Pain in horses

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WHAT IS PAIN?

“An unpleasant sensory and emotional experience that is associated with actual or potential tissue damage”

“A subjective, complex experience, only a part of which is sensory in its nature”

Pain is often described as acute or chronic.
Pain in the wild animal

Causes of pain:
* Trauma eg animal bite / accident
* Infection eg dental abscess
* Disease eg diarrhoea from parasites
  hepatitis from viral infection

Pain evolved as a mechanism to protect the wild animal in the short term. Wild animals with prolonged pain tend to die – lack of food, infection, become prey etc.
What is a nociceptor?

“A type of sensory receptor found in tissue that respond only to stimuli that damage, or have the potential to damage tissue”

Eg. Mechanical, thermal, chemical stimuli.
Types of pain in horses and ponies

*Wounds (inc surgery and dental)
*Trauma  
  eg bruise, fracture, strain
*Stings / bites
*Infection (abscess, cellulitis)
*Inflammation (laminitis / arthritis)
*Gut pain  
  eg impactions, diarrhoea  
    stomach ulceration,
*Hepatitis (liver pain)
*Cystitis
*Headache (sinus)
*Allergic skin reaction
What is chronic pain?

Acute: severe but of short duration

Chronic: persisting for a long time or constantly recurring

Is that the only difference?!
Peripheral activity
- Vasodilation
- Edema
- Hyperalgesia
- Release of chemicals

Peripheral transmission
- Dorsal horn

Brainstem

Anterolateral tract

Spinal cord

Release of substance P

Peripheral transmission

Peripheral activity
- Vasodilation
- Edema
- Hyperalgesia
- Release of chemicals

Primary sensory cortex
- Location of pain

Cortical association area
- Interpretation

Limbic forebrain
- Emotional reaction to pain

to other areas of brain

How does the pain make you feel?

Where does it hurt?

How does it feel?

Where does it hurt?

How does it feel?
Brain chemistry

The role of neurotransmitters on pain perception

What is a neurotransmitter?
Brain chemistry

The role of neurotransmitters in pain

Excitatory neurotransmitters

*Glutamate
*Substance P
*Noradrenalin

Inhibitory neurotransmitters

*GABA
*Glycine
*Serotonin
*Peptides (enkephalin / dynorphin / adenosine)
Acute vs chronic? The right words?

**Adaptive pain** – helps to protect currently injured tissues and maintain overall homeostasis

**Maladaptive pain** – is doing little to help any existing injured tissue and is affecting the bodies overall homeostasis eg fitness. Hypersensitivity to pain is a common feature.
Acute vs chronic? The right words?

**Features of chronic / maladaptive pain**

‘Wind up’ ~ heightened sensitivity resulting in altered pain thresholds both peripherally and centrally

Allodynia – pain resulting from a stimulus that does not normally cause pain eg light skin touch

Hyperaesthesia – more pain felt than is normal for the stimulus
Equines are athletes
Activities rarely undertaken in the normal equine repertoire

*Carrying extra weight on their backs

*Jumping

*Frequent circling

*Prolonged flexion of the neck

*Prolonged weight distribution over the hind limbs

*Tugging at food source from an elevated position

*Standing still for prolonged periods
Recognising pain in horses

*Behaviour changes

*Body language

*Postural changes

*Physiological changes

*Vocalisations

X
Horse’s suffer in silence

The evolutionary strategy of a prey animal such as the horse, is to deliberately hide symptoms of pain or weakness.

This means recognising pain in the horse can be very difficult.
Horse’s hide their pain!

Horses will unconsciously adapt their posture and movement to limit the pain. Eg chewing food on the other side of the mouth from a dental abscess.

Horses will deliberately choose to avoid showing pain. Eg choose to offer trot, canter, play despite feeling much orthopaedic pain.
Recognising pain in horses

*Postural changes

*Head tilt (dental / sinus / ear)

*Hunched abdomen (severe colic / grass sickness / peritonitis / muscle pain)

*Stiff body (muscle pain / foot pain / chest pain eg pleuropneumonia)

*Rocking weight back over hind limbs (laminitis / muscle pain / chest pain)

*Unusual eating positions

*Increased yawning / flehmen

*Lameness
Lameness recognition

Recent study by Greve and Dyson (2014) found that 47% of 506 sports horses in normal work were lame.
Why is lameness poorly recognised?

* Often multi-sited eg bilateral

* Hind limb problems harder to see (equine weight distribution)

* Chronic problems with gradual deterioration are common

* Anthropomorphic attitudes
Recognising pain in equines

*Behaviour changes

*Increase or decrease sleeping

*Decrease in playing

*Decrease in voluntary exercise / certain movements

*Decrease in appetite (change in eating method – mouth pain)

*Decrease in social affiliations

*Increase in appeasement/displacement activity

*Irritability / aggression

*Withdrawal

*Abnormal behaviour development
Specific abnormal behaviours

Any normal behaviour  TOO MUCH / TOO LITTLE  TOO FREQUENT / TOO INFREQUENT  OUT OF PLACE (CONTEXT)

Or

Behaviours outside of the normal ethogram

*Compulsive Disorders (CDs)  such as stereotypies
Specific abnormal behaviours

Any normal behaviour  TOO MUCH / TOO LITTLE
TOO FREQUENT / TOO INFREQUENT
OUT OF PLACE (CONTEXT)

Or

Behaviours outside of the normal ethogram

*Compulsive Disorders (CDs) such as stereotypies

*Phobias (extreme fear responses) (hyperacusis, hyperaesthesia)

*Unresponsiveness (depression / tonic immobility)

*Sleep disorders eg narcolepsy, sleep deprivation
Abnormal behaviours may arise because the animal is painful....

Or abnormal behaviours may cause the development of pain.....
Recognising pain in horses

*Body language

*Fear

*Appeasement

*Displacements

Horses hide their pain!

Body language associated with pain is often subtle, and may not be demonstrated until pain, or fear of pain, is quite advanced.
Stiffly backwards ears

| Not present (0) | Moderately present (1) | Obviously present (2) |

The ears are held stiffly and turned backwards. As a result, the space between the ears may appear wider relative to baseline.

Orbital tightening

| Not present (0) | Moderately present (1) | Obviously present (2) |

The eyelid is partially or completely closed. Any eyelid closure that reduces the eye size by more than half should be coded as "obviously present" or "2".

Tension above the eye area

| Not present (0) | Moderately present (1) | Obviously present (2) |

The contraction of the muscles in the area above the eye causes the increased visibility of the underlying bone surfaces. If temporal crest bone is clearly visible should be coded as "obviously present" or "2".

Prominent strained chewing muscles

| Not present (0) | Moderately present (1) | Obviously present (2) |

Straining chewing muscles are clearly visible as an increase tension above the mouth. If chewing muscles are clearly prominent and recognizable the score should be coded as "obviously present" or "2".

Mouth strained and pronounced chin

| Not present (0) | Moderately present (1) | Obviously present (2) |

Strained mouth is clearly visible when upper lip is drawn back and lower lip causes a pronounced "chin".

Strained nostrils and flattening of the profile

| Not present (0) | Moderately present (1) | Obviously present (2) |

Nostrils look strained and slightly dilated, the profile of the nose flattens and lips elongate.
Pain = self defensiveness

Animals in pain frequently try to avoid physical contact in order to avoid experiencing the pain

*Withdrawing social interaction

*Don’t approach me body language (avoidance / aggression)

*Please don’t hurt me body language (appeasement)

Pain and fear of pain, lead to stress.

Stress chemicals increase the decision to use fight over flight.
Common pain displacements in equines

* Excessive licking

* Excessive chewing inedible objects

* Teeth grinding

* Frequent / excessive yawning (or tongue lolling)

* Excessive self rubbing (mane / tail / self groom)

* Frequent pawing at ground / objects
Anthropomorphmic attitudes in the horse

- Naughty
- Stubborn
- Taking
- Advantage
- Dominant
- 'Marish'
- Excited
- Lazy
What affects our individual perception of pain?

*Genetics
- Low expression of serotonin transporter alleles (reduced serotonin activity)

*Chronic stress
- hypercortisolaemia (increased removal of serotonin in synaptic cleft = less to bind with receptors)

*Excess steroids (medicines vs PPID)

*Reduction in sleep

*Early life stress (including in utero) – increased sensitivity of glucocorticoid receptors and nociceptors

* ‘Wind up’ (sensitisation from other pain / fear / harsh training / memories of previous pain)
Chicken or Egg?

PAIN CAUSES STRESS

CHRONIC STRESS WORSENS PAIN

Recognising pain, and treating with medication to reduce pain, is an important part of reducing chronic stress and preventing ‘wind up’
How does pain manifest as a behaviour problem?

Animals in pain are more likely to:

* Show stress related behaviour issues including increased reactivity, irritability, poor learning capacity

* Have ‘maladaptive pain’ symptoms such as poor touch acceptance, low tolerance of handling procedures (due to hyperaesthesia / allodynia / wind up)

* Develop abnormal behaviours such as compulsive disorders including stereotypies or self mutilation
WHAT CAN WE DO?

*Reduce chronic stress
(animals with chronic pain may benefit from assessment with a veterinary behaviourist)

Eg. Confinement may increase pain

- chronic stress in confined prey animals

- inability for free movement worsens certain orthopaedic conditions and abdominal disorders
WHAT CAN WE DO?

*Reduce chronic stress
(animals with chronic pain may benefit from assessment with a veterinary behaviourist)

*Meet inelastic needs
Eating and drinking

- **Grazers** – minimum 14 hours daily
- **Social eating**
- **Browsing** comprises up to 10% diet
- **Social drinking** – in open spaces
Body Care

- Elimination (urination / defaecation)
- Temperature regulation
- Coat care
Sleep

*Less than 2 hours in every 24 hours

*Polyphasic – taken in multiple periods

*Slow wave standing up

*REM sleep must be lying flat on side

SAFETY / SAFETY / SAFETY
The problems with sleep in the painful animal

*Getting down or getting back up is painful

*Lying down, still, is painful (horses are heavy on their supporting ribs/skeleton)

*Getting cold while still, increases musculoskeletal pain

*Constant ‘throbbbing’ or ‘burning’ pains eg dental, head, liver, joints prevents sleep

Sleep is one of the key behaviours involved in the balance of serotonin and GABA activity

Pain = poor sleep = increased pain perception
WHAT CAN WE DO?

*Reduce chronic stress
(animals with chronic pain may benefit from assessment with a veterinary behaviourist)

*Meet inelastic needs

*Appropriate exercise
EXERCISE MATTERS

Robert Sean Photography

INCREASED
- Adrenalin
- Cortisol
- Glutamate

DECREASED
- GABA
- Serotonin

Equine ethogram exercise:

- Constantly on the move in walk while grazing / foraging for approx. 18 hours daily
- Short bursts of social play involving trot and canter
Mimicking natural exercise in the domestic horse

* Increased space and foraging

* Ensuring turnout areas have adequate variety of grazing and forage to avoid ‘gate standing’

* Ensuring group turnout (following appropriate social introductions)

* Encouraging appropriate play patterns (good social introductions, mixed gender turnout, offering play in human interactions)

Obesity matters:

Increased weight (incl. rider)
Adipose tissue increases cytokines
Puzzle solving and serotonin boosts

- Easy to solve puzzles feel good = serotonin activity

- Hard to solve puzzles and ‘non consummation’ puzzles can lead to frustration
  - frustration increases cortisol and reduces serotonin
HELPING HORSES COPE WITH CHRONIC PAIN

* Reducing chronic stress
* Enhance serotonin (appropriate foraging, play, sleep, non frustrating puzzle solving)
* Avoiding / resolving obesity

* Pain relieving medications (NSAIDS, opioids)
* Relieving secondary muscle tension
Medications affecting pain

*Non steroidal anti-inflammatory drugs NSAIDs
  - phenylbutazone  -suxibuzone  -fibrocoxib

*Paracetamol

*Steroids – injected into region of pain eg joint, ligament

*Opioids (morphine, butorphanol, buprenorphine)

*Muscle relaxants (benzodiazepines, methocarbamol)

*Topical anti-inflammatories (topical NSAID with heparin)

*Local anaesthetics

*Neuropathic pain medications (gabapentin)

*Short term use until source of pain is fixed

*Long term use to assist in pain management

*Short term infusions to reduce ‘wind up’
Neurectomies

PROS  VS  CONS
Complementary therapies
Pain in horses

- Recognising and understanding pain
- Always considering the role of pain in any given behaviour problem
- Correct diagnosis of the source of the pain
- Using medications to prevent ‘wind up’ and prevent secondary tissue damage
- Using complementary therapies to assist in pain management
- Looking at the big picture (reduce stress, maximise sleep, correct exercise, correct diet, puzzle solving)
THE QUALITY OF OUR EFFORTS IS THEIR QUALITY OF LIFE