# ANALGESIA AND PAIN MANAGEMENT

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# PAIN MANAGEMENT FOR WILDLIFE

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ABSTRACT

Pain management for wildlife has been regarded as difficult even though effective techniques have been available for humans and other domestic species.

Besides being humane, there are many advantages to providing pain management for wildlife. Outcomes following injury and ilness are improved. Treatment and prevention of acute pain help to preclude the establishment of chronic pain states that are a negative influence on recovery, rehabilitation and release. Neurophysiology and pathophysiology of pain are described. Assessment of pain in wildlife requires an understanding that the outward manifestations are often different to those observed in other species.

Current pain management protocols utilize physical, chemical and psychological techniques. There are many medications available to assist in the modification of pain. Some of these medications are freely available but must be applied in an effective and safe manner. Others are restricted to use by a veterinary surgeon. Methods of delivery of analgesics are described.

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WHAT IS PAIN ? A sensation associated with actual or potential tissue damage

WHAT IS ANALGESIA ? Pain relief and prevention of pain

WHY USE ANALGESIA ?

Humane reasons

Reduce stress

Allows early mobilization — prevents immobility, muscle wasting (atrophy), bone wasting (osteoporosis), pressure sores

Assists breathing — avoids atelectasis (lung/alveolar collapse) and pneumonia

Prevents self trauma — scratching, biting and rubbing

Improves recovery rate — recover more quickly, improved chance of rehabilitation and release

Prevents neuronal 'wind up' — better short and long term prognosis (eg 'phantom limb' pain)

Reduces immune compromise

## REMEMBER

Pain relief is more effective if given EARLY ( pre operative, pre-emptive)

Pain relief needs to be given REGULARLY to avoid the need to catch up

COMBINATIONS of analgesic medications and physical methods

All analgesics are DIFFERENT and have potential SIDE EFFECTS and TOXICITY

Method of pain management should be APPROPRIATE for the species, type of pain and physical circumstances

## PHYSIOLOGY AND PATHOPHYSIOLOGY

Pain receptors of various types. Located in most areas of the body.
Called NOCICEPTIVE – free nerve endings or specialized receptors, which normally detect and respond to different types of stimuli

eg stretch – peritoneum
pressure – bone
heat, touch, etc. - skin

With increased level of stimulation these receptors transmit information that is interpreted as PAIN rather than warmth, touch, etc.
Pain neurological pathways from peripheral receptors...via spinothalamic tracts to thalamus and many other areas
eg limbic system -> emotional effects
Also to sympathetic NS to give rise to associated responses
eg tachycardia, hypertension, sweating, (hypotension and/bradycardia)

Many types of chemical mediators (neurotransmitters) = complex important for analgesic pharmacology eg NMDA – Ketamine

ENDORPHINS and ENCEPHALINS are endogenous analgesics. Variable presence and effect in different species.

## NEURONAL ADJUSTMENT TO PAIN

INCREASED STIMULUS -> recruitment of previously silent receptors

PROLONGED STIMULUS -> recruitment of high threshold nociceptors
Suppression of inhibitory neurones
Histological changes...new dendrites from A fibres replace dying C fibres in spinothalamic tracts. A fibres change from inhibitory to nociceptive function...overcomes 'GATE CONTROL'

= PERIPHERAL SENSITIZATION

PROLONGED STIMULUS -> persistent nociceptive neurotransmitters (eg substance P), plus suppression of

inhibitory neuronal activity, generate
increased sensitivity of brain and dorsal horn
neurones

= CENTRAL SENSITIZATION

These changes cause CHRONIC PAIN STATES

HYPERALGESIA

ALLODYNIA

NEUROPATHIC PAIN

WHY IS THIS IMPORTANT FOR WILDLIFE ? ( and others)

Chronic and altered pain states cause prolonged STRESS which
will interfere with recovery and rehabilitation
will contribute to adrenal exhaustion
may result in death
is inhumane
precludes the best outcome

PREVENTION (PRE EMPTIVE) AND EARLY INTERVENTION ARE MOST EFFECTIVE

FOR SHORT AND LONG TERM

## SIGNS AND ASSESSMENT OF PAIN IN WILDLIFE

Pain may vary from acute to chronic
mild to severe intensity
superficial or visceral or bone origin

and may be modified by species
age
gender
learning
individual response
hand reared or wild
environment eg presence of predators
concurrent illness

early management
concurrent medications
climate
endorphins/encephalins
stress

## ASSESSMENT

### PRESUMPTIVE PAIN and ANTHROPOMORPHISM

Because the neuroanatomy and neurophysiology of mammals, birds, reptiles, amphibians and fish are basically similar and they have the necessary components for pain perception and response, it is reasonable to accept that they are able to feel pain. Pharmacological and behavioural changes following administration of pain modifying techniques support that conclusion. While there may be differences between species in the degree and nature of pain perception, it is also true that even in human primates, differential pain perception occurs. It is better to err on the side of caution and humane behaviour, and apply analgesic protocols, rather than allow pain to persist.

### GENERAL SIGNS of PAIN

Initial assessment should be by observation, at a distance prior to capture or if already captured then by close inspection prior to handling. Many signs of pain change once the individual is threatened or confined.

Avoidance behaviour avoiding contact
Social behaviour decreased with group
Interaction change aggression, submission
Vigilance increased or decreased
Posture crouching, hunching, arching, drooping, unusual
Vocalization type
Immobility whole or part
Limping/favouring a part/ lameness
Rubbing/licking/biting/scratching at a part
Grooming lack of
Appetite decreased
Eyes closed, partly closed, wide open
Dribbling

EXAMINATION

May help to confirm the presence of pain and/or the site of origin. Prolonged and distressing examination is counterproductive and stressful, and may need to be conducted under general anaesthesia.

| | |
|---|---|
| Interaction | unusual aggression or passivity |
| Palpation | resentment, sensitivity, temperature, differential reaction |
| Cardinal signs | temperature, pulse/heart rate, breathing |
| Deformities | swellings, angulation of limbs, deficits |
| Integument | hair, fur |
| Excretions | diarrhoea, bleeding, pus |
| Auscultation | grunting, groaning, wheezing, coughing, |

RESPONSE TO INTERVENTION

Detection of the recurrence or persistence of pain necessitates the regular reassessment of the patient and further analgesic input as required.

A plan of approach should be formulated to ensure that the maximum benefit is derived from analgesia.

## TYPES OF ANALGESICS AND PAIN MODERATION

### PHYSICAL METHODS

Immobilization of the part and/or whole patient
Mobilization
Heat, cold
Pressure
Elevation
Massage
Environmental factors eg temperature
Cleaning, washing, irrigation eg eyes, caustics
Physiotherapy
Ultrasound
Acupuncture

### ANTIDOTES

reverse toxicity caustics, hyperthermia, extreme cold, muscle spasm, GIT hyperactivity/spasm

TREAT PRIMARY PROBLEM — eg infection/swelling/fracture/pleurisy

REDUCE STRESS

environmental factors
- temperature (too hot or too cold)
- noise
- smells (predators, chemicals)
- light (cover head)
- housing (places to hide)
- music

diet and nutrition
hydration

PSYCHOLOGICAL SUPPORT — carers, parent, surrogate

MEDICATIONS

OPIATES RESTRICTED USE
morphine, fentanyl, codeine, pethidine, dextropropoxyphene, methadone, butorphanol, buprenorphine

NSAIDS diclofenac, indomethacin, ibuprofen, naproxen, ketorolac, phenylbutazone, meloxicam, pentosan polysulfate, flunixin, carprophen, ketoprofen, aspirin

DISSOCIATIVE AGENTS RESTRICTED USE ketamine, tiletamine, (phencyclidine)

CORTICOSTEROIDS prednisolone, dexamethasone, hydrocortisone

LOCAL ANAESTHETICS lignocaine, bupivacaine, levobupivacaine, Ropivacaine, prilocaine, amethocaine, Emla

ALPHA 2 ADRENOCEPTOR AGONISTS Xylazine, romifidine, detomidine, medetomidine, clonidine

OTHER paracetamol, paracetamol combinations (paracetamol plus codeine) Tramadol, glyceryl trinitrate (GTN), methoxyflurane, cannabinoids

## ADJUNCTIVES

NOT ANALGESICS but may help in association with analgesics by potentiating effect of analgesics and/or treating cause of pain

MUSCLE RELAXANTS diazepam, midazolam, baclofen, hyoscine, quinine bisulphate, Mg SO4, dantrolene

SEDATIVES, TRANQUILLIZERS, HYPNOTICS temazepam, zolidem, midazolam, diazepam, phenothiazines

ANTICONVULSANTS carbamazepine, valproate, gabapentin

ANTIDEPRESSANTS tricyclics, SSRI's

ANTIHISTAMINES promethazine, trimeprazine

## METHODS OF DELIVERY OF ANALGESIC MEDICATION

ENTERAL Oral tablets, liquids, capsules, in food, crop needle, via nasogastric tube or oesophagostomy tube

Rectal suppositories, liquids
Vaginal pessaries, liquids
Cloacal

PARENTERAL subcutaneous
intramuscular
intravenous
intrathecal
epidural
nerve blocks
intraarticular
intraosseous

Can use single dose (bolus) or infusion for most routes

OTHER sublingual
transdermal
intranasal
topical
nebulized
conjunctival

## WARNING

There are 3 commonly available liquid preparations of PARACETAMOL

1 24 mg per ml ( 1 – 5 yrs )
2 48 mg per ml ( 5 – 12 yrs )
3 100 mg per ml ( 1 month – 2 yrs )

At a DOSE RATE of 10 mg per kg body wt the following amounts are given

24 mg per ml → 0.4 ml ( 4/10 ml ) approx. per kg body wt

48 mg per ml → 0.2 ml ( 2/10 ml ) approx. per kg body wt

100 mg per ml → 0.1 ml ( 1/10 mi ) per kg body wt

The dose may be repeated 2 or 3 times daily

PARACETAMOL PLUS CODEINE ("Pain Stop Daytime") contains

120 mg paracetamol plus 5 mg codeine per 5 mls which

= 24 mg paracetamol plus 1 mg codeine per 1 ml

"Pain Stop Night" contains the above plus promethazine 6.5 mg per 5 ml
This medication is sedating and may be contraindicated.

## HISTORICAL NOTE

SUXAMETHOMIUM (SCOLINE) has been used in the past, for the purpose of restraining horses for operation, by some unqualified and unscrupulous people. This drug is dangerous, gives neither pain relief, nor sedation and in fact is painful when administered by itself without anaesthetic. The patient remains fully conscious but paralysed and cannot move nor breathe.