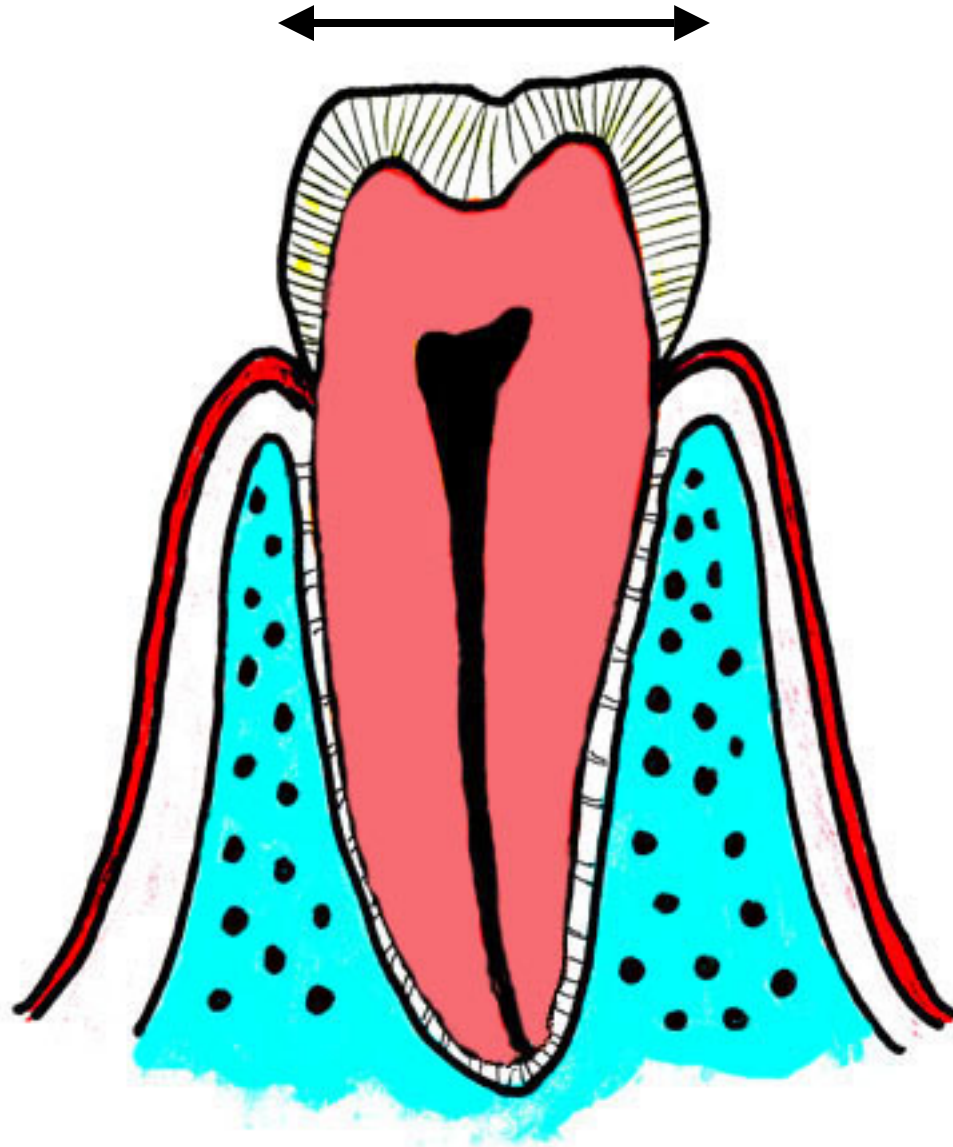
There is a complete presentation and two articles on abfractions elsewhere on this website.

The reason abfractions are rarely found on prehistoric teeth is due to the fact that prehistoric humans did not have any other choice of nurturing their young other than breastfeeding. Breastfeeding was responsible for better occlusions and lack of tongue thrusts in prehistoric times.

# Consequence #3

Flattened occlusions

# Flat occlusion.



# Reason for flattened occlusion.

- Root - Crown - Bone - are all solid.
- Bruxing is major contributor to flat teeth.
- Attrition of the enamel just due to wear over time.
- Chewing of coarse foods.



B55 Prehistoric skull illustrating a flat occlusion.

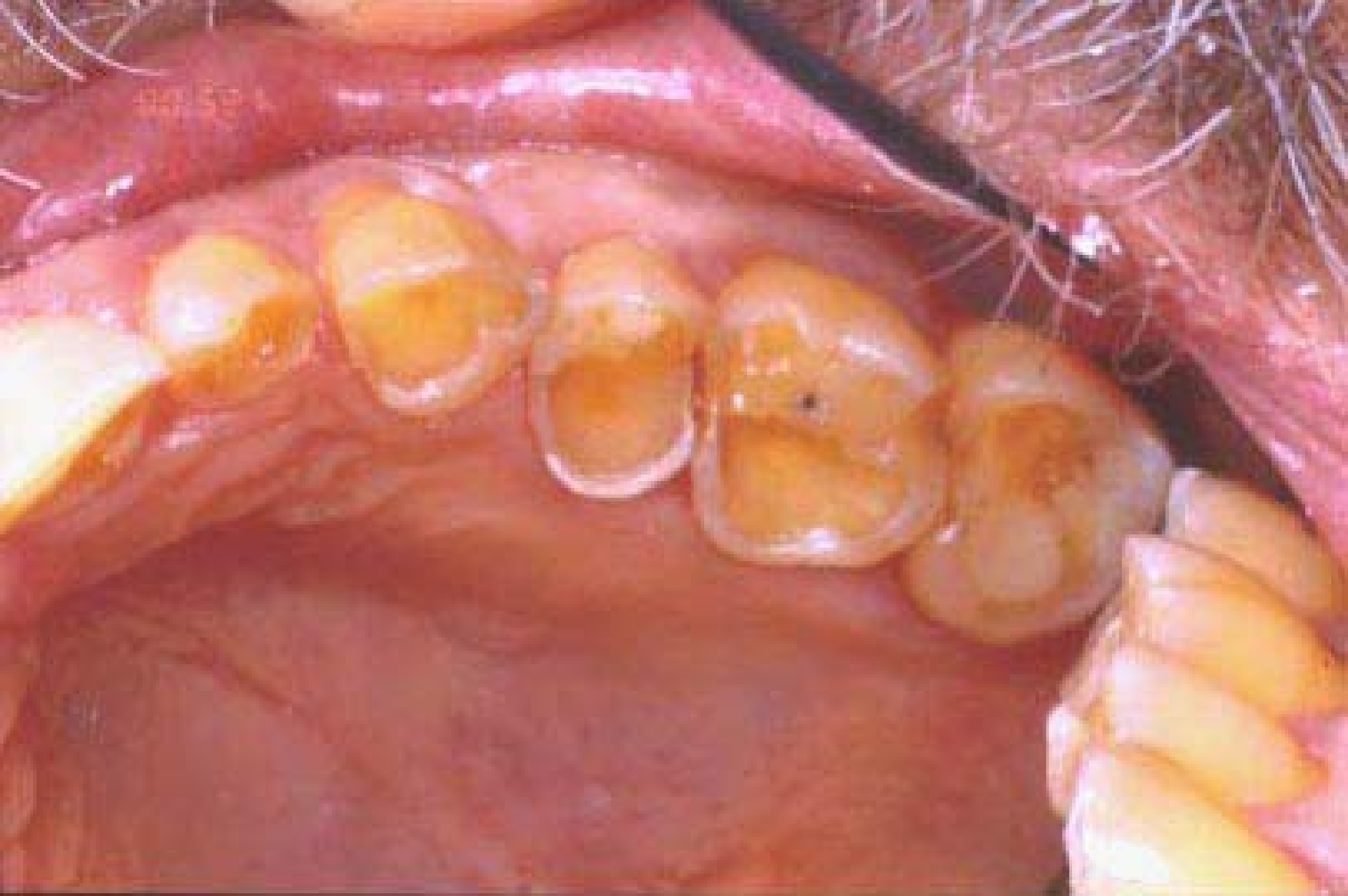


An example of flat occlusion.





Another example of flat occlusion.  
Have a slight reverse curve of Wilson.



B58

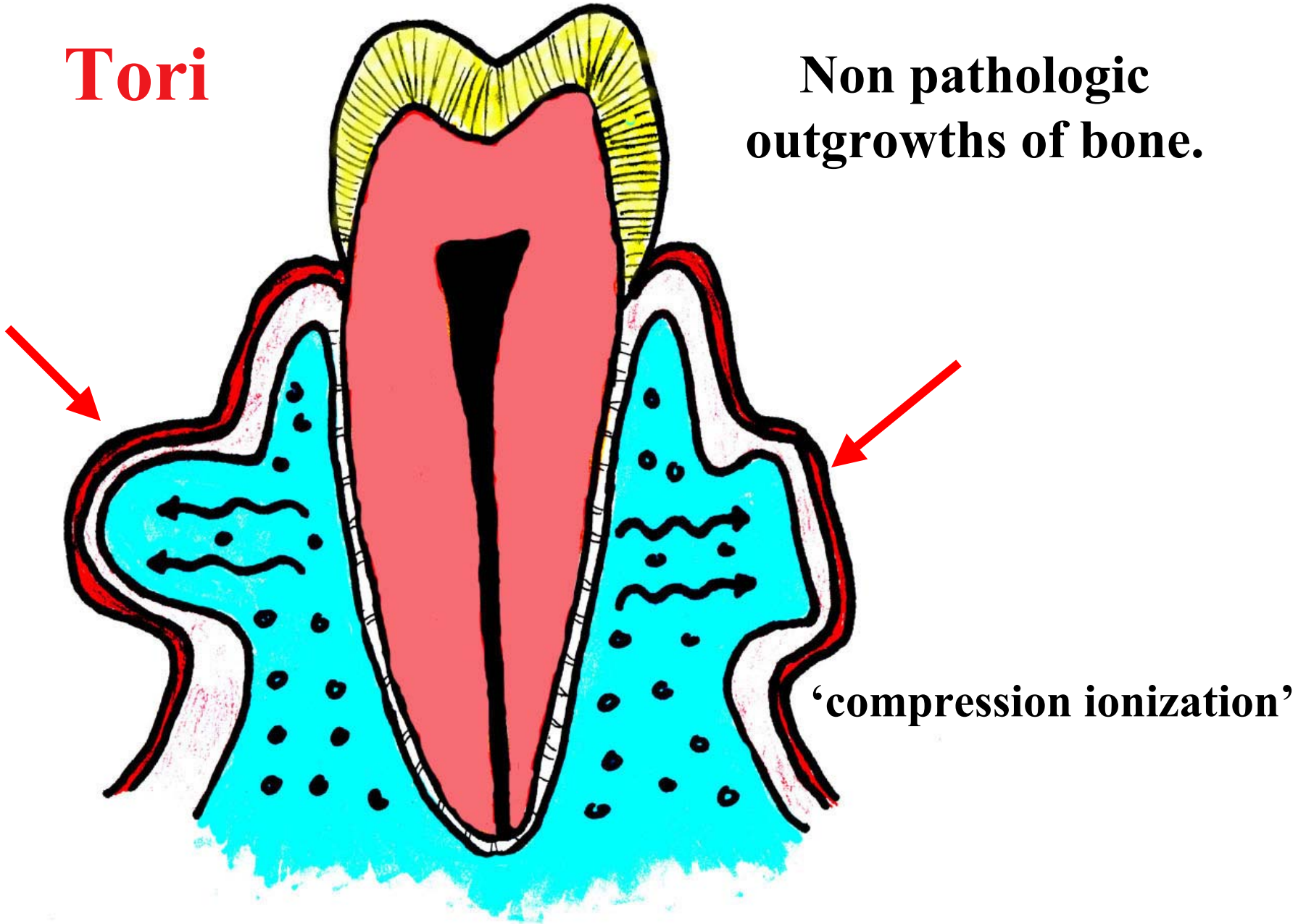
Close-up of previous mouth.

# Consequence #4

Tori

# Tori

Non pathologic  
outgrowths of bone.



# Reasons for tori

- Similar to a flattened occlusion in that the root, crown and bone are all solid.
- There is ‘compression ionization’ or some form of stimulation through the bone that causes more bone to be laid down. The bone is laid down as a ‘support system’ to help prevent the teeth from rocking in the bone and causing damage.
- Tori are most prevalent in clenchers, bruxers, worriers, nervous individuals and those who have a driver-type personality.
- They are non-pathologic outgrowths of bone.

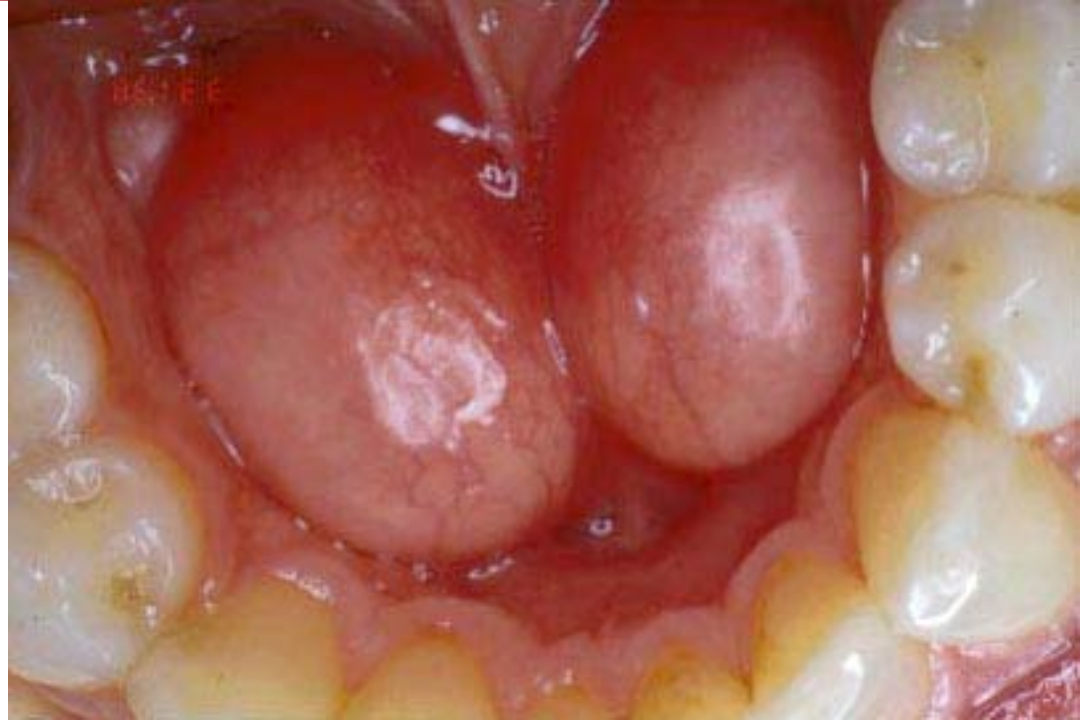


**1994**

Example of tori  
growth over 4 years.

**Same individual.**

**1998**





**1995**

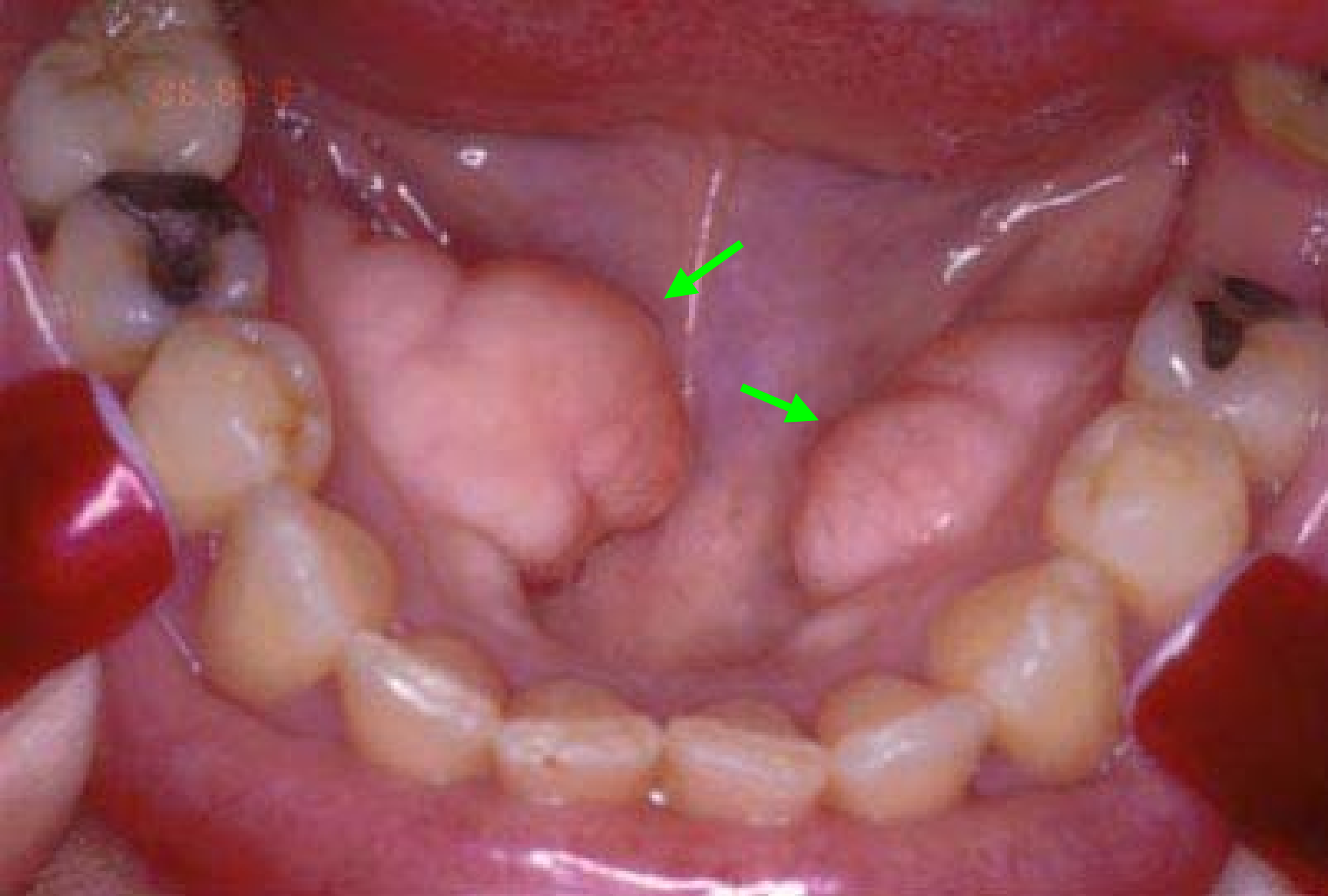
Example of tori  
growth over 9 years.

**Same individual.**



**2004**

**(Post whitening.)**



B64

Example of mandibular lingual tori.





Example of mandibular buccal tori.



**B66**

**Massive buccal and lingual tori.**



B67

Massive tori take up tongue space. Lady had OSA.



B68

Large palatal torus.



B69

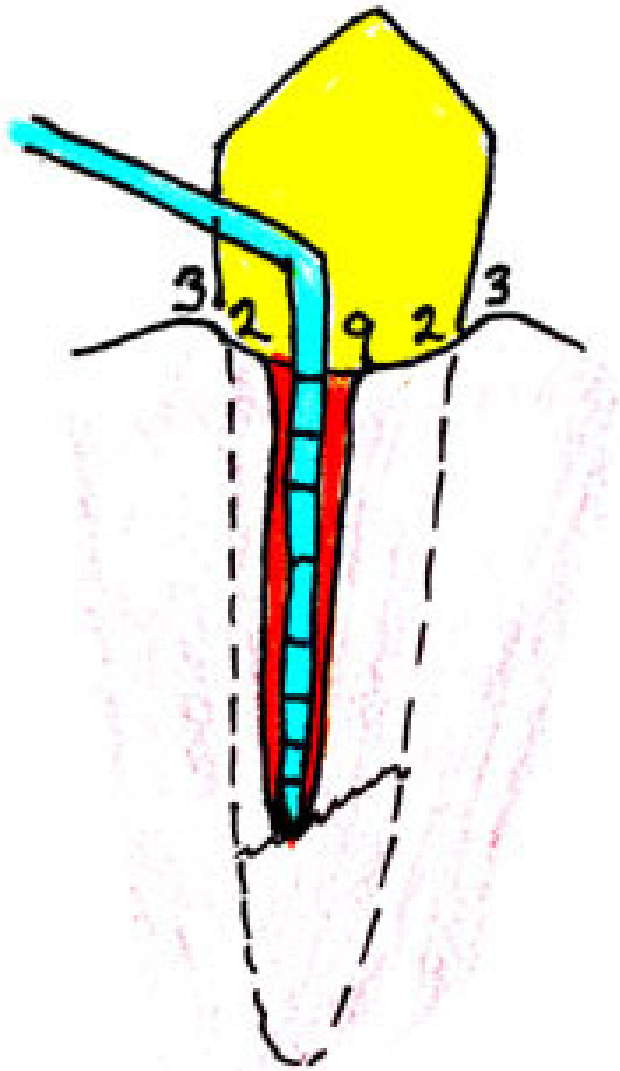
Another massive palatal torus.

See full presentation on tori  
elsewhere on this website.

# Consequence #5

Cracked teeth

Fractured teeth are sometimes difficult to see and cracks do not always show up on radiographs.



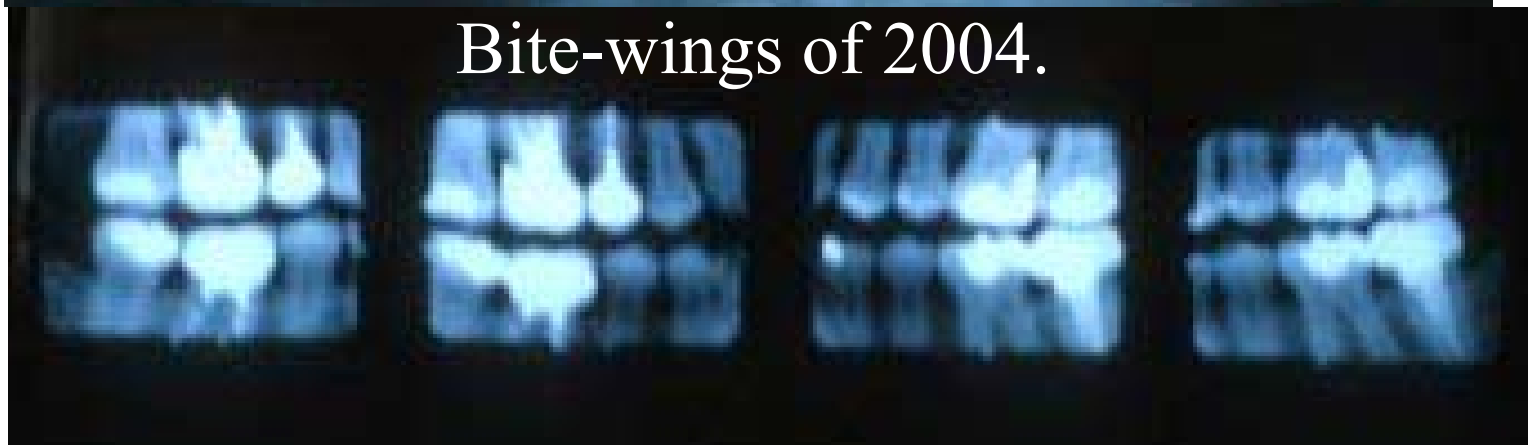
One diagnostic tool that can sometimes be used is finding one significant pocket like this around a tooth when most of the other pockets are within normal limits.



Panoramic of 1987.



Bite-wings of 2004.



B73

4 cracked teeth that needed root canals and crowns.



Heavy bruxing at night caused these deep grooves. This splint used to be very flat, had no grooves and had fine cusp tip contacts.





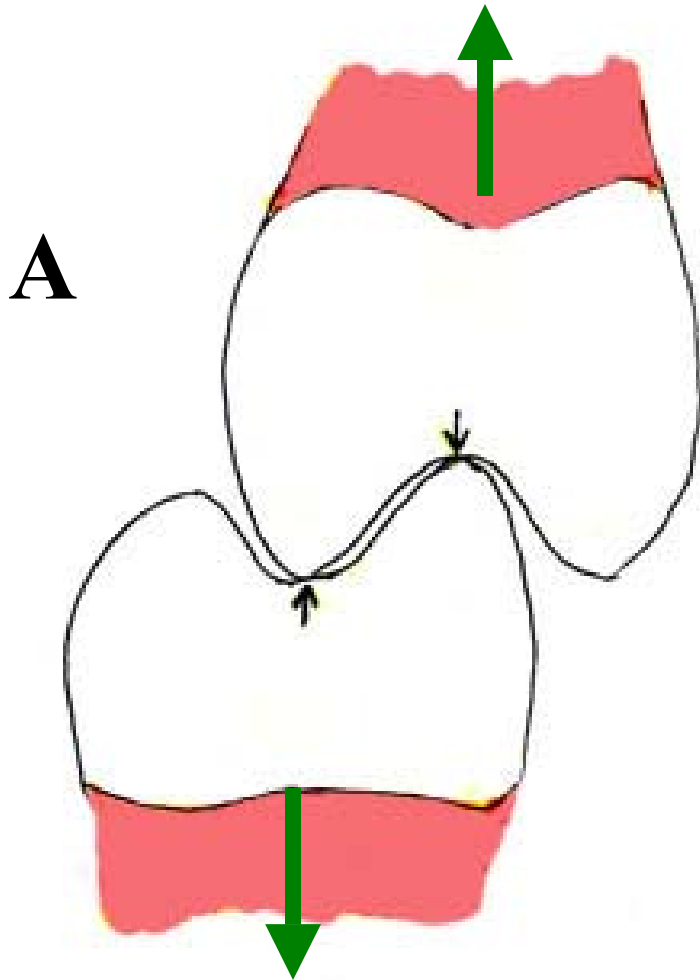
Heavy bruxing at night caused these deep grooves. This splint used to be very flat, had no grooves and had fine cusp tip contacts.



# Consequence #6

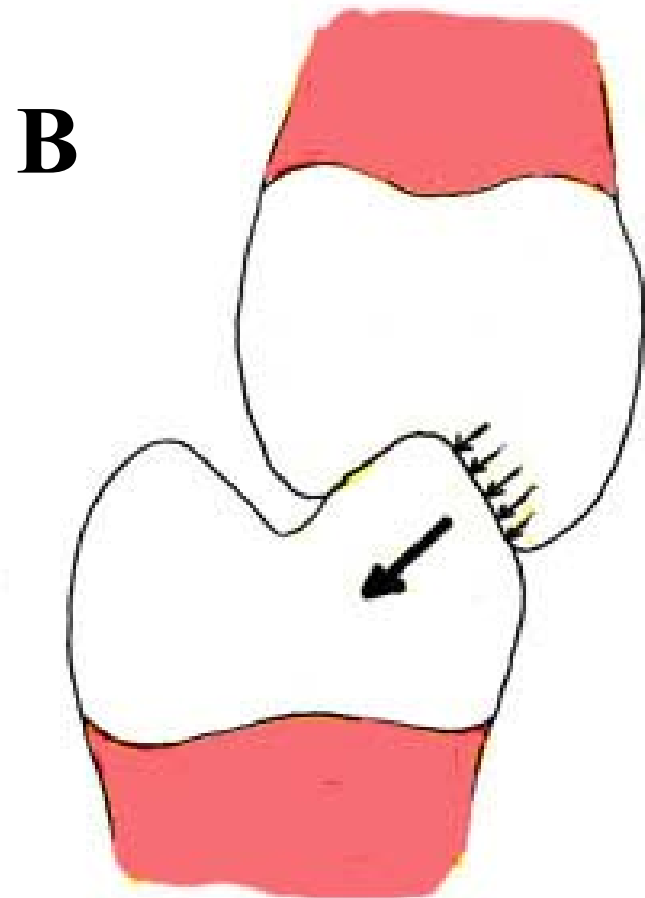
Tight bites

## Ideal bite.



**Point contacts and forces directed down long axis of tooth.**

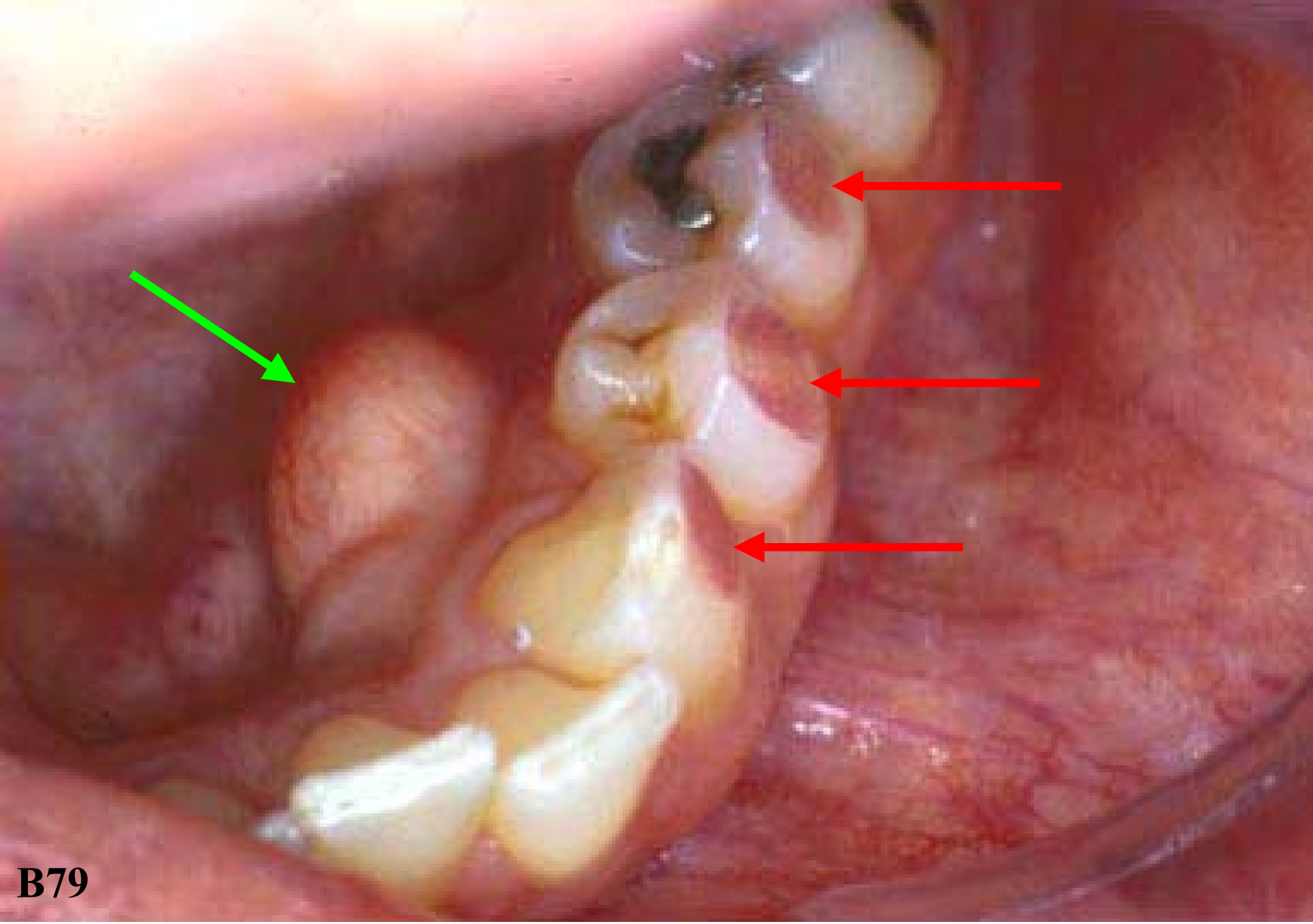
## Tight bite.



**Incline (flat) contacts and damaging lines of force.**

# Tight bite

- **Inclines** (broader surfaces) of opposing teeth are in contact. Contacts between teeth are much broader than 'point contacts'. This may cause flat wear facets.
- Can be due to discrepancy in arch width and/or teeth having incorrect angulation or slant, or missing teeth (which can cause shifting or drifting of teeth).
- Results in forces being directed in the wrong directions within the tooth (black arrows) and not in the direction of the long axis.



**B79**

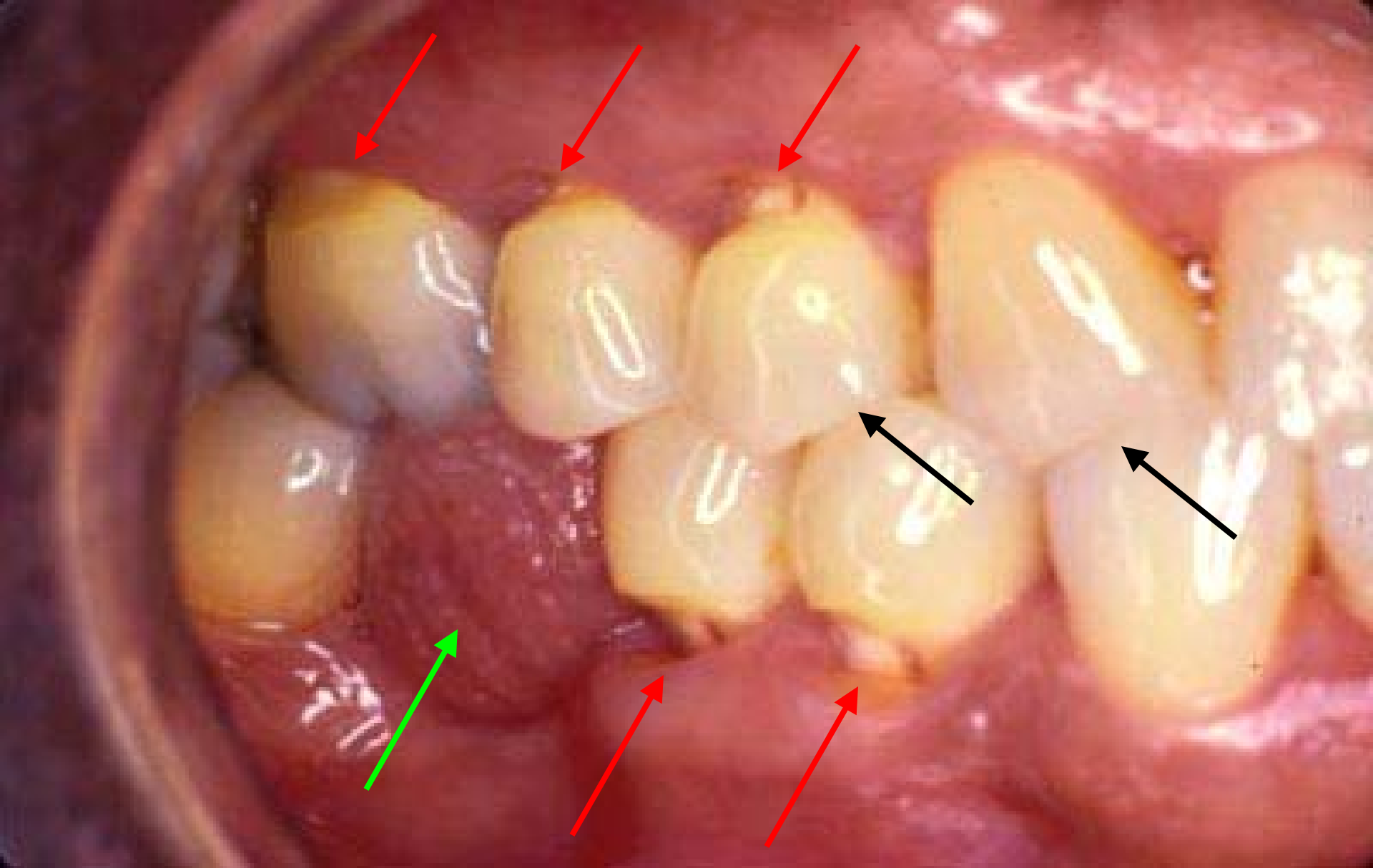
Heavy 'wear' facets and tori are due to tight bite.



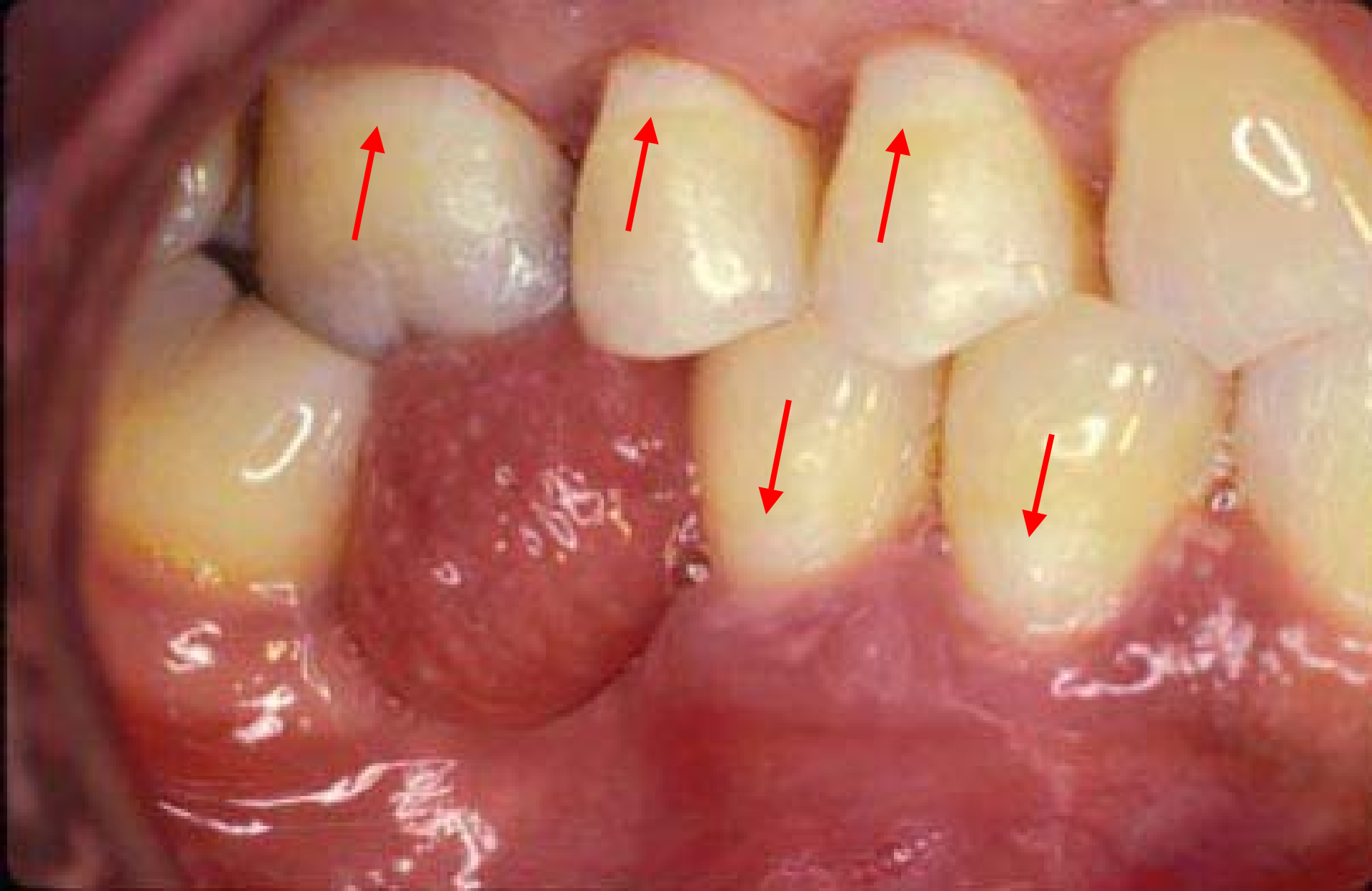
Tight bite. Nearly end-to-end malocclusion.

B80





Tight bite and tongue thrust (green arrow) caused these abfractions. See next slide.



Abfractions restored.



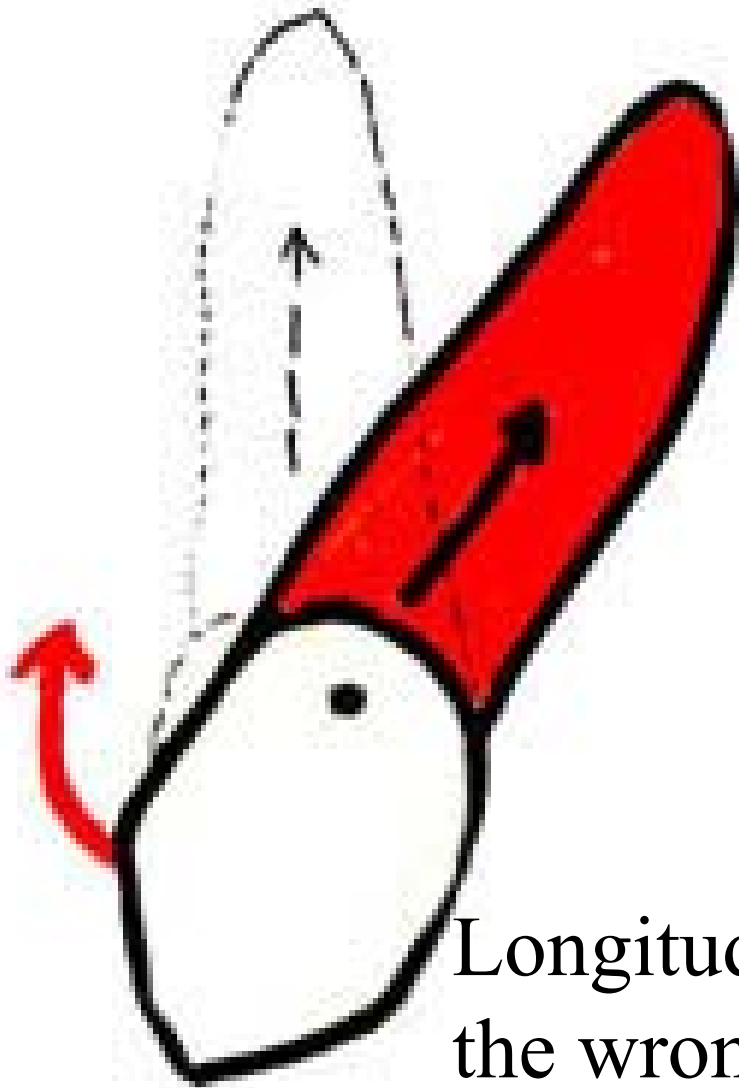
**B83**

Inward slant of upper anteriors locks bite in causing recession.

# Consequence of Mal-alignments

## Mal-aligned cuspid.

**Too angled.**



Root tip angled distally.

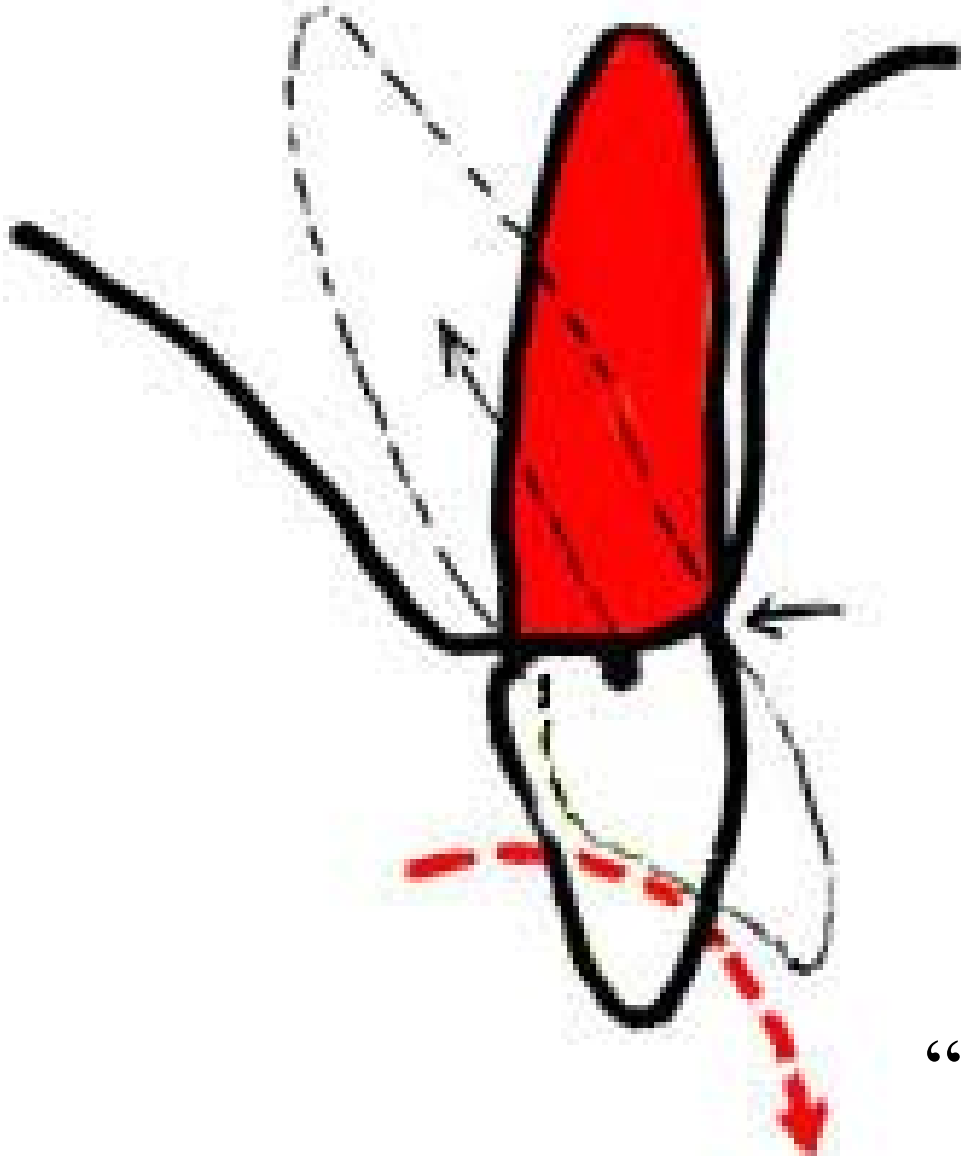
Longitudinal forces are running in the wrong direction. Should be running in direction of dotted arrow.

## Mal-aligned cuspid.

**Too upright.**

Should have position  
of dotted tooth.

Interferes with the  
“Envelope of Function”.





B87

Mal-positioned cuspid.



B88

Cuspid too upright.





Another cuspid that is too upright.



**B90** Cuspid and bicuspid have wrong angulations.



B91 Cuspid too upright and bicuspid too angled.



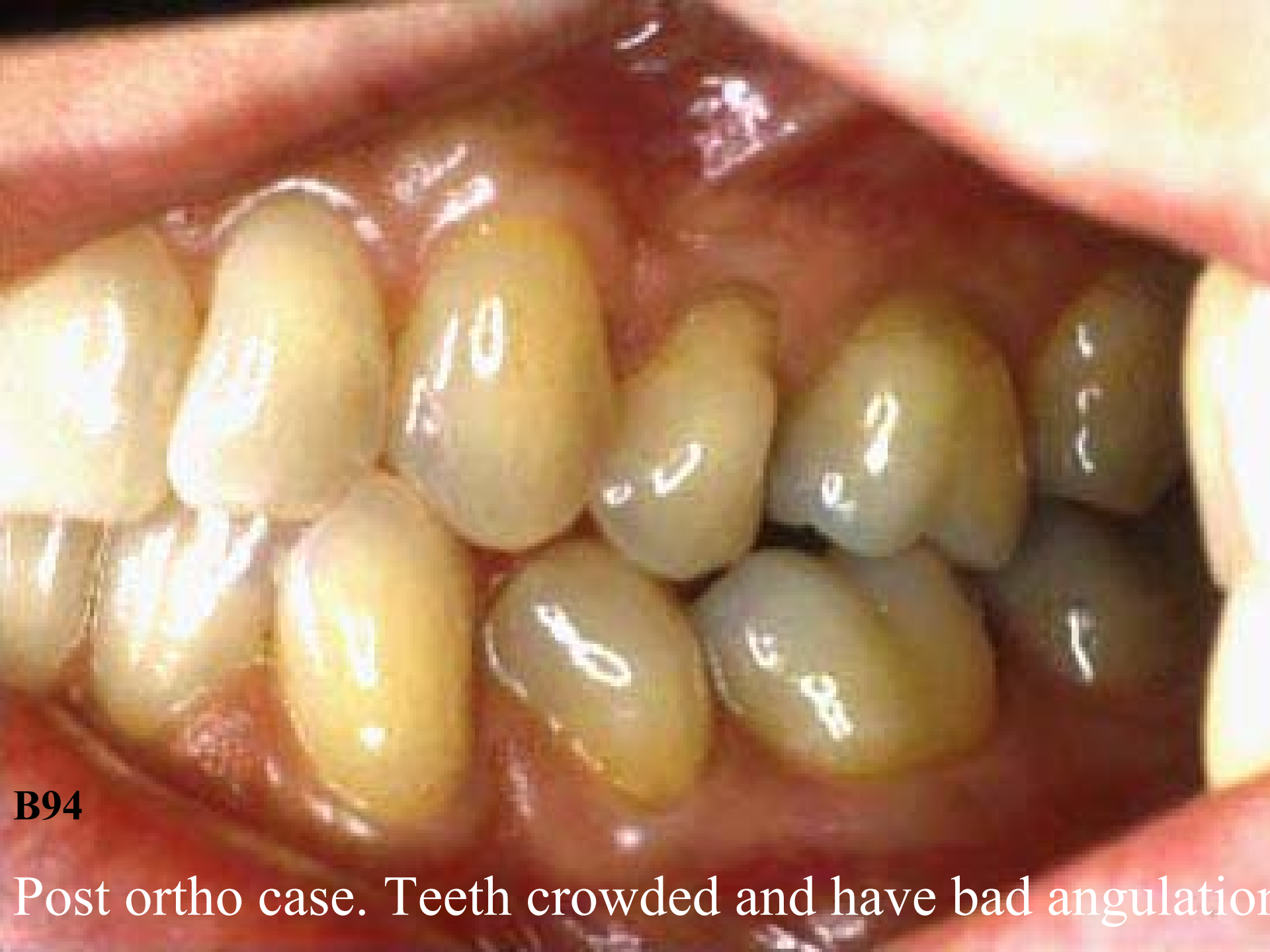
Bicuspid damaged because there was no cuspid rise and bicuspid too angled.

B92



Recession on bicuspid result of forces generated by excessive lean.

B93



**B94**

Post ortho case. Teeth crowded and have bad angulation

End of section B

Brian Palmer, D.D.S.  
Leawood, Kansas  
December 2004.