

Prehistoric skulls have
minimal malocclusions.

Why do contemporary industrialized
societies have such a high incidence
of malocclusion?



This historic skull has good facial form, beautiful dental occlusion and no dental decay.

Reason: During that era there was no other way to feed newborns except to breastfeed them. There were **no** bottle or pacifiers available.



C3

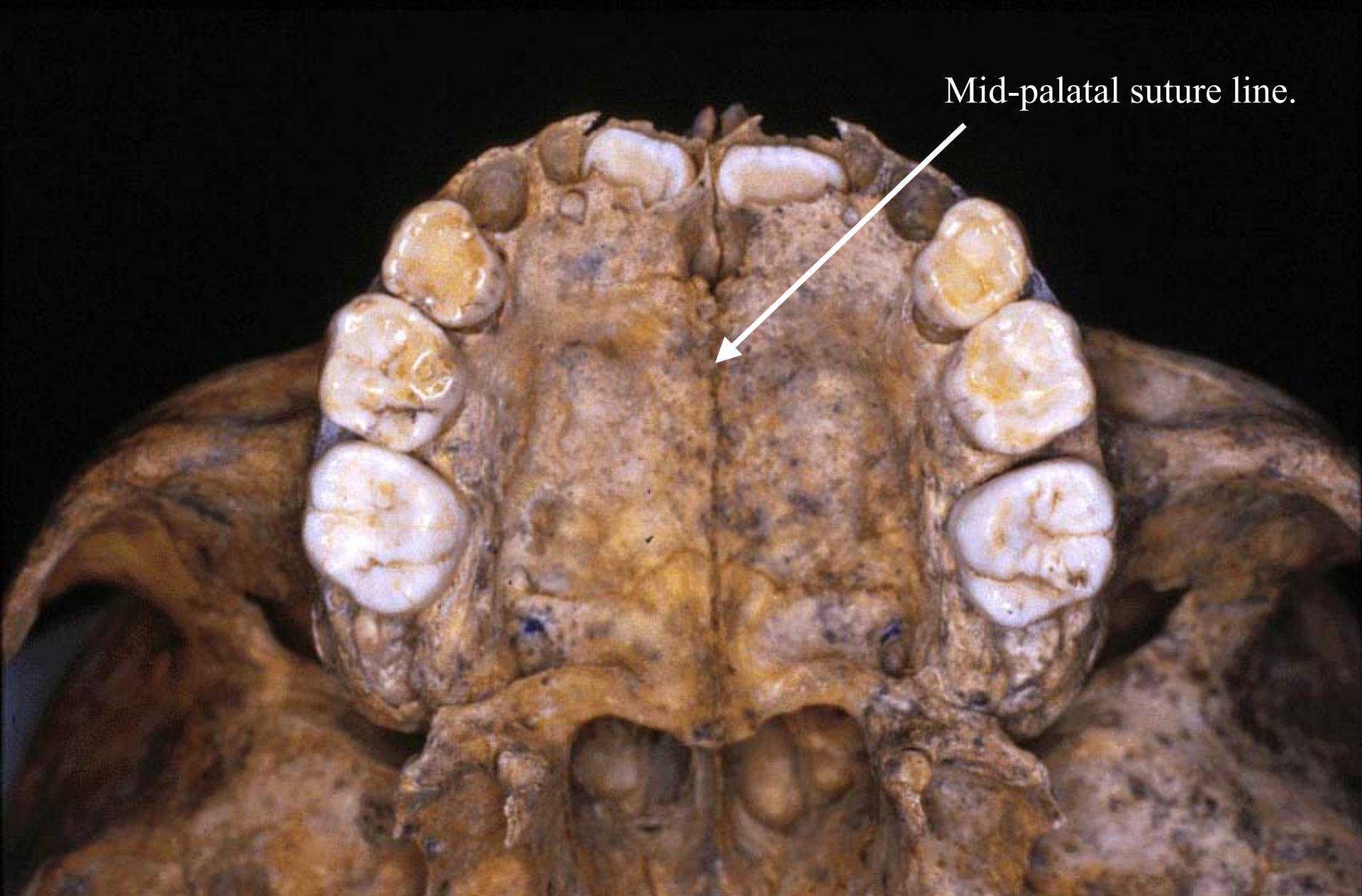
Close-up of previous skull. Has beautiful occlusion and no decay.



C4
Same skull illustrating wide palate and nice 'U' shaped dental arch.

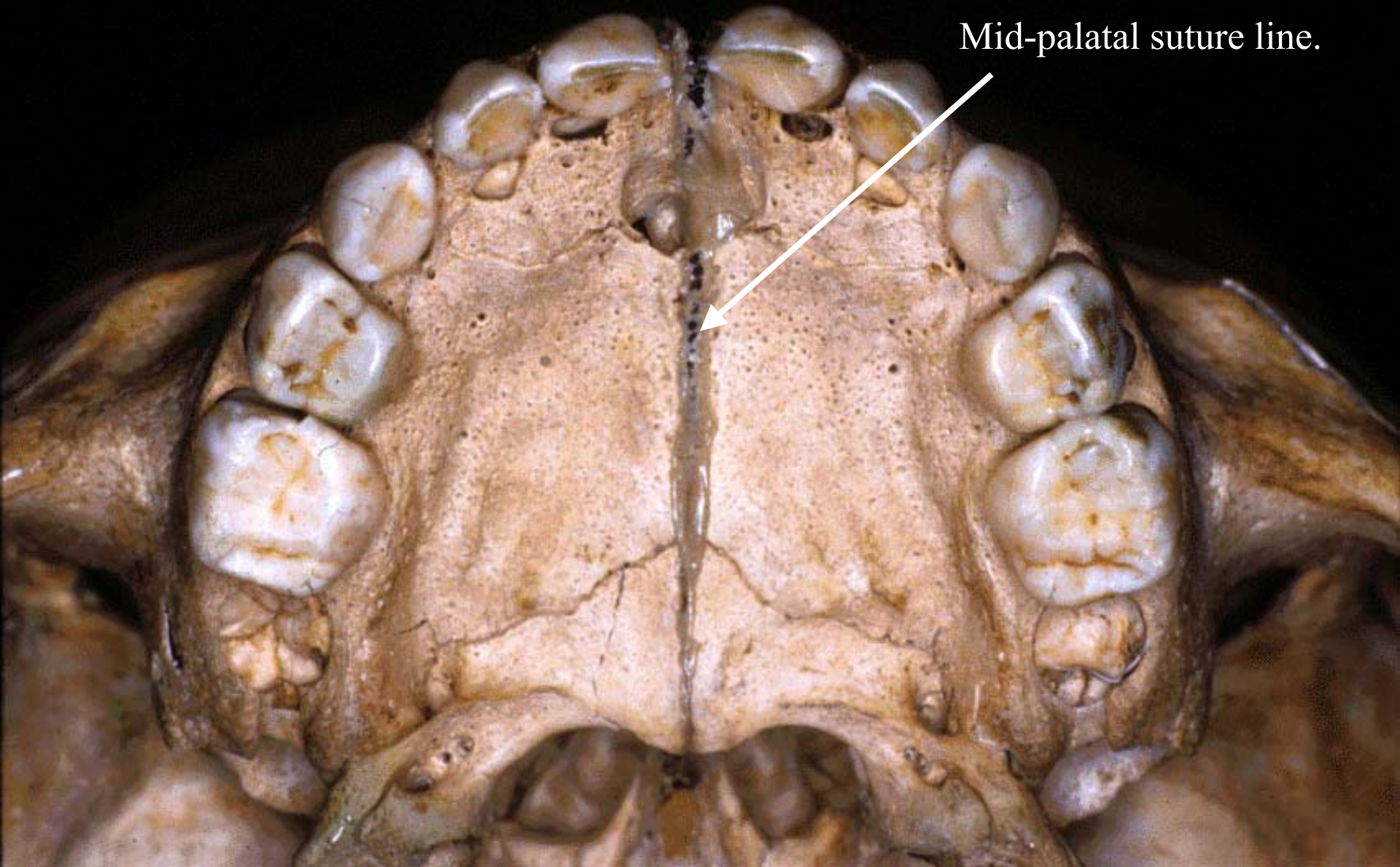


Only when you have a wide palate as seen on this skull, can you have a large posterior nasal aperture (PNA) opening. The PNA is the gateway to the beginning of the soft portion of the airway. The larger the PNA the less likely (less prone) the airway is to collapse.



Prehistoric infant skull. Nice palate shape, nice arch form and no decay.

C6



Mid-palatal suture line.

Prehistoric infant skull. Nice palate shape, nice arch form and no decay.

Craniofacial Development

- Largest increase occurs within the first 4 years of life.
- Is 90% complete by 12 years of age.

Shepard, J. et al. Evaluation of the Upper Airway in Patients with OSA. *Sleep* 1991, 14(4):361-71. (Research done at Mayo)

AAPD Vision Statement (1996)

- “89% of youth, ages 12 - 17 years, have some occlusal disharmony.”
- “16% of youth have a severe handicapping malocclusion that requires mandatory treatment.”

Pediatr Dent, Spec Edition: Ref Manual 1995-96, 17(6).

Pacifier use (1997)

- 85% of children in her study used pacifiers by age one month. Children weaned from breastfeeding early use a pacifier more often than those who are breastfed longer.

Victora CG, Behague DP, et al. Pacifier use and short breastfeeding duration: cause, consequence, or coincidence?
Pediatr. 1997 Mar;99(3):445-53.

Variables that can impact oral cavity and airway development.

- Improper feeding - artificial bottles and nipples.
- Noxious habits - pacifiers, excessive infant habits.
- Grossly enlarged tonsils and adenoids.
- High palates and narrow arches
- Ankyloglossia / tongue-tie.
- Facial-skeletal growth abnormalities.
- CNS dysfunction affecting facial muscles.
- Drugs - refined sugars might be considered in this category.
- Illnesses.

Contributing factors to illness:

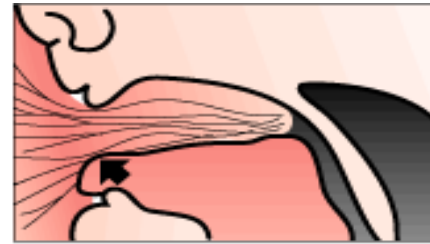
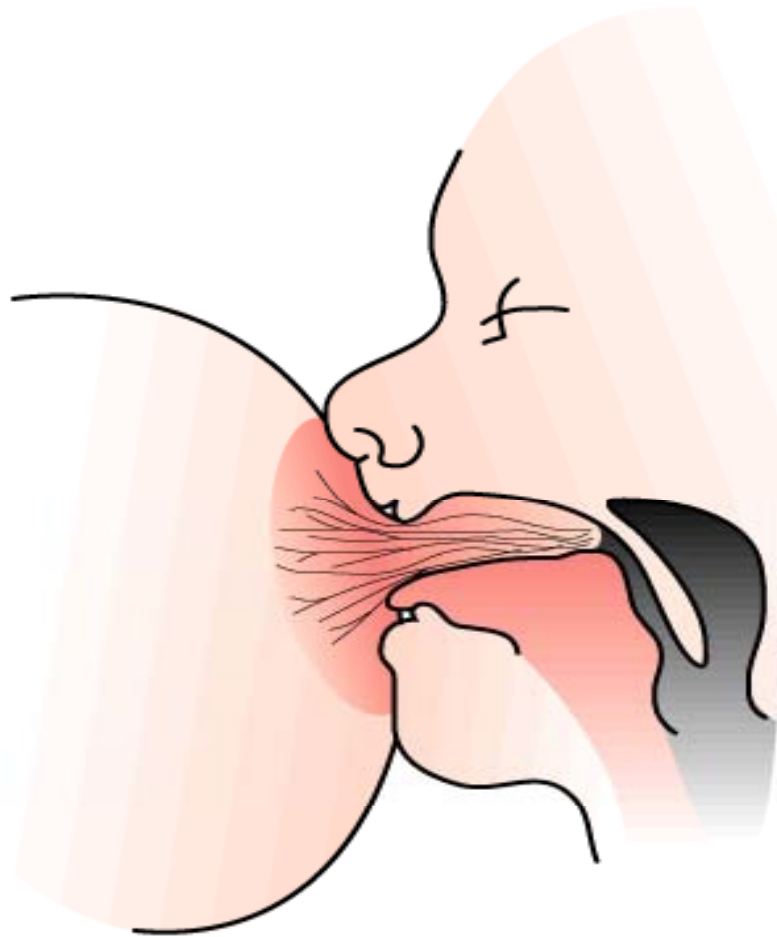
- Not receiving mother's immune system.
- Decreased airway size due to:
 - edema, obstructions, genetics, etc.
- Day care contacts.
- Hygiene practiced / contaminated pacifiers.
- Environmental pollution.
- Viral / bacterial outbreaks.
- Stress.
- Nutrition.
- Economics.

Most common infant allergy foods

- Eggs
- Peanuts
- Milk
- Soy
- Fish
- Wheat

Annick Gaye, 1996 ILCA Conference, KC, MO

The development of a
correct swallow.



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**Michael Woolridge, The 'anatomy' of infant sucking.
Midwifery, 1986, 2, 164-71.**

During breastfeeding, the proper swallow is developed.

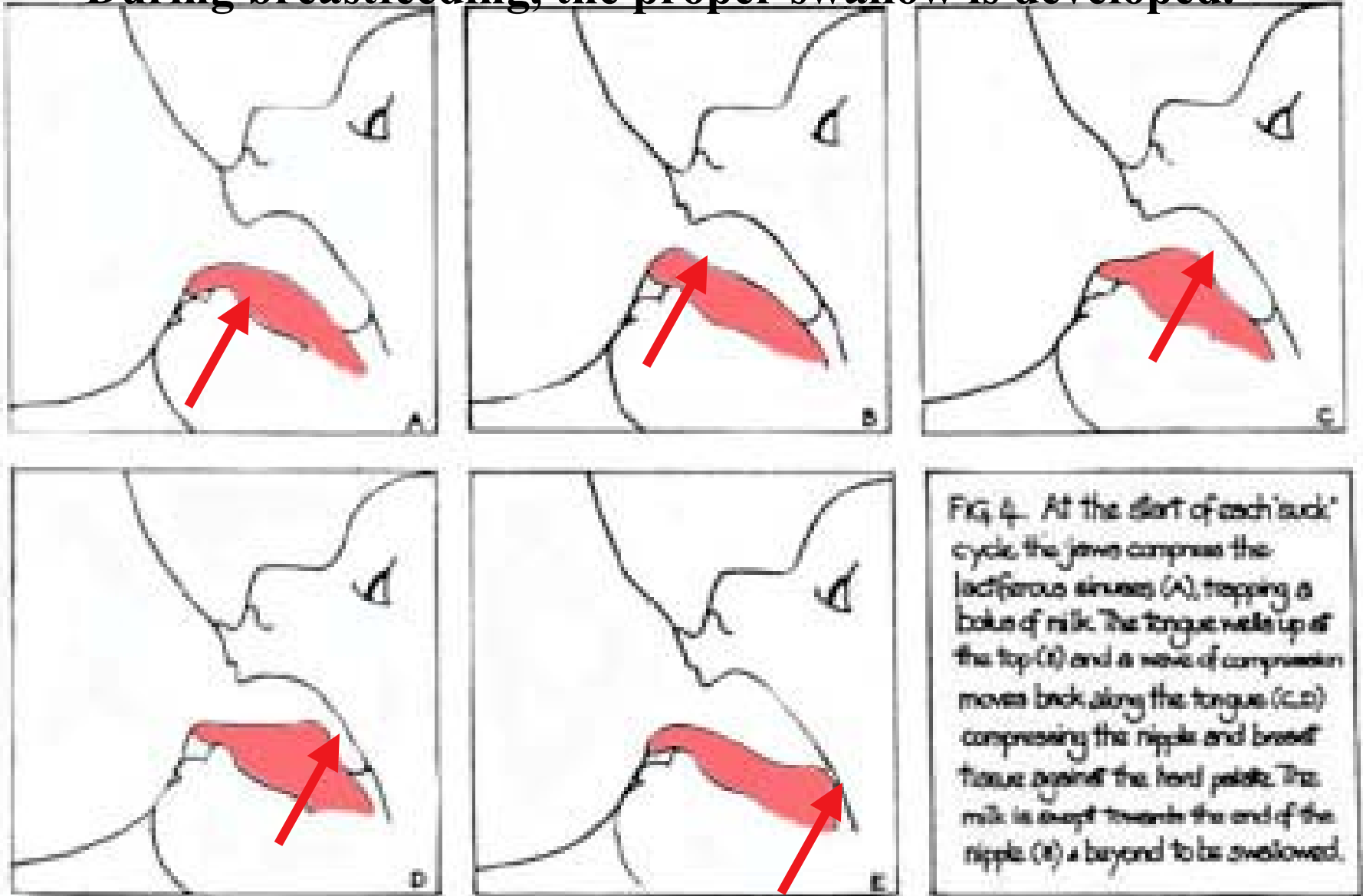
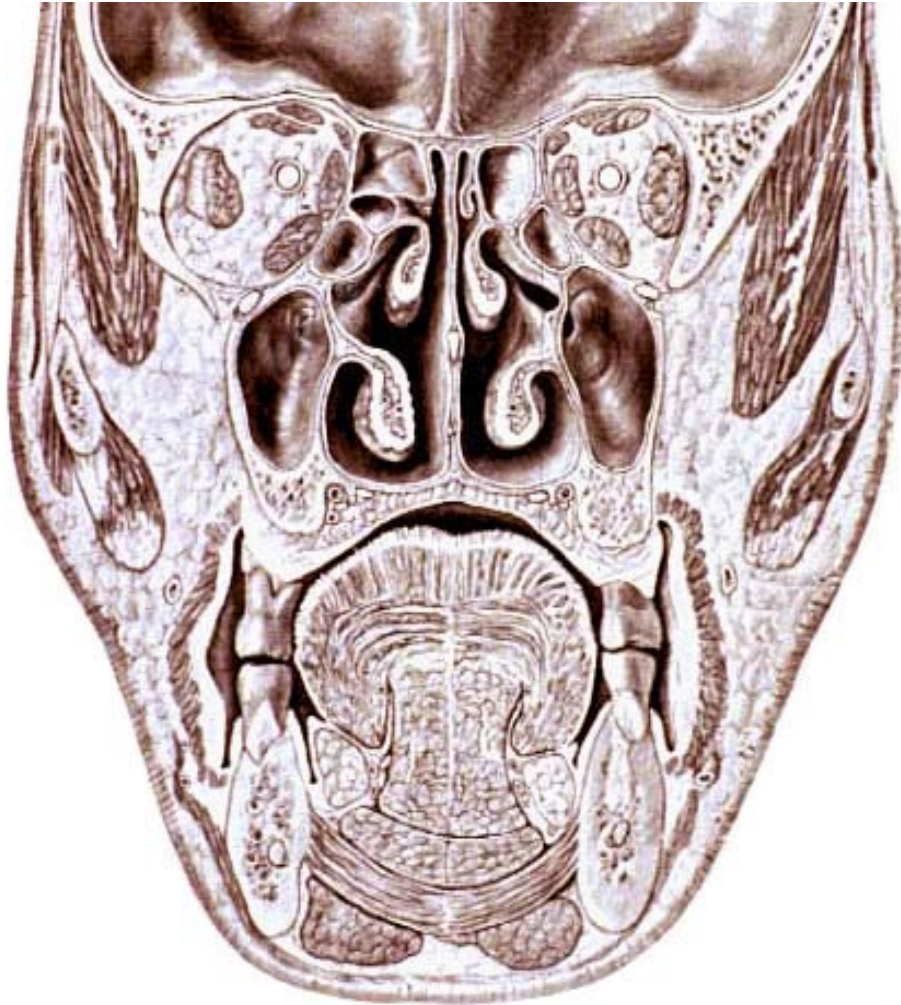
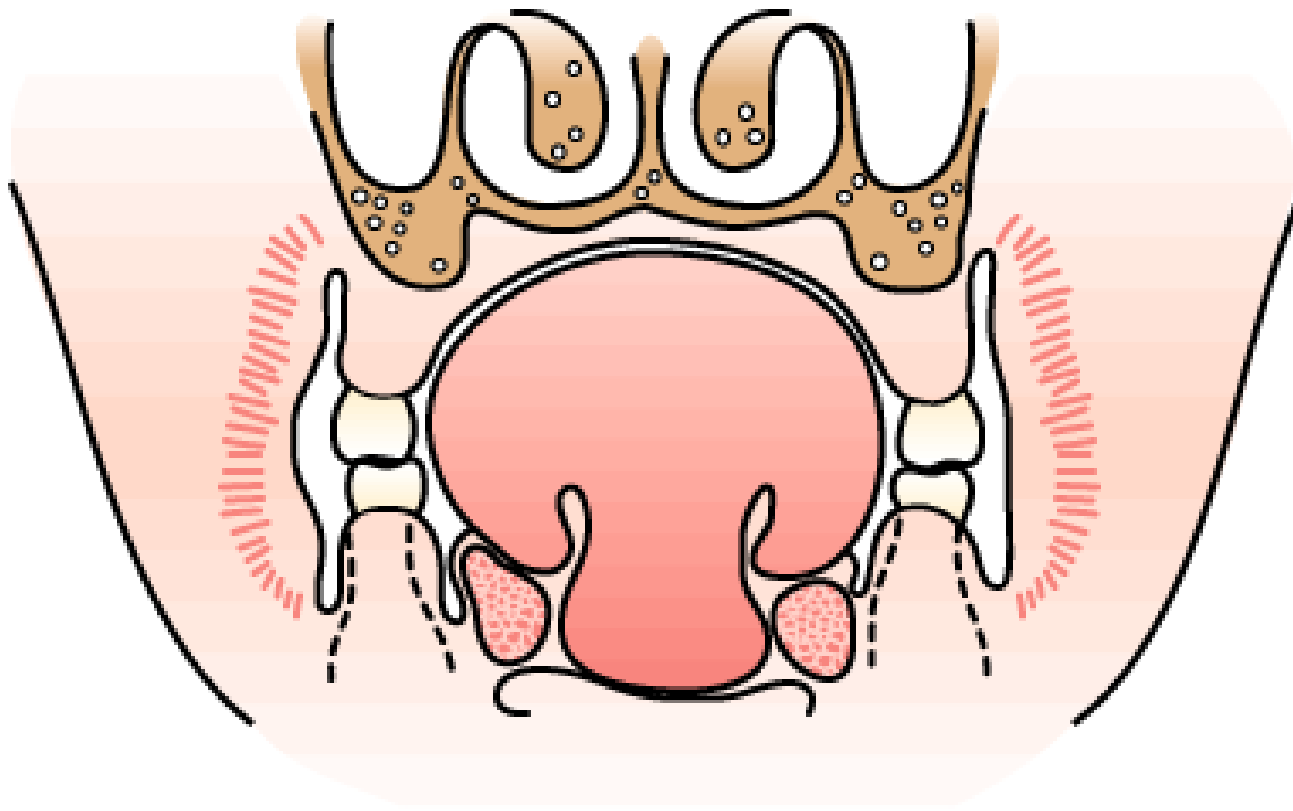


Illustration from Ros Escott article, Positioning, Attachment and Milk Transfer, Breastfeeding Review, 1989, p.35.



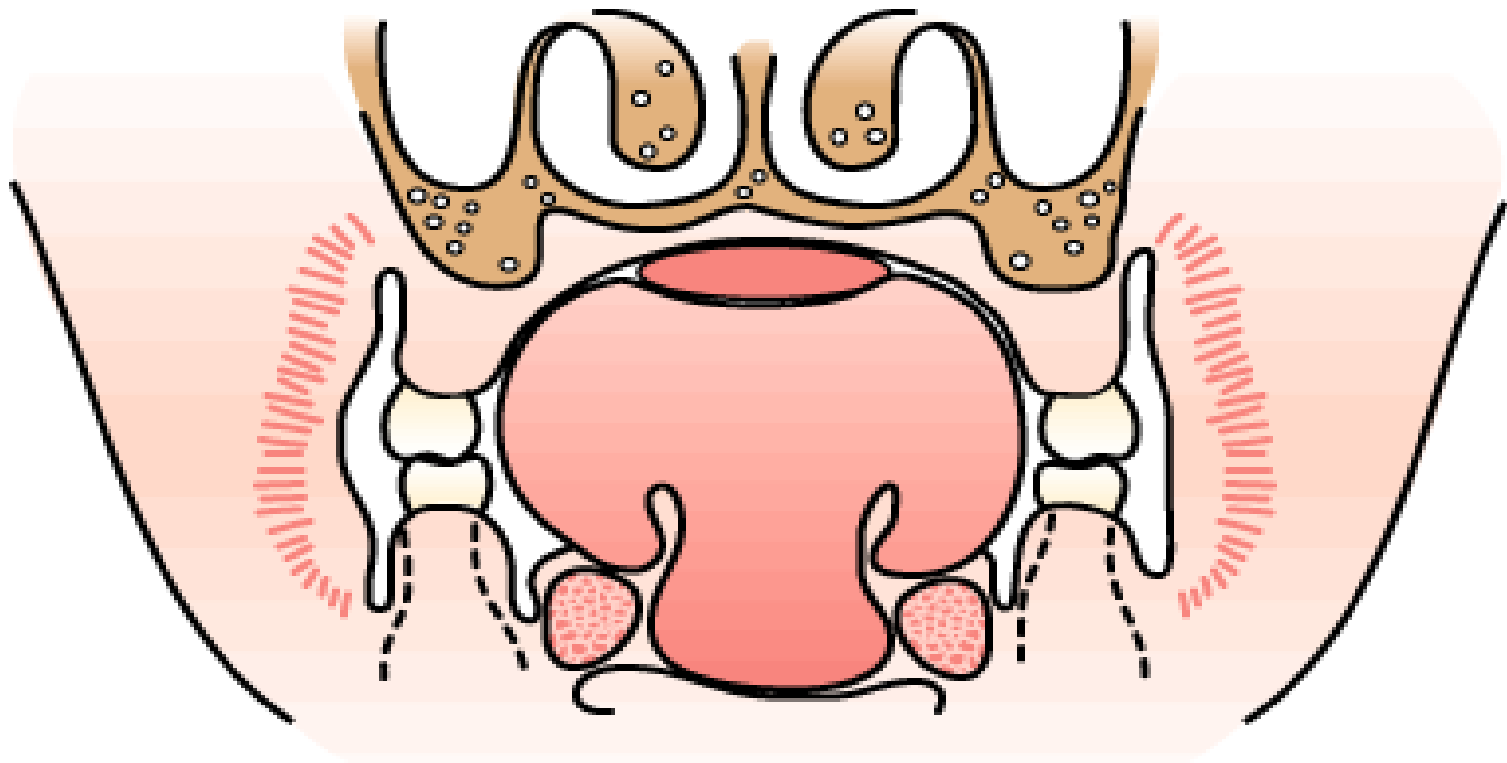
The tongue, teeth and cheeks are in a natural resting “neutral” position. There are no abnormal forces within the mouth. This allows for the proper alignment of the teeth, position of the dental arches, height of the palate and normal facial growth and development.

Tongue at Rest



Tongue at rest in a 'neutral' position.

Tongue Position While Breastfeeding



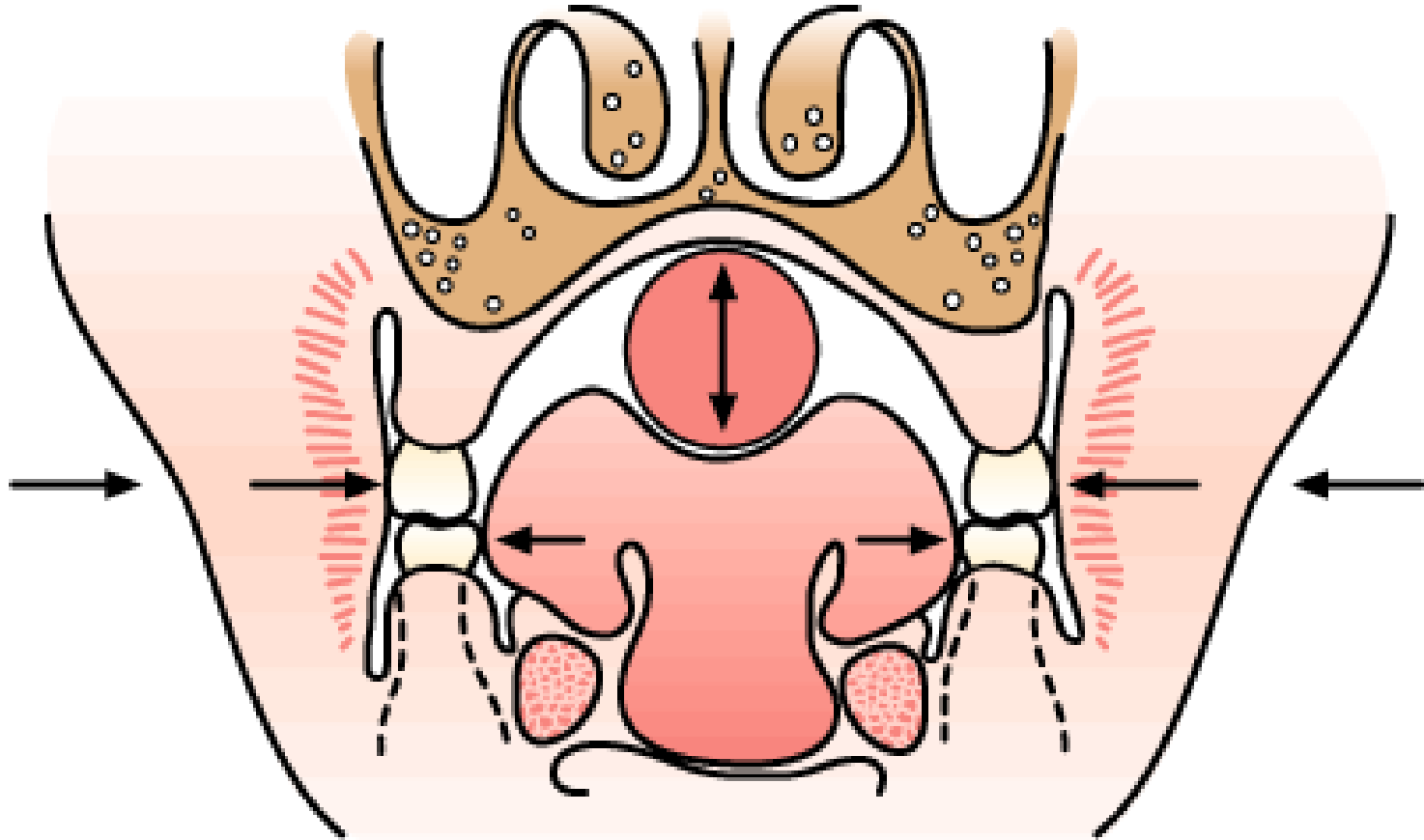
During breastfeeding there are no abnormal forces generated against any tooth or bone.

Vacuum created during a suck.



A vacuum created by a strong suck, can create an inward collapse of the oral cavity, throat and airway.

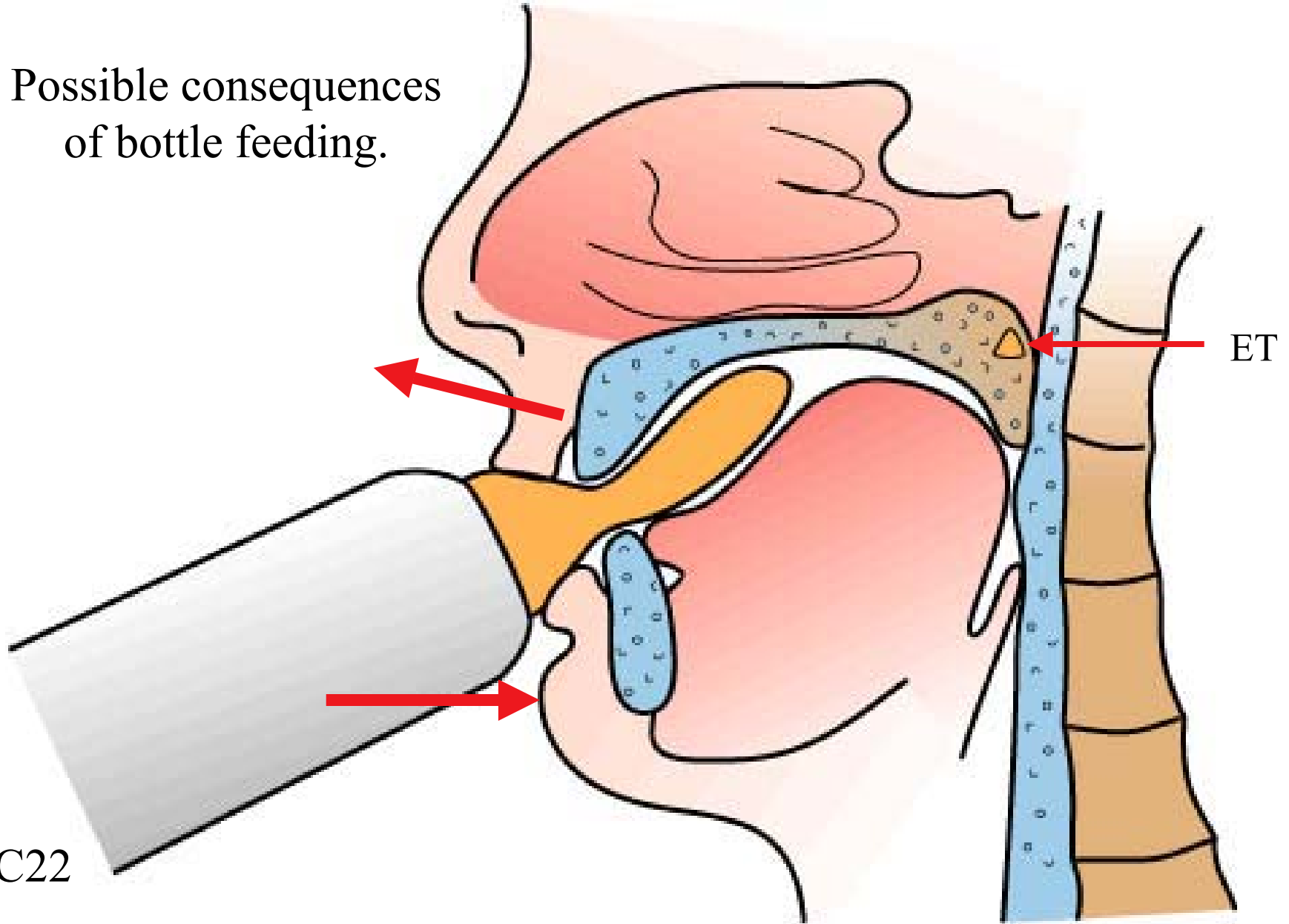
Pacifier / Bottle Nipple



C21

Amount of 'suck' on a bottle varies depending on nipple size, hole size, firmness of material, vacuum inside bottle, thickness of formula, etc.

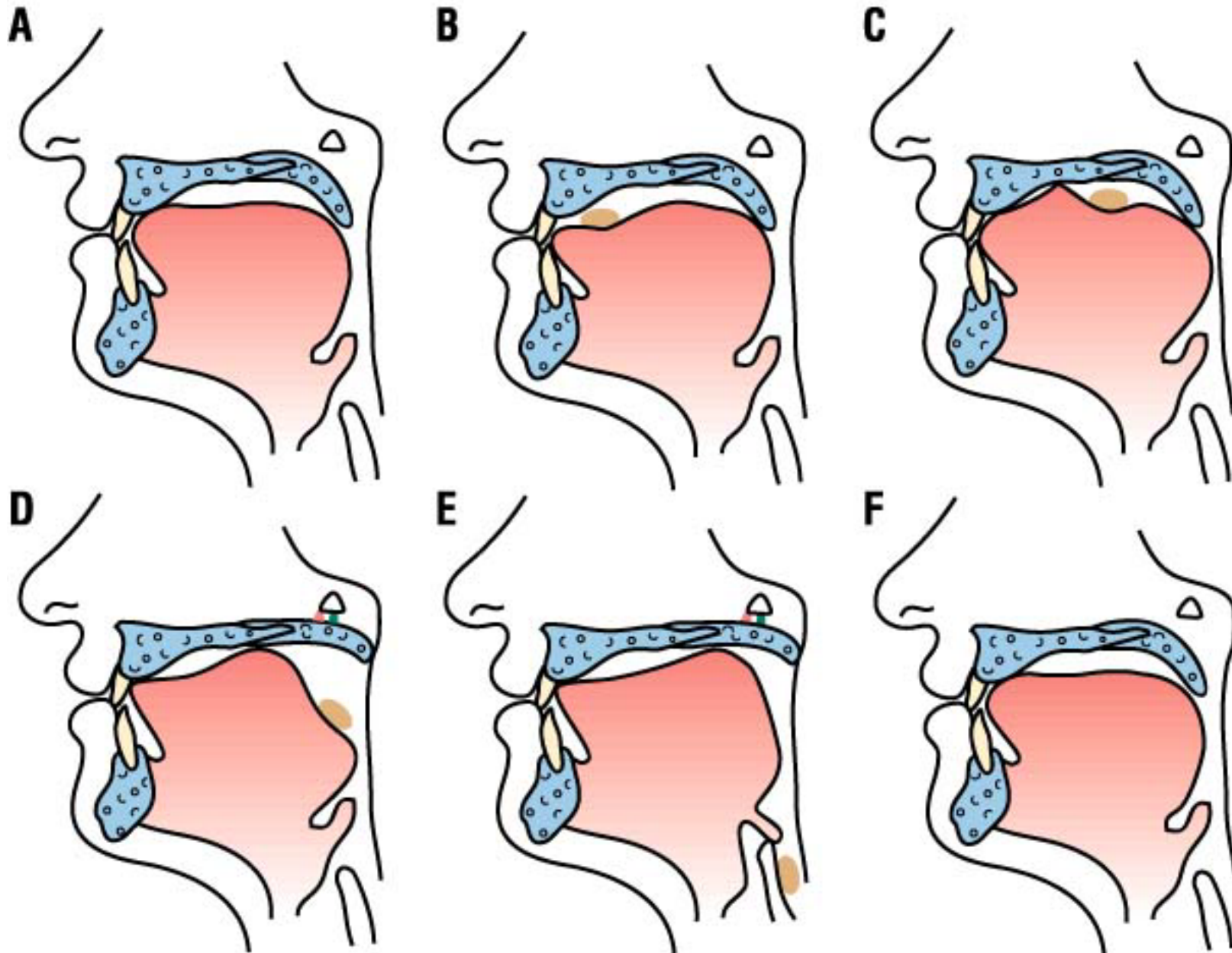
Possible consequences
of bottle feeding.



C22

Bottle feeding can separate the epiglottis/soft palate connection, elevate the soft palate, drive the tongue back and alter the action of tongue.

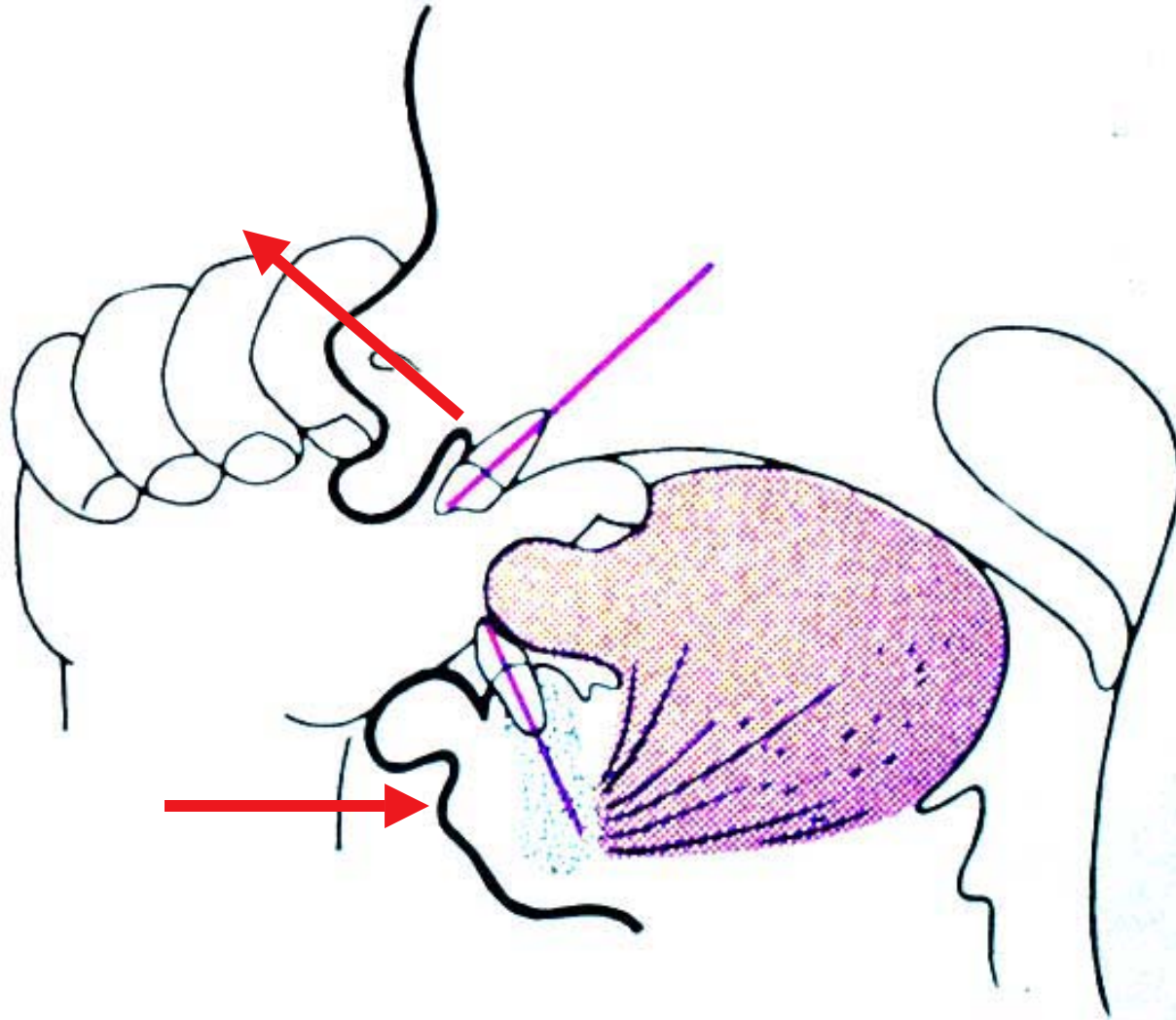
Adult Swallow



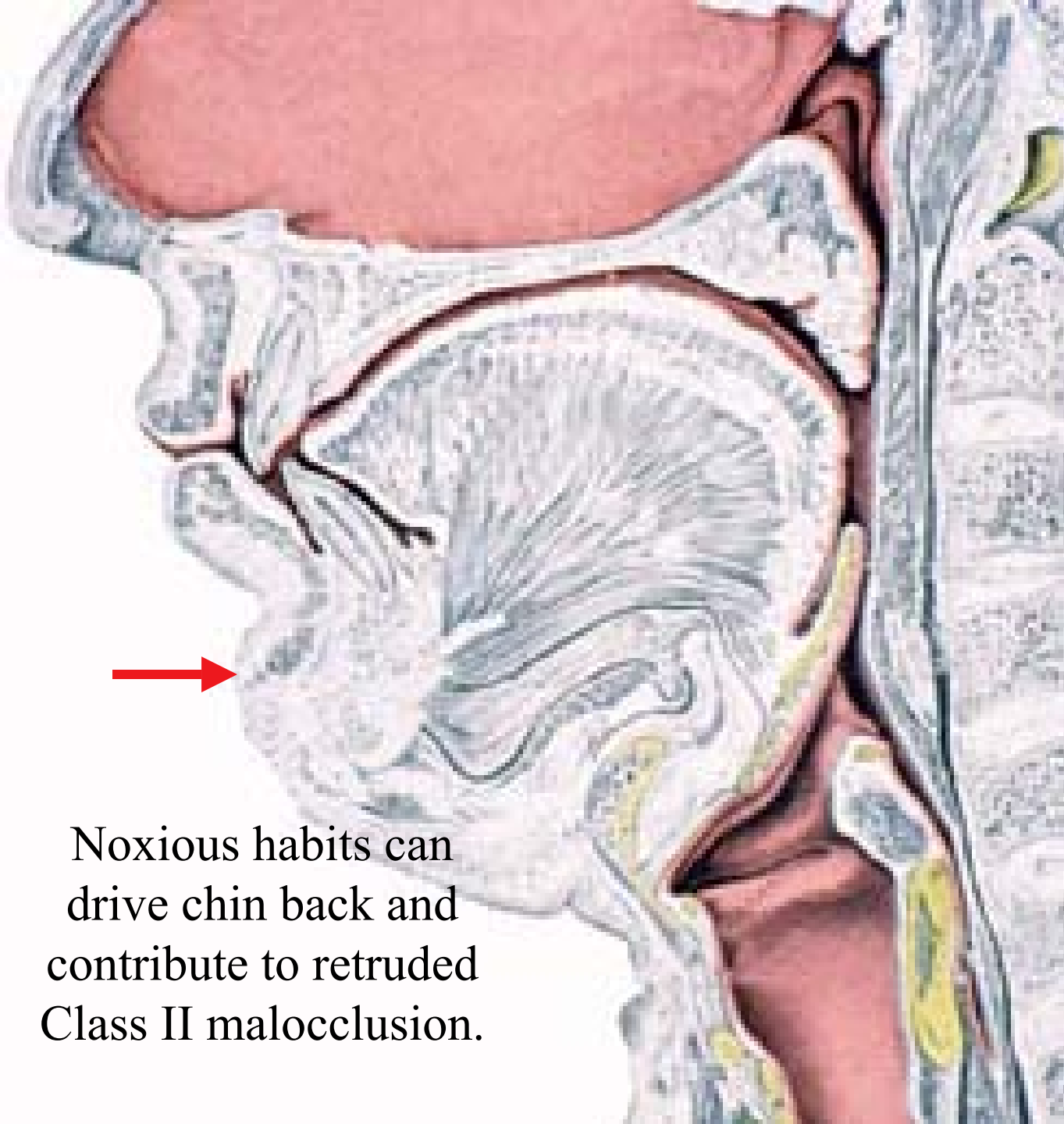
Test your own swallow.

Close your eyes and swallow. Concentrate what your tongue does during the swallow. It should basically stay on the roof of your mouth - and should not go forward or sideways, against or between your teeth. If it does, you probably have gaps or spaces between your teeth in the area where your tongue hits or goes between your teeth.

Impact of infant habits on occlusion.



EXCESSIVE digit sucking can set up abnormal forces on the oral cavity and surrounding structures.



Demonstrates how retruded chin can cause blockage of airway by driving tongue back.

This adult may have died from OSA. Note blockage of airway by soft palate and base of tongue. (Grant's Atlas)

Noxious habits can drive chin back and contribute to retruded Class II malocclusion.



**Upper open bite caused
by lower tongue thrust.**





**Upper open bite caused
by lower tongue thrust.**





**Upper open bite caused
by lower tongue thrust**



C30



Thumb sucking caused open bite and tongue thrust.



C31



Finger sucking caused open bite and tongue thrust.





Lip sucking caused open bite and tongue thrust.





Arm sucking caused malocclusion and need for expansion and orthodontics.





Early **excessive** thumb sucking caused open bite malocclusion and resultant long face syndrome.



Long face syndrome.



Open bite on same 7-year-old. Note forward position of tongue.

Compromised oropharynx (throat) of same 7-year-old.



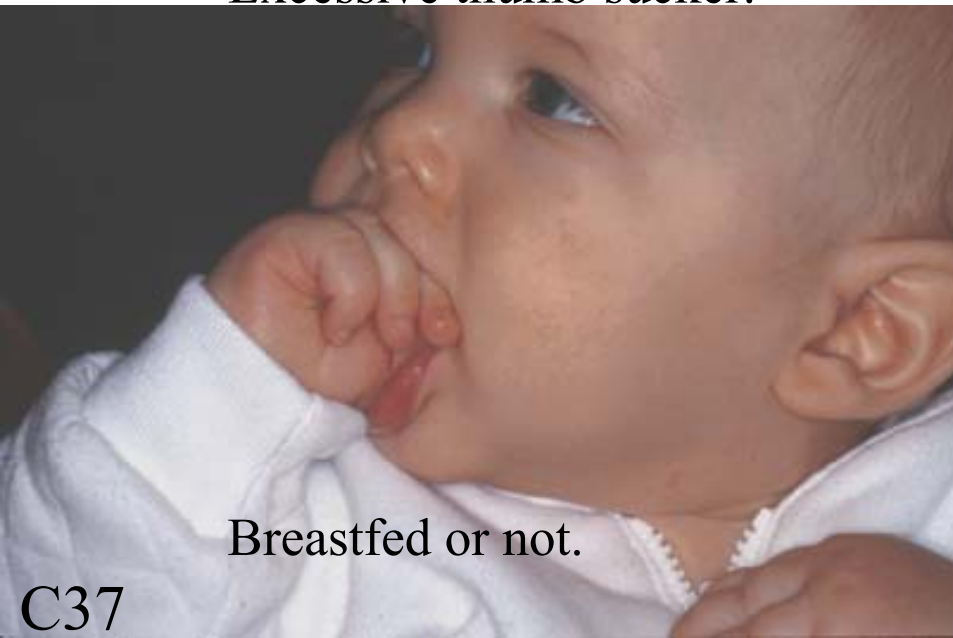
Impact on facial form.



Breastfed infant.

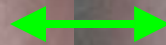


Excessive thumb sucker.



Breastfed or not.



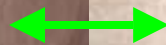


4 months old.

Breastfed and was not a thumb sucker. 4 1/2 years old.

4 months old.

Was an excessive thumb sucker. 4 1/2 years old.



C38

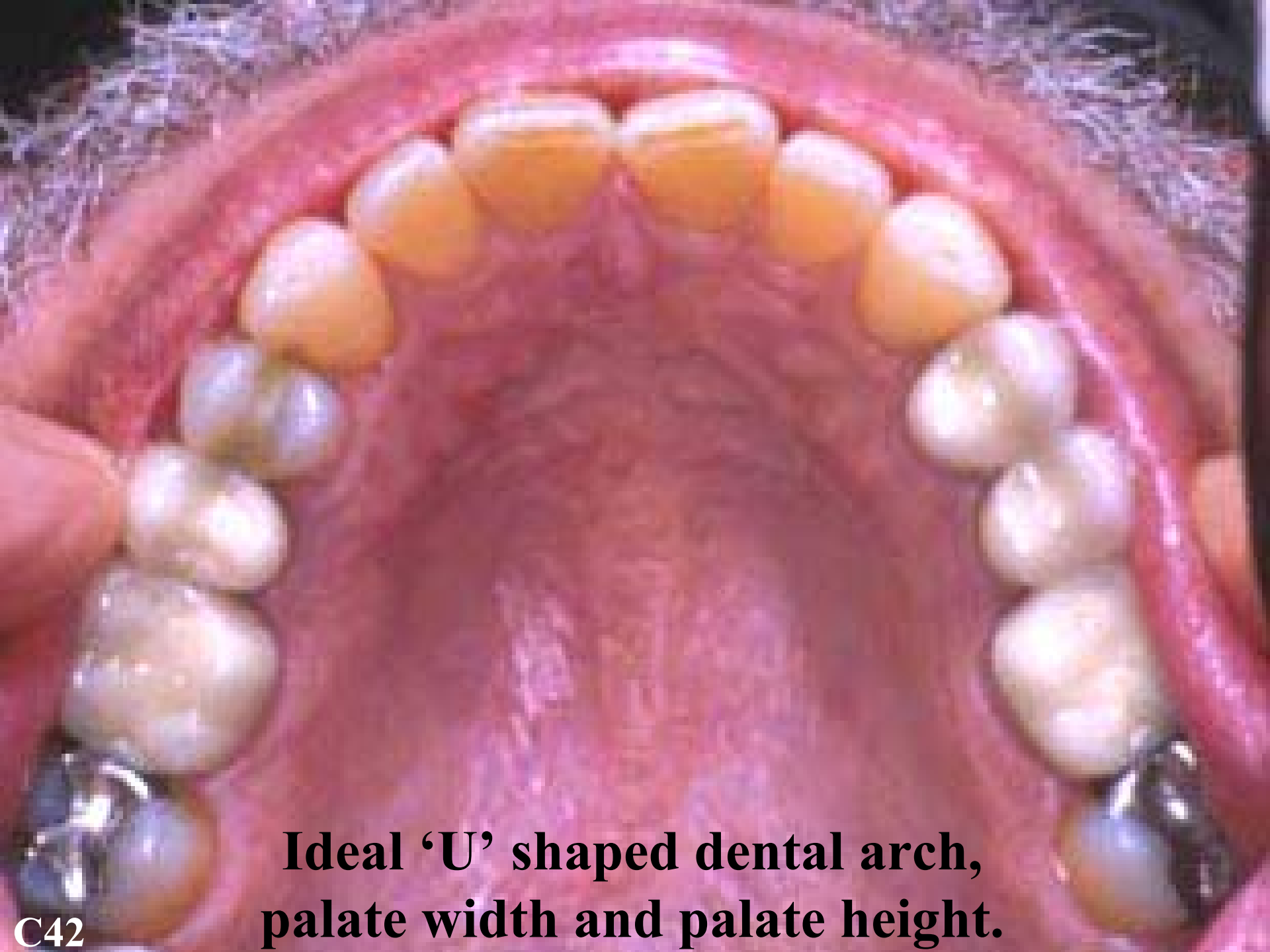
Impact of the shape of the dental arch on occlusion.

Factors that influence occlusion:


- Shape and width of dental arches.
- Height and width of hard palate.




C41 Natural palate width and height and 'U' shaped dental arch.



**Ideal 'U' shaped dental arch,
palate width and palate height.**



Ideal wide palate and nice “U” shaped arch of an adult that was breastfed.



Narrow “V” shaped maxillary arch and high palate of an adult that was bottle fed and was a thumb sucker.



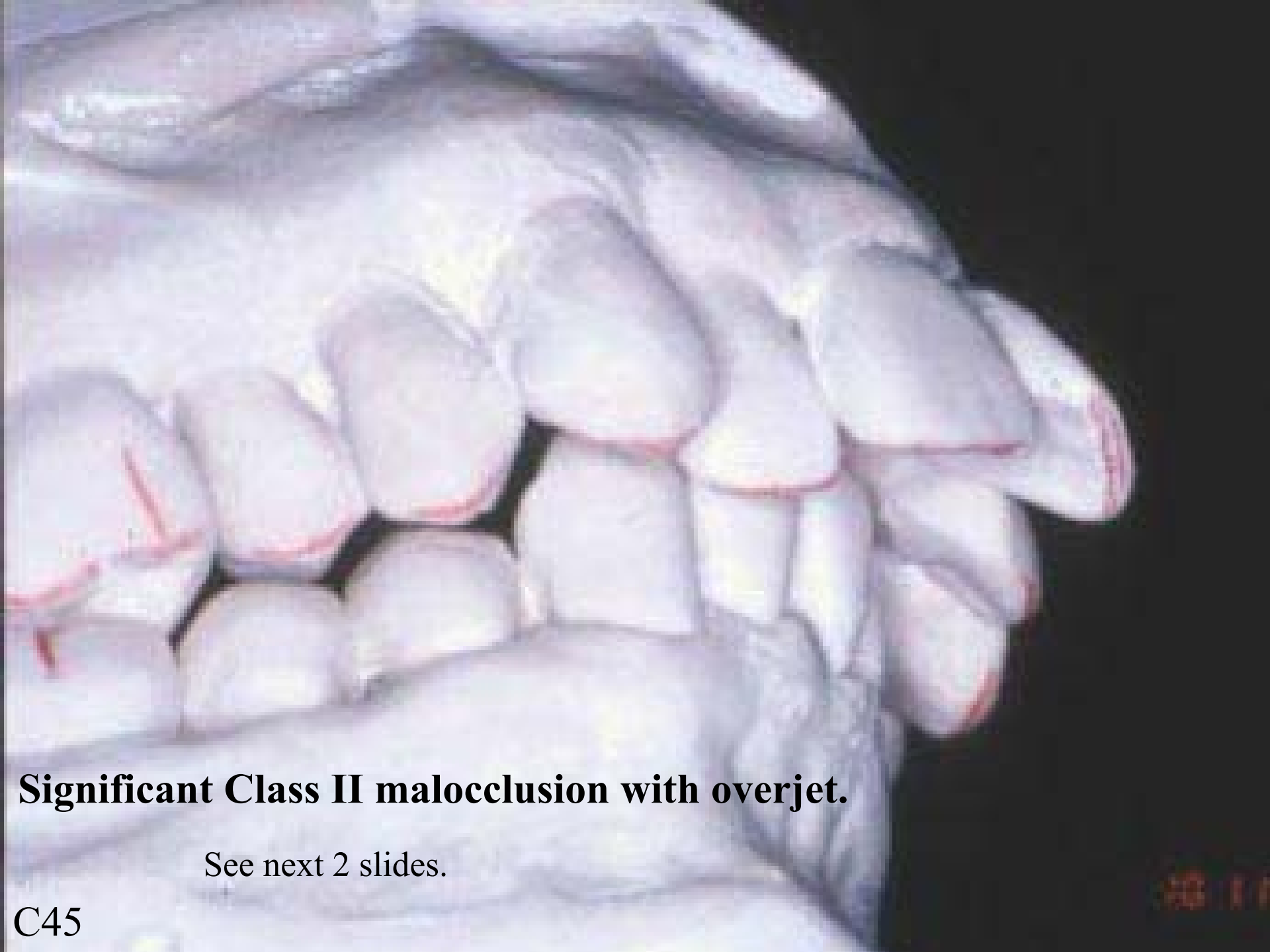
Naturally wide 'U' shaped dental arch with ideal palate height and width.

Key Illustration:

Note how much more space is available for teeth on a 'U' shape vs. 'V' shape arch.

Example of a high palate and narrow arch.

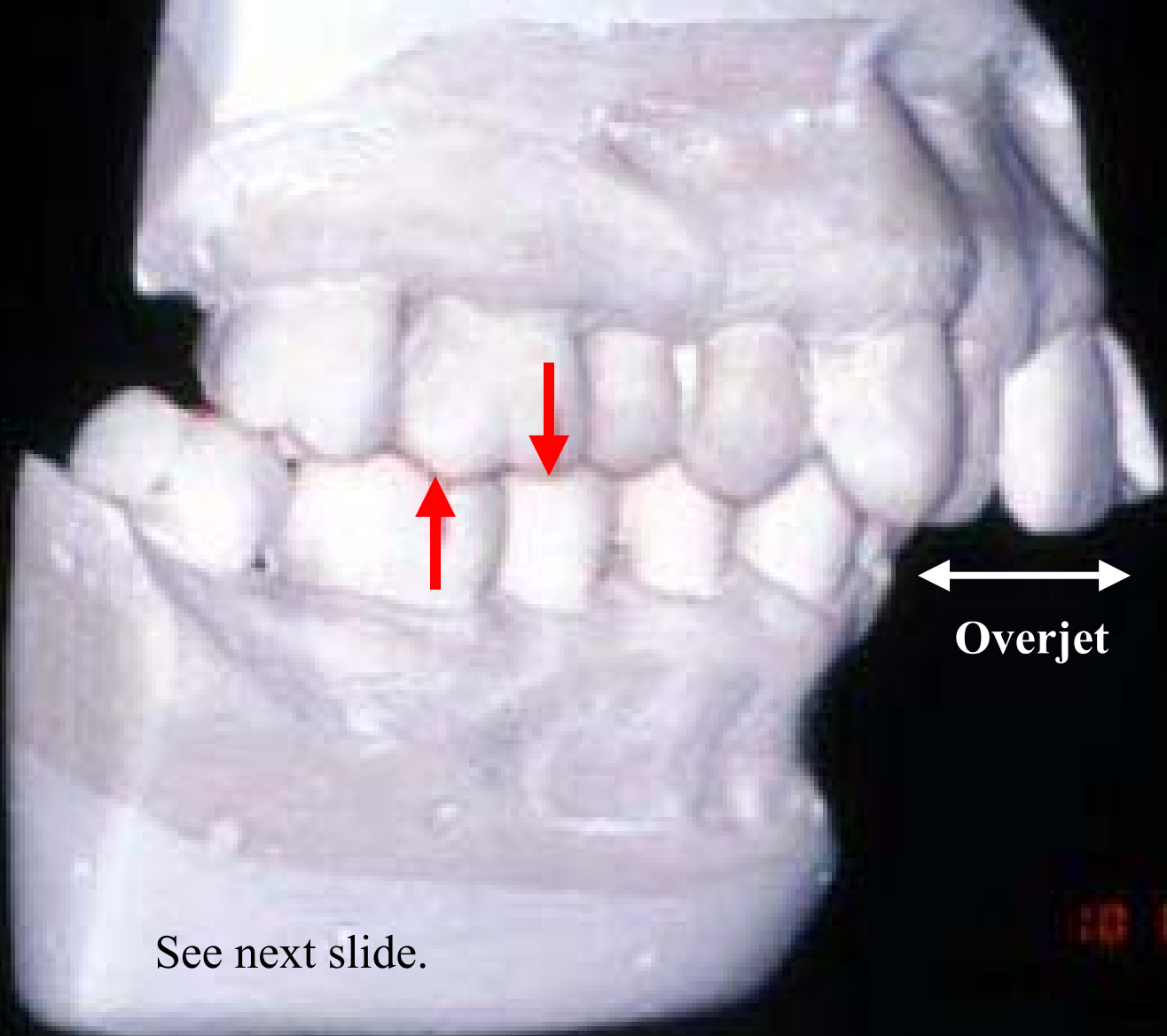




Significant Class II malocclusion with overjet.

See next 2 slides.

Class II malocclusion.



See next slide.



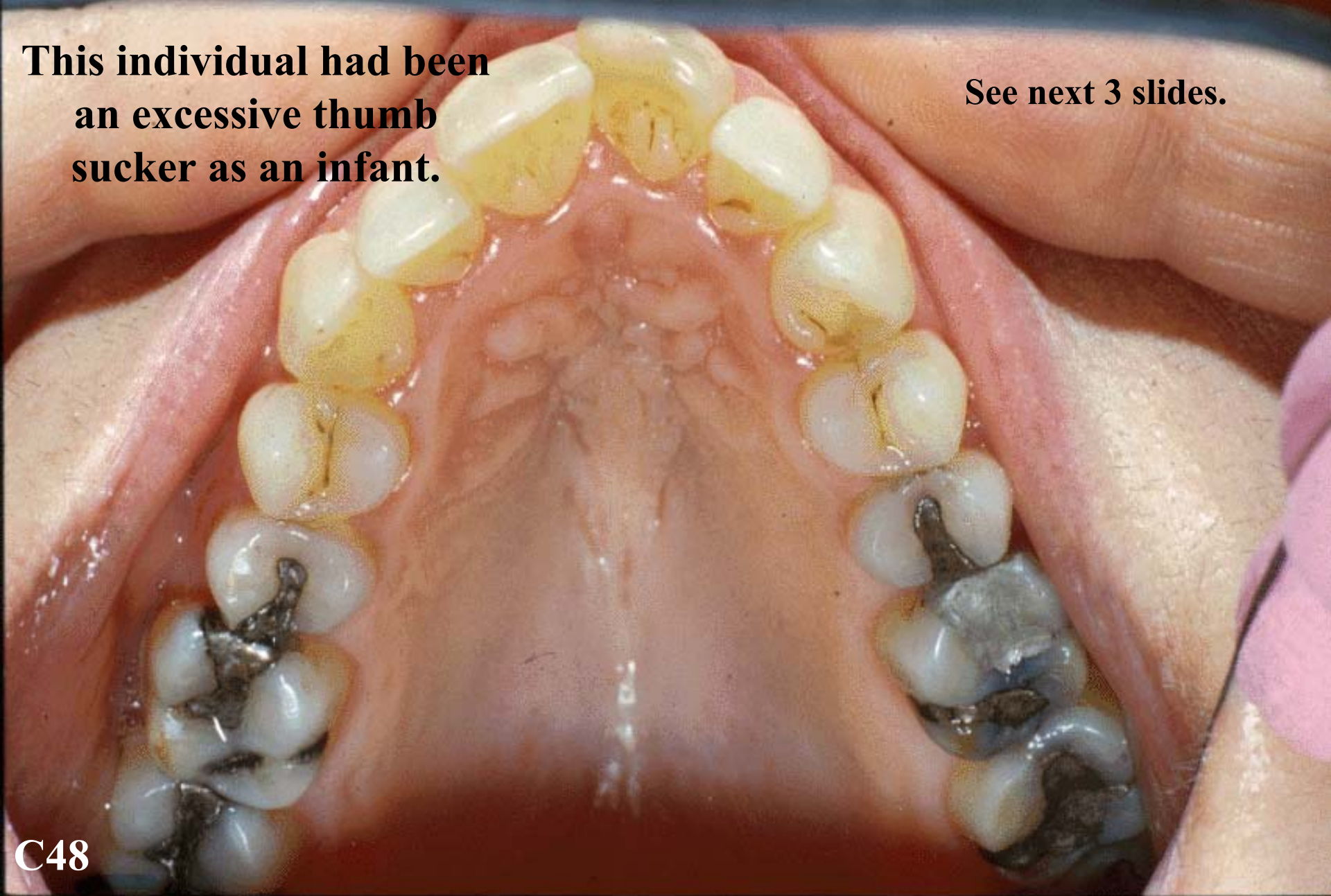
‘V’ shaped arches.

These ‘V’ shaped arches were the main reason for the significant Class II malocclusion in the previous slides.



**This individual had been
an excessive thumb
sucker as an infant.**

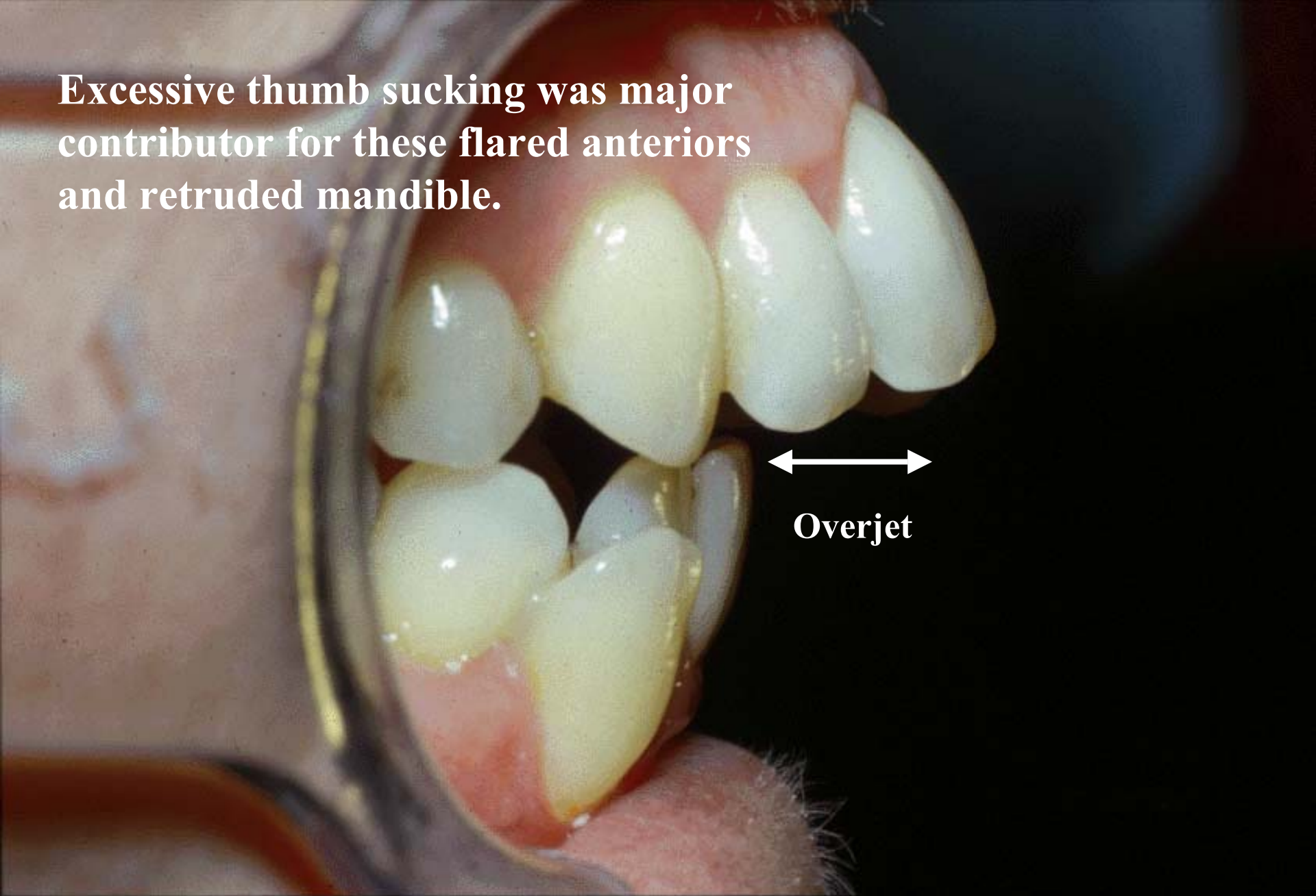
See next 3 slides.



C48

Adult with high palate and 'V' shaped narrow arch.

Excessive thumb sucking was major contributor for these flared anteriors and retruded mandible.





See next slide.

C50 View of open bite and overjet from inferior view.

Excessive thumb sucking was major contributor for this tongue thrust.



End of case.

C51

Open bite was caused by this tongue thrust.



C52

Age 13. Very high palate, narrow dental arch.



High palate / narrow arch.



Models demonstrating an example of a high palate and narrow upper arch.

A narrow arch usually results in a cross-bite.
See next slide.



C55

Resultant cross-bite of narrow arch.

Morphometric formula:

Link between palate height and arch width to obstructive sleep apnea, a very serious medical condition.

See next 3 slides.

Morphometric formula

Kushida C. et al., A predictive morphometric model for the obstructive sleep apnea syndrome, *Annals of Internal Medicine*, Oct 15, 1997; 127(8):581-87.

This is one of the most important formulas in the medical field today!

See next slides.

Stanford Morphometric Model

$$P + (Mx - Mn) = 3 \times OJ + 3 \times (BMI - 25) \times (NC/BMI)$$

P = palatal height

Mx = maxillary intermolar distance

Mn = mandibular intermolar distance

OJ = overjet

NC = neck circumference

BMI = body mass index

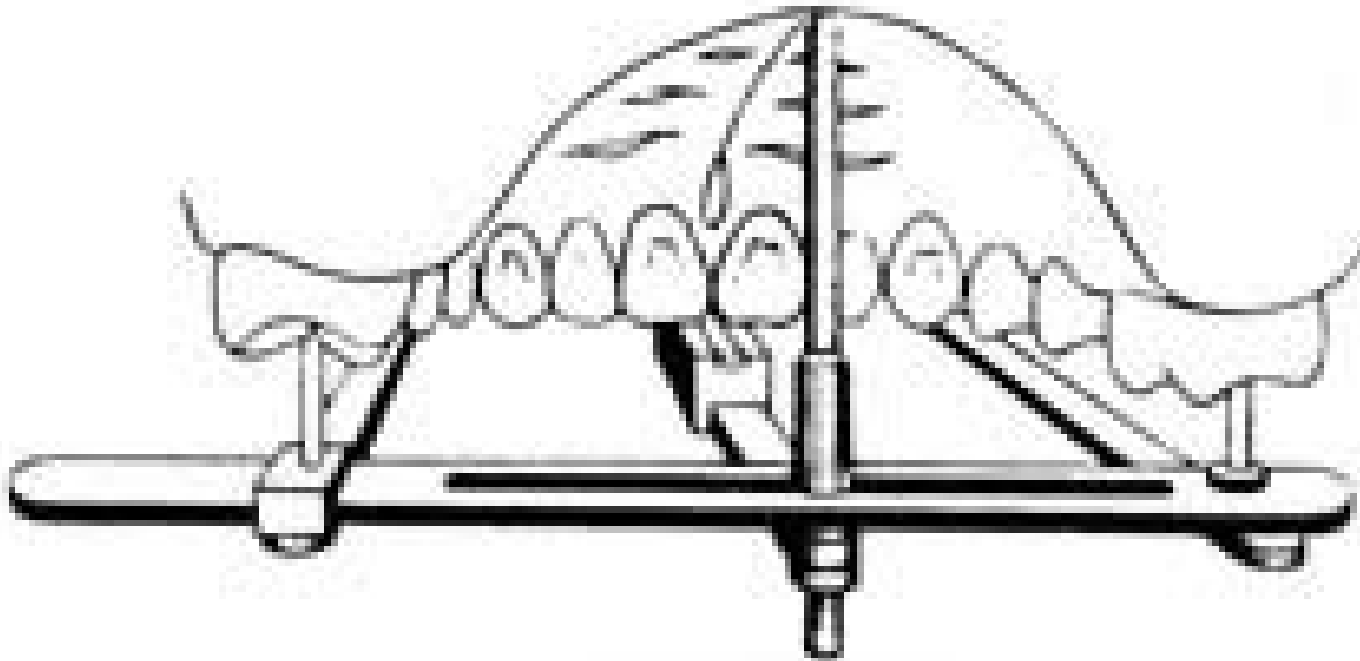
“Model has clinical utility and predictive values for patients with suspected obstructive sleep apnea”

See next slide.

Summarizing formula

Anyone with a high palate, narrow dental arches, overjet, large neck and/or large body mass, is at risk for sleep apnea. If the individual does not have a large neck size or body mass, the predictive value of the formula is based on the height of the palate, arch wide and overjet.

Caliper to measure arch width and palatal height.



Caliper described in: Sten Linder-Aronson, Arne Backstrom. A comparison between mouth and nose breathers with respect to occlusion and facial dimensions. *Odontol Revy* 1960, 11(4):343-376.

See full presentation and articles
on sleep apnea elsewhere on this
website.

End of section C

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December 2004.