

Sensitive equine mouth

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Bitting study

- Questionnaire: 655 respondents
- Clinical study: 30 horses
 - University of Helsinki, Equine hospital
 - Supervisors: BVSc, Dipl. AVDC Robert Menzies and Prof. Riitta-Mari Tulamo
- Study subject
 - Anatomical proportions of the horse mouth and meaning for bit fitting
 - Prevalence and location of oral ulcers
 - Prevalence of biting problems in bitted and bitless horses
- Aim of the study
 - To get evidence based guidelines for bit and bridle fitting
 - To get information about horse oral welfare
 - To teach people to recognize biting problems



Contents

- Anatomy of horse oral cavity
- Bit effects on oral physiology
- Oral examination
- Dental pathologies
- Biting problems
- Bit fitting



Why is the mouth health important?

- Free of pain and discomfort
- Normal eating and breathing
- Best possible performance
- Good communication
- Safety



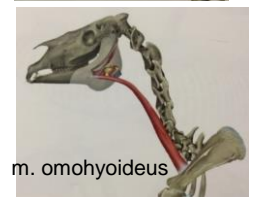
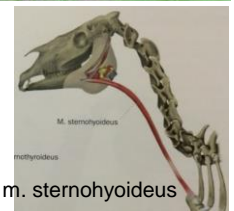
Anatomy and physiology of the horse mouth

- Horse breaths only through the nostrils and nasal cavity, mouth closed
- Tongue occupies almost the entire oral cavity
- Tongue is used to separate eatable and non-eatable objects
- Very sensitive
- Interdental space between incisors and cheek teeth
- 2-3 mm soft tissue covering the lower jaw
- Anatomical proportions change as the horse gets older



Bit effects on mouth physiology

- Bit has no anatomical space
 - takes space from the tongue
- Bit is movable
- Bit is a non-eatable object
- Bit activates gastrointestinal system
 - Secretion of saliva and swallowing
- Bit causes pressure to oral structures
 - Masticatory muscles keep mouth closed
 - Tongue moves
 - Jaw joint moves



Bit and communication

- Bit used to communicate with the horse
- Takes use of the very sensitive touch and sense of pain of horse mouth
- Horse has to be taught to pressure-yield
- Regulating horse
 - speed
 - direction of movement
 - head position
 - collection
- Order of importance of communication ways
 - riding: 1. seat and legs, 2. bit, 3. voice, 4. whip
 - driving: 1. bit and reins, 2. whip, 3. voice
 - hand walking: 1. body language, 2. halter/bit, 3. whip



Bit pressure on the mouth

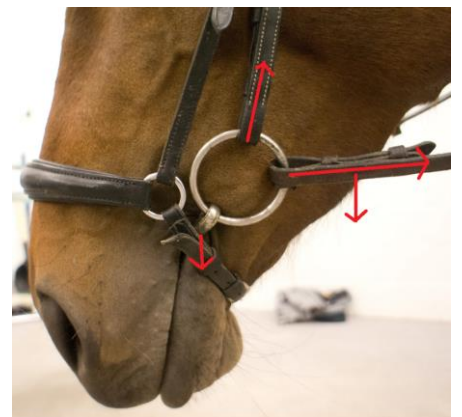
$$p = F / A$$

p = pressure

F = force vector sum (rein tension)

A = area (bit and mouth contact area)

- Basic pressure on the mouth:
 - Bit weight
 - Rein weight
 - Cheek strap tightness
- The bigger the basic pressure, the bigger rein tension is needed for the horse to react!
- Small basic pressure = horse can sense a small change in pressure (small rein tension) => soft on hand



Rein tension

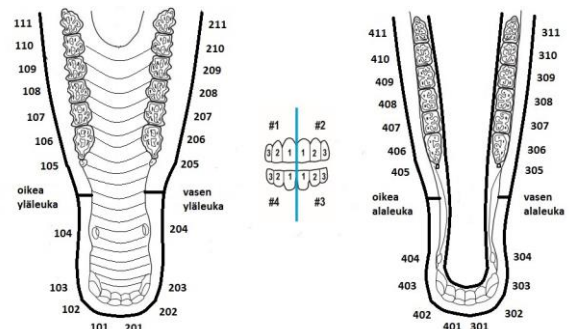
- Use as small rein tension as possible
- Rein tension increases when
 - Rider shorten reins
 - Horse is heavy on hand
- Rein tension is not constant, it varies with horse and riders motion
- Rein tension when riding
 - mean 12-35 N = 1,2 kg - 3,5 kg
 - range 2-104 N = 0,2 kg - 10 kg

Centaur Rein Tension Device



Oral examination

- Interval
 - Foals 6 months
 - Adults 6-12 months
 - dental diseases 1-6 months
- Anamnesis
- Physical examination, sedation, mouth gag, head stand, mouth flush, light and mirror
- Oral examination (visual and palpational)
- Dental chart
- Treatment
- Bit and bridle fitting

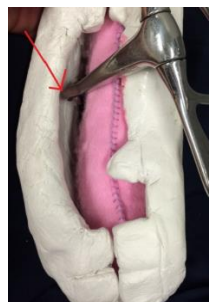
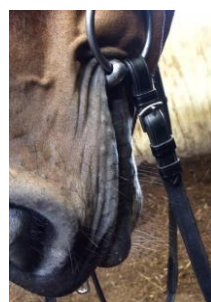
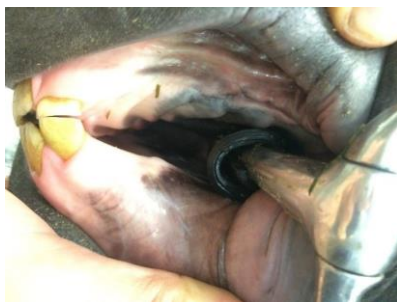


Bittings problem: behavioural symptoms

- Mouth open
- Tongue on top/behind the bit
- Tongue outside the mouth
- Taking bit between cheek teeth
- Under/over the bit
- Heavy on hand
- Excess salivation
- Blood coming form mouth
- headshaking



Biting problems: Unfitting bit or bridle



- Too short/long bit
- Too thick/thin bit
- Too hard (leverage) bit
- Bit with rough/sharp surface/dirty/rusty/icecold
- Anatomically unfitting/pressure to more sensitive part of the mouth
- Too tight cheek strap

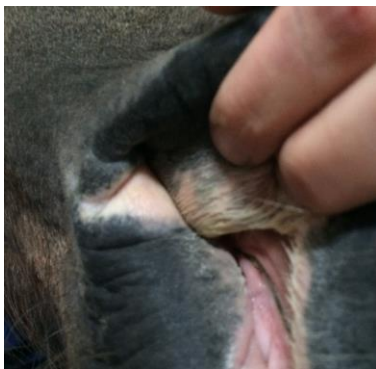


Bitting problems: bit misuse

- incorrect pressure-release timing
- Too much rein tension – too much pressure
 - Constant or instant pressure
- Bit used to keep riders balance
- Bit used to punish the horse



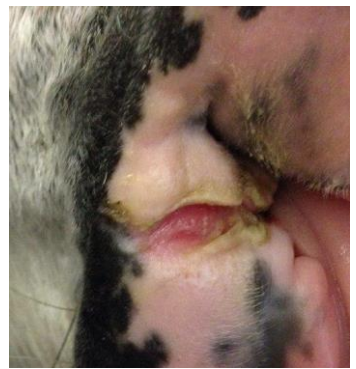
Bitting problems: Lip commissures



depigmentation

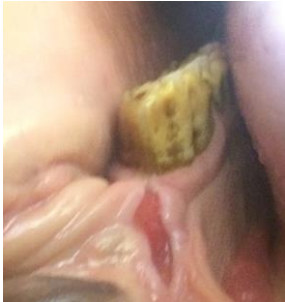


thickening, scar



ulceration

Biting problems: bars of the lower jaw



Mucosal ulceration



Necrotic hole



Periosteal reaction/ bone spurs

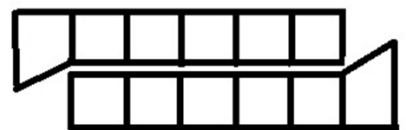
Buccal mucosa next to lip commissures



Mucosal wound next to 06-cheek tooth



06 hook



Overjet or underjet

Tongue



Bruise/wound on both sides of the tongue



Wound on both sides at the tip of the tongue

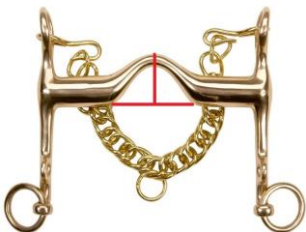


Pressure wound on the body of the tongue, decreased blood circulation

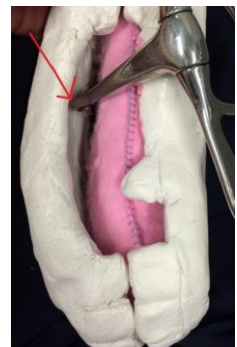
Hard palate



Bruising/wound



When head flexed "on the bit"



Premolar erosion/bit wear



Bit having rough surface



normal



**bit wear of 06-
cheek tooth**

Improving mouth welfare

- Evidence based guidelines for bit fitting
- Regular oral examination
- Competition rules
 - permitted and forbidden bits and tack
- Judge/veterinarian controls:
 - Horse welfare
 - Horse treatment and riding
 - permitted ja forbidden tack
 - Tack condition and fitting
 - Biting problems and lameness
- Mouth and bit check
 - Rule out from the competition if too high "wound score"
- Noseband tightness
 - with ISES taper gauge
- Thermographic camera?
 - To measure horse stress



Communication method ranking (riding)

1. Riders seat, legs and neck strap
2. **Different types of bits used every few days, days without noseband, bitless days/bitless bridle**
3. Bitless bridle/Bit with no or loose noseband
4. Bit with tight noseband
5. Double bit/double noseband/other tack affecting bit use.....



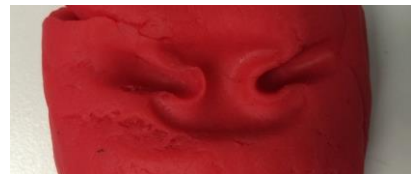
Bitless bridle

- Not permitted in all competitions
- Communication also based on pressure
- Pressure to less easily damaging tissues of the head
- Horse stops as easily with bitless bridle as with the bit?
- Does the horse get tolerant to the pressure more easily?
- Noseband on the bony nose and not too tight
- Noseband causes pressure to buccal mucosa when turning
- Bitless bridle doesn't cause excess salivation or swallowing



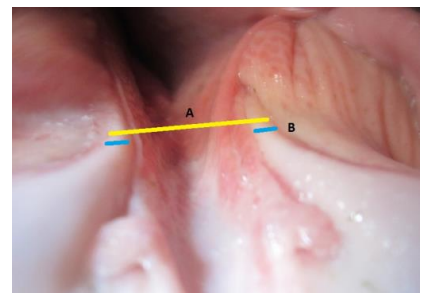
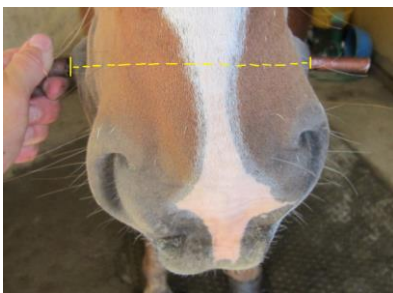
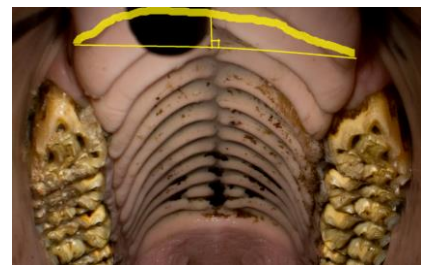
Perfect bit

- Allowed in competitions
- Easy to use right/difficult to misuse
- Bit size fitting for the horse mouth proportions
- Even pressure on soft tissues (tongue and lips)
 - Soft tissues can tolerate more pressure, have good sense and heal fast if damaged
 - No pressure points to bony structures
 - No pinching of soft tissue
 - The smaller the contact area between bit and mouth, the harder the bit is
- Soft, durable, smooth and light material
- Movable
- Safe
 - good communication: horse stops and turns when asked



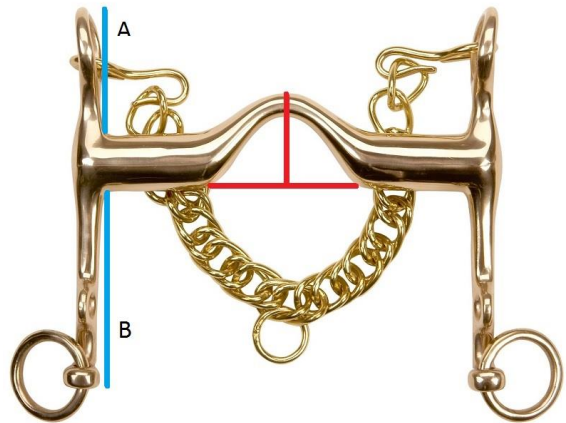
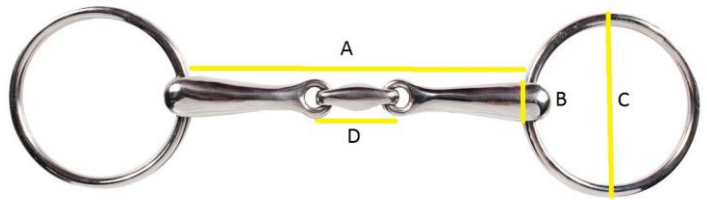
Mouth proportions

- Mouth width
- Distance between upper and lower jaw
- Bar width
- Bar thickness
- Palatinum height

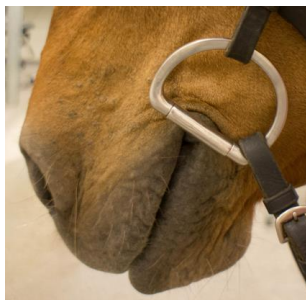


Bit size

- Mouthpiece length
- Mouthpiece thickness
- Double joint middle piece length
- Bit ring size
- Lower and upper curb height
- Port height



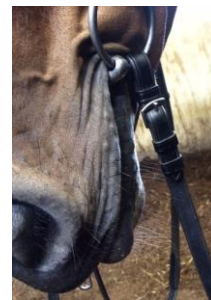
Bit length and mouth width



Good



Too long

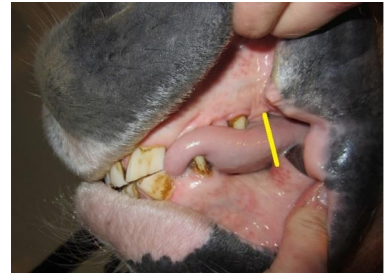


Too short

- Good fit = length equal to mouth width or max. 0,5 cm longer on each side
- Too long bit moves too much sideways, irritates lip commissures, if single jointed snaffle, joint too low
- Too short bit presses lip commissures and buccal mucosa against the cheek teeth

Bit thickness and distance between upper and lower jaw

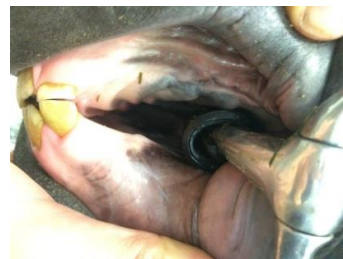
- Bit and tongue should fit between the upper and lower jaw
- UP-LOW distance varies between 15-50 mm
 - Asymmetry -> measure both sides
- Min 10-15 mm tongue space
- Tongue thickness varies, difficult to measure
- Bits are usually narrower in the middle, but the thicker part of the bit moves between UP-LOW when horse is turned
- Competition rules state the minimum bit width



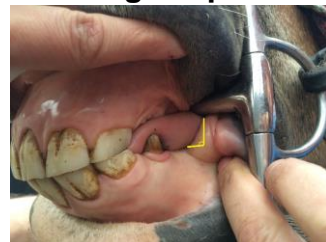
Bit thickness and tongue space

Too thick bit

- Too little space for the tongue
- Tongue blood circulation weak
- Horse cannot swallow saliva
- Biting problem behavior:
 - mouth open
 - Tongue outside the mouth/ over the bit/behind the bit
 - Tongue moves
 - Takes the bit between cheek teeth



Tongue space 0 mm



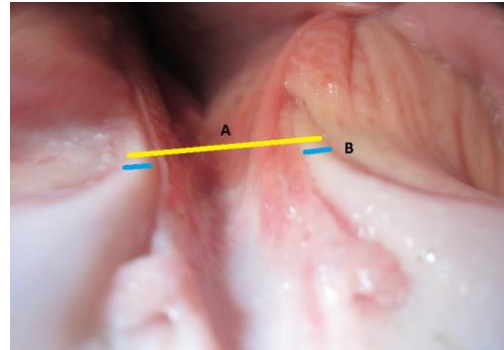
Tongue space 15 mm

Good bit thickness

- Min 10-15 mm tongue space
- Mouth quiet

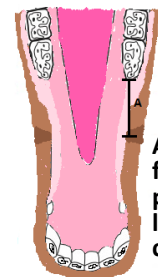
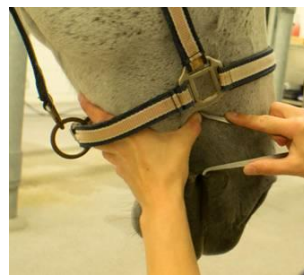
Lower jaw bar width and thickness

- Only 2-3 mm of soft tissue on top of the bone
- Tongue as a cushion
- Bar thickness varies
 - warmblooded = thin bars
 - cold blooded = thick bars
- If horse has thin and sharp bars, contact area between the bit and mouth is smaller -> horse is more sensitive to the bit
- Bar width 2-4 cm
- Double jointed bit can cause pressure points to bars
- middle piece length \neq bar width

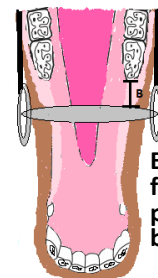


Bridle cheek strap length

- Cheek strap used to adjust bit location
- Bit should fit between
 - Cheek teeth
 - Canine teeth and lip commissures
- Bit pull lips towards cheek teeth = A-B
- varied in the study 2-7 cm
- Each horse had 2 lip folds
- Horse whose lip commissures are pulled 7 cm backwards have much more pressure than 2 cm



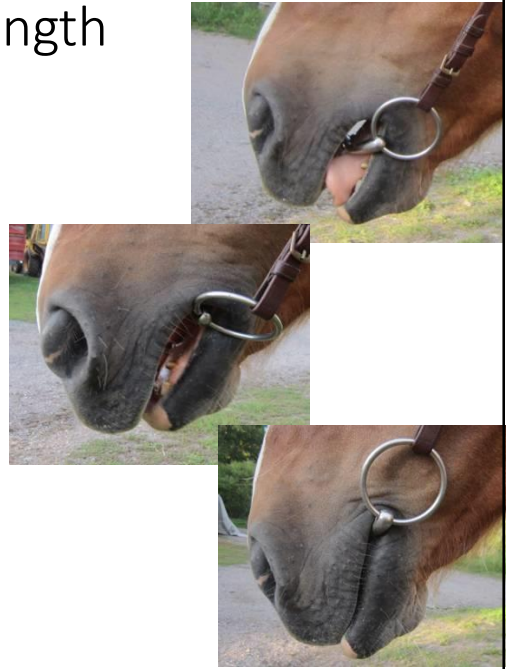
A) Distance from second premolar to lip commissure



B) Distance from second premolar to bit

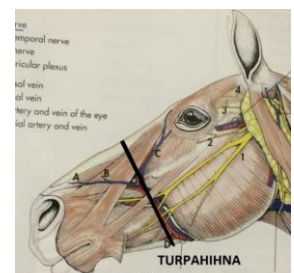
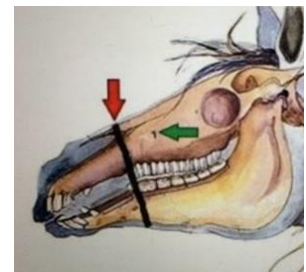
Adjusting cheek strap length

- Put cheek strap 2-3 holes looser
- let the horse pick up the bit with its tongue
- Good fit
 - mouth quiet
 - Bit doesn't hit cheek teeth or canine teeth
- Too tight:
 - bit hits cheek teeth
 - Mouth open, take bit between cheek teeth, tongue behind the bit
- Too loose:
 - Horse lifts the bit with its tongue



Noseband

- Horse can be ridden without noseband
- Aesthetic reason should not be the only reason to use noseband
- Benefits of riding without noseband
 - True educational level and acceptance of the bit
 - Horse has possibility to show discomfort caused by excess bit pressure
- Too tight noseband is and welfare issue
 - Presses oral mucosa against cheek teeth causing ulceration
 - Impairs blood circulation
 - Restricts jaw and tongue movement
 - Increases stress
 - Sensitizes to bit



Thank you!