

# VISCERAL PAIN IN HORSES

Defined as pain originating in any internal organ and is often subdivided to include the organs contained within each major body cavity, which are the

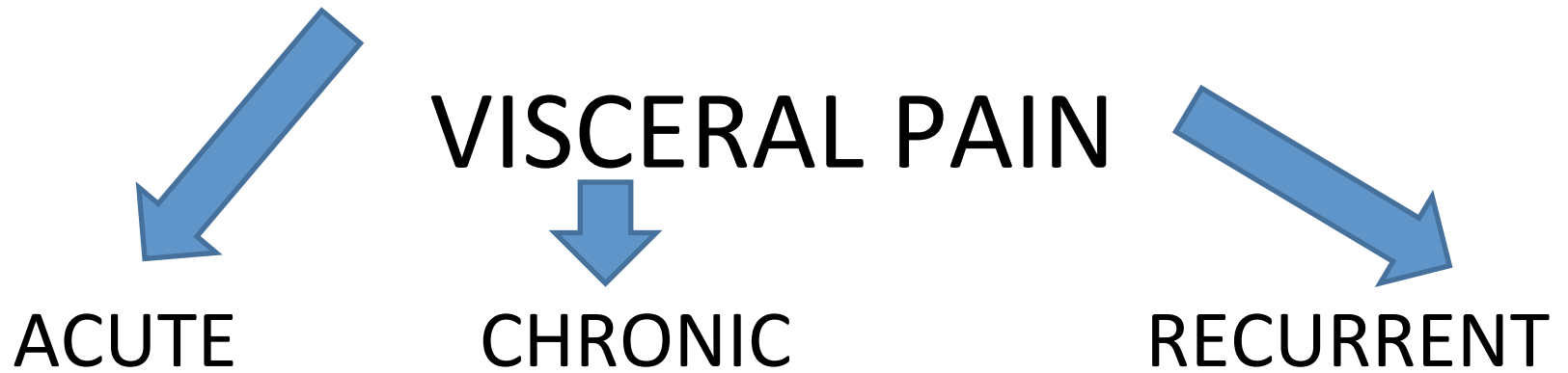
THORAX

ABDOMEN

PELVIS

# ORIGIN AND EXAMPLE OF VISCERAL PAIN IN HORSES

Origin	Example: Acute	Example: Chronic
<b>Thorax</b> <ul style="list-style-type: none"> <li>• Lung</li> <li>• Pleura</li> <li>• Esophagus</li> <li>• Heart</li> </ul>	<ul style="list-style-type: none"> <li>• Pleuropneumonia</li> <li>• Choke</li> <li>• Trauma</li> <li>• Pericarditis</li> </ul>	<ul style="list-style-type: none"> <li>• Pleural abscessation</li> <li>• Neoplasia</li> <li>• Pericarditis</li> </ul>
<b>Abdomen</b> <ul style="list-style-type: none"> <li>• Stomach</li> <li>• Small intestine</li> <li>• Large intestine</li> <li>  Cecum</li> <li>  Large colon</li> <li>  Small colon</li> <li>• Spleen</li> <li>• Liver</li> <li>• Pancreas</li> <li>• Kidneys</li> <li>• Ureters</li> <li>• Ovaries</li> <li>• Uterus</li> </ul>	<ul style="list-style-type: none"> <li>• Most causes of acute colic</li> <li>• Pancreatitis</li> <li>• Nephrolithiasis</li> <li>• Uterine artery hematoma, rupture</li> <li>• Metritis</li> <li>• Cholelithiasis</li> <li>• Uterine torsion</li> </ul>	<ul style="list-style-type: none"> <li>• Inflammatory bowel diseases</li> <li>• Enterolithiasis</li> <li>• Chronic diarrhea</li> <li>• Nephrolithiasis</li> <li>• Neoplasia</li> <li>• Cholelithiasis</li> </ul>
<b>Pelvis</b> <ul style="list-style-type: none"> <li>• Bladder</li> <li>• Testicles</li> <li>• Rectum</li> <li>• Anus</li> <li>• Vagina</li> </ul>	<ul style="list-style-type: none"> <li>• Cystitis</li> <li>• Urolithiasis</li> <li>• Testicular torsion</li> <li>• Rectal tear</li> <li>• Foaling trauma</li> <li>• Necrotic vaginitis</li> </ul>	<ul style="list-style-type: none"> <li>• Cystitis</li> <li>• Urolithiasis</li> <li>• Neoplasia</li> </ul>



some individuals may experience a combination of these manifestations

# THE CAUSE OF VISCERAL PAIN

- ORGANIC (identifiable structural change in an organ)
- DYSFUNCTIONAL (an abnormal change in organ function without identifiable pathologic changes)

# THE CAUSE OF VISCERAL PAIN

- ISCHEMIA, INFLAMMATION, MUSCLE CONTRACTION (SPASM) OR DISTENSION may be the primary underlying cause of pain, and identifying which of these is responsible for the patient's discomfort is important for directing therapy

- VISCERAL PAIN IS COMMON IN HORSE

- CHALLENGE TO MAKE A DEFINITIVE DIAGNOSIS !!

Origin	Example: Acute	Example: Chronic
<b>Thorax</b> • Lung • Pleura • Esophagus • Heart	• Pleuropneumonia • Choke • Trauma • Pericarditis	• Pleural abscessation • Neoplasia • Pericarditis
<b>Abdomen</b> • Stomach • Small intestine • Large intestine • Cecum • Large colon • Small colon • Spleen • Liver • Pancreas • Kidneys • Ureters • Ovaries • Uterus	• Most causes of acute colic • Pancreatitis • Nephrolithiasis • Uterine artery hematoma, rupture • Metritis • Cholelithiasis • Uterine torsion	• Inflammatory bowel disease • Enterolithiasis • Chronic diarrhea • Nephrolithiasis • Neoplasia • Cholelithiasis
<b>Pelvis</b> • Bladder • Testicles • Rectum • Anus • Vagina	• Cystitis • Urolithiasis • Testicular torsion • Rectal tear • Foaling trauma • Necrotic vaginitis	• Cystitis • Urolithiasis • Neoplasia

NUMBER OF INTESTINAL ORGANS

# THE TERM “COLIC”

- should be clearly defined because it is often misused
- “Colic” is not a diagnosis !!!



- **IT IS A CLINICAL SIGN RESULTING FROM VISCERAL PAIN WITHIN THE ABDOMEN** (the most common sources are the small and large intestine)
- hence the term “COLIC” most typically refers to **GASTROINTESTINAL PAIN**

# INCIDENCE AND IMPACT OF VISCERAL PAIN

- Gastrointestinal and Musculoskeletal diseases are two of the most clinically and economically important medical problems facing horses and their owners
- Equine study conducted by the United States Department of Agriculture (USDA) in 2005, “colic” affected 2.4% of horses
- The economic impact of this was estimated to be \$115 million per year

# VISCERAL PAIN ASSESSMENT

REMEMBER: the assessment of pain in animals is always based on observations and interpretation of what is seen

- When addressing an animal's status, one must be aware of inherent DIFFERENCES based on
  - Species
  - Age
  - Sex
  - Genetics
  - Environment
  - Source and duration of the pain



# RESEARCH MODELS OF PAIN IN ANIMALS (Gebhart & Ness, 1991)

## NECESSARY CRITERIA

- the subject must be conscious
  - the experimental stimulus mimics a natural stimulus
  - the stimulus is minimally invasive and ethically acceptable
  - the stimulus is controllable, reproducible, and quantifiable, and the responses are reliable and quantifiable
- 
- MOST MODELS OF VISCERAL PAIN IN HORSES AND OTHER SPECIES INVOLVE ACUTE DISTENSION OF A PORTION OF THE GASTROINTESTINAL TRACT (cecal, duodenal and colorectal distension)

# PAIN ASSESSMENT TOOLS

To claim that one has treated pain effectively implies that one can recognize it and measure or quantify it.

## OBJECTIVE MEASURES

- VITAL SIGNS (such as Heart Rate)
- PLASMA CORTISOL CONCENTRATION

(circumvent the subjective nature of assessment)

...HOWEVER Vital Signs...

# PAIN ASSESSMENT TOOLS

...that might be predicted to be useful are affected not only by pain but a variety of other factors including:

HYDRATION STATUS

PERFUSION

SEPSIS AND/OR ENDOTOXEMIA

FEAR

ANXIETY

SEDATIVE OR ANALGESIC DRUGS

## *PAIN-SCORING SYSTEM*

- A VARIETY OF TECHNIQUES EXSIST
- Numerical rating scales
- Visual analogue scales
- Simple descriptive scales
- Composite multifactorial scales

....just to know...

# Behavioural assessment of pain in horses and donkeys: application to clinical practice and future studies

F. H. ASHLEY\*, A. E. WATERMAN-PEARSON and H. R. WHAY

## NONSPECIFIC BEHAVIOURAL INDICATORS OF PAIN IN EQUIDS

Behaviour	Source	Application
Considerable restlessness, agitation and anxiety	Taylor and Matthews (1998) <sup>c</sup> Sanford <i>et al.</i> (1989) <sup>d</sup> Fleming (2002) <sup>a</sup> Price <i>et al.</i> (2003) <sup>b</sup>	Most commonly cited characteristic feature of severe or acute pain. Simple and easy to observe, especially in the confined horse, although high individual variation. Has been quantified via activity budgets to assess pain associated with arthroscopy. Cannot be relied upon for the donkey.
Rigid stance and reluctance to move	Sanford <i>et al.</i> (1989) <sup>d</sup> Taylor and Matthews (1998) <sup>c</sup> Taylor <i>et al.</i> (2002) <sup>a</sup>	Commonly described general indicator of pain for a range of disorders. Horse may appear anxious and face away. Does not specify pain source or intensity. Likely to be a protective behaviour. Often misdiagnosed in the donkey.
Lowered head carriage	Whitehead <i>et al.</i> (1991) <sup>c</sup> Taylor <i>et al.</i> (2002) <sup>a</sup> Price <i>et al.</i> (2003) <sup>b</sup>	Associated with depression due to chronic, severe and often unrelenting pain. Significant increase seen in post arthroscopy studies, although nature of surgery may affect results. Difficult to differentiate in the donkey.
Fixed stare and dilated nostrils, clenched jaw	Taylor <i>et al.</i> (2002) <sup>a</sup> Casey (2004) <sup>a</sup>	General facial expression of pain and fear, although lacks information on pain source or intensity. Seen in cases of chronic pain. Not described for the donkey.
Aggression towards own foal	Haupt and Feldman (1993) <sup>c</sup> Juarbe-Diaz <i>et al.</i> (1998) <sup>c</sup>	Pain during parturition associated with foal, resulting in directed aggression. Infrequently reported, with numerous contributory factors engaged in final response. Unreported in the donkey.
Aggression towards handlers, horses, objects and self	Short (1998) <sup>a</sup> Sanford <i>et al.</i> (1989) <sup>d</sup> DuPreez (2002) <sup>c</sup>	Strong evidence that this behaviour emerges with pain. Reluctance to be handled or palpated resulting in aggressive pain response. Conditioned fear response may inflame the behaviour. More subtle display in the donkey.

PHOTO / VIDEO

# BEHAVIOURAL INDICATORS OF ABDOMINAL PAIN IN EQUIDS

Behaviour	Source	Application
Vocalisation (deep groaning)	Hubbell (1999) <sup>c</sup> Casey (2004) <sup>a</sup>	Commonly seen in practice and highly indicative of visceral pain, often expressed while rolling or recumbent. Difficult to quantify or relate to severity. Has been used in assessment of post operative recovery. Not reported in the donkey.
Rolling	Sanford <i>et al.</i> (1989) <sup>d</sup> Bernard (2002) <sup>c</sup> Crane (2002) <sup>c</sup> Duffield <i>et al.</i> (2002) <sup>c</sup> Thoefner <i>et al.</i> (2003) <sup>b</sup>	Most commonly cited indicator. Violent and graphic expression of abdominal pain with self-infliction of bruising and tissue damage possible. Intensity has been related to lesion severity. Foal's response may be to roll onto their back. Cannot be relied upon in the donkey as rarely reported.
Kicking at abdomen	Jochle (1989) <sup>b</sup> Jochle <i>et al.</i> (1989) <sup>b</sup> Pritchett <i>et al.</i> (2003) <sup>b</sup>	Commonly observed as a dramatic and quantifiable behaviour in response to pain source. Significant demonstration reported prior to colic surgery. Usually part of a behavioural repertoire. Frequency and intensity used in pain scale scoring. Not reported in the donkey.
Flank watching	Muir and Robertson (1985) <sup>b</sup> Bernard (2002) <sup>c</sup> Pritchett <i>et al.</i> (2003) <sup>b</sup>	Frequently seen in clinical presentation and commonly described in the literature. Varies from slight head turning to intense staring or actual contact. Foals may turn to glance at sides. Used in pain scale scoring. Not reported in the donkey.
Stretching	Jochle (1989) <sup>b</sup> Bernard (2002) <sup>c</sup> Green and Tong (2002) <sup>c</sup>	Regularly associated with colic. An obvious stance with limbs often placed base-wide. A general sign of abdominal pain usually accompanied by straining to defaecate or urinate. Has been used successfully with other behaviours to evaluate analgesia.
Dullness and depression	Whitehead <i>et al.</i> (1991) <sup>c</sup> Matthews <i>et al.</i> (1997) <sup>c</sup> Duffield <i>et al.</i> (2002) <sup>c</sup>	Varied agreement over its indication of abdominal pain in the horse. Commonly reported as the only observable behaviour in the donkey. Lethargy and reduced alertness is often accompanied by self-isolation or facing away from handlers. Lowered head carriage usually observed.

# PHOTOS / VIDEO

Continuous rolling has been linked strongly with the most severe intestinal lesions, particularly obstructions and strangulations (Jochle, 1989)

Very few behavioural indicators of abdominal pain in the donkey have been reported (stoical nature/ rarely rolls or sweats ) only terminal stages of disease!



Dullness and depressed appetite are the most frequently observed signs of abdominal pain in donkeys



# BEHAVIOURAL INDICATORS OF LIMB AND FOOT PAIN IN EQUIDS

Behaviour	Source	Application
Weight-shifting between limbs	Owens <i>et al.</i> (1995) <sup>b</sup> Taylor <i>et al.</i> (2002a) <sup>a</sup> Dyson and Murray (2003) <sup>b</sup> Rietmann <i>et al.</i> (2004a) <sup>b</sup>	Most commonly cited, clear and reliable indicator of limb/foot pain. Horse loads limbs alternately by shifting weight from one to another, with a reluctance to stand on one limb. Feet may not actually leave the ground. Easily quantifiable and used in grading to help assess pain severity. Significant reduction seen post analgesia.
Limb guarding	Dyson (2002) <sup>a</sup> Goodrich <i>et al.</i> (2002) <sup>b</sup> Wolf (2002) <sup>a</sup>	Seen by competent observers, but difficult to quantify or correlate with pain severity. The whole limb may be a source of pain and even minor damage can cause pain and subsequent limb guarding. Horse attempts to stabilise limb to modify pain. Willingness to move limb could be assessed.
Abnormal weight distribution	Herthel and Hood (1999) <sup>a</sup> Hood <i>et al.</i> (2001) <sup>b</sup> Peham <i>et al.</i> (1999) <sup>b</sup> Swanson (1999) <sup>a</sup>	Very commonly described as an attempt to reduce pain on affected limbs. Preferred limb loading results in various postural alterations that can be quantified. Postures depend on pain type, severity and pathology of damage with high individual variation, e.g. classic stance associated with laminitis. Vertical head motion changes can also be detected and graded. Not commonly seen in the donkey.
Pointing, hanging and rotating limbs	Sanford <i>et al.</i> (1989) <sup>d</sup> Wright (1993) <sup>c</sup> Taylor <i>et al.</i> (2002a) <sup>a</sup> Dyson and Marks (2003) <sup>c</sup>	Very commonly described indicator. Pointing or actually lifting the limb to nonweightbearing level modifies preferred limb loading further. Often associated with severe unrelenting pain. Rotated limbs often indicate pain in pelvis/shoulder. High individual variation. Not reported in the donkey.
Abnormal movement	Hunt (2002) <sup>a</sup> Dabareiner and Carter (2003) <sup>a</sup> Dyson and Murray (2003) <sup>b</sup> Price <i>et al.</i> (2003a) <sup>b</sup>	Commonly described, but difficult to link with pain severity. Very few gait assessment techniques include a lack of mobility. Jerky/ataxic movements seen in confined horses. Often accompanied by numerous unsuccessful attempts to lie down. Nature of surgery may affect ability to move normally.
Reluctance to move	Sanford <i>et al.</i> (1989) <sup>d</sup> Trawford and Crane (1995) <sup>c</sup> DuPreez (2002) <sup>c</sup> Price <i>et al.</i> (2003a) <sup>b</sup>	Frequently cited as a protective behaviour indicative of major skeletal damage and severe limb pain for many disorders. Significantly less time moving seen in post arthroscopy studies. Weakly associated with limb pain in the donkey, although repeated episodes of lying down are reportedly more indicative.

# PHOTO / VIDEO

The locomotor system is a principal source of pain in horses (Dyson & Marks 2003)

# BEHAVIOURAL INDICATORS OF HEAD AND DENTAL PAIN IN EQUIDS

Behaviour	Source	Application
Headshaking	Mair and Lane (1990) <sup>b</sup> Easley (1999) <sup>b</sup> Taylor <i>et al.</i> (2002a) <sup>a</sup> Wolf (2002) <sup>a</sup>	Generally suggestive of head pain including temporomandibular pain, or horizontal headshaking can be indicative of ear pain. Therefore it cannot be solely relied upon to indicate source due to numerous aetiologies. Palpation of painful area (head or dental) can cause an obvious head toss. Headshaking can become an established behaviour and vary with season/climate despite analgesia. Very high individual variation.
Abnormal bit behaviour	Lane (1994) <sup>a</sup> Easley (1999) <sup>b</sup> Knottenbelt (1999) <sup>b</sup> Taylor <i>et al.</i> (2002a) <sup>a</sup>	Most commonly cited indicator from anecdotal sources. Dental pain can be exacerbated while bitted, subsequently reducing contact and causing aversive behaviour. Reduction in performance or tilted head carriage recognised by the rider may be the first indicator of pain due to mucosal damage from disorders.
Altered eating; anorexia, quidding, food pocketing	Lane (1994) <sup>a</sup> Easley (1999) <sup>b</sup> Duffield <i>et al.</i> (2002) <sup>b</sup> Graham (2002) <sup>a</sup>	Commonly cited as a clear indicator of dental pain and easily recognisable. Alterations to eating behaviour commonly include slowly chewing on a preferred side accompanied by food pocketing. Quidding partially chewed portions of feed indicates obvious mastication discomfort and can lead to choke in older equids, particularly donkeys. Severe dental disease can physically prevent normal chewing and the pain experienced is sufficient to cause anorexia resulting in considerable weight loss.

# PHOTO / VIDEO

lack of reports in the donkey.!

# CASTRATION PAIN

The Association of Veterinary Anaesthetists strongly advocates use of analgesic to prevent or control pain in animals and state that because any surgical procedure results in some post operative pain, the administration of nonsteroidal anti-inflammatory drugs (NSAIDs) prior to surgery is likely to be of considerable benefit to a horse's wellbeing.

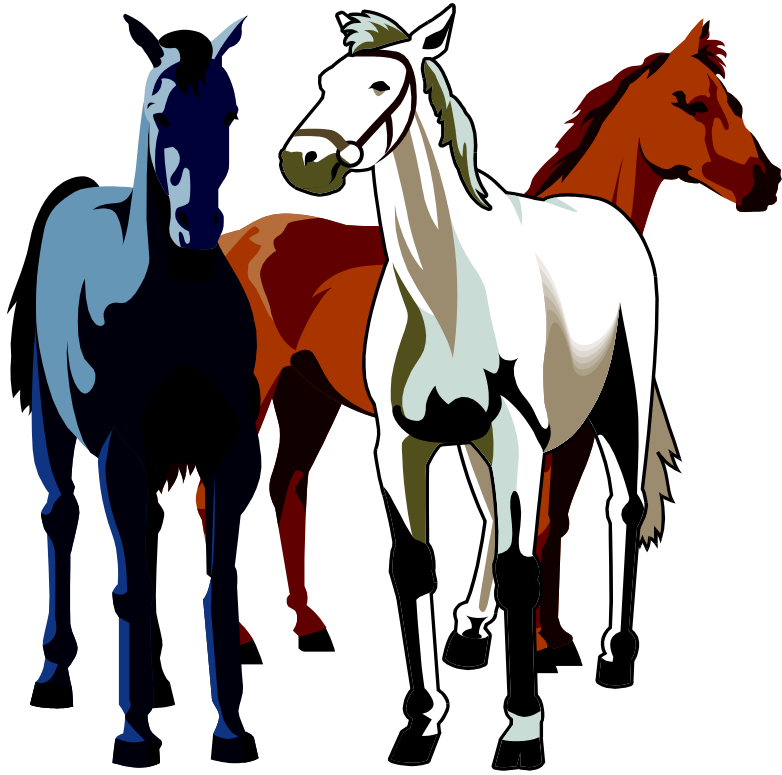
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# TAKE HOME MESSAGE and conclusions

Accurate and localised detection of pain in any animal is notoriously difficult

Prey species such as the Horse and the Donkey have evolved to minimize or mask signs of pain to reduce predator's advantage

Lack of information is available on donkeys and their hybrids (usually reluctance to move has been identified as pain indicator in limb, abdominal and respiratory problems)



NEXT TIME  
EQUINE COLIC  
SYNDROME