Surgery and rehabilitation: a roadmap to functional recovery

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Optimizing postoperative outcome involves more than being a good surgeon in the operating theatre. Success relies on applying evidence-based principles, selecting the most appropriate surgical techniques, carefully planning perioperative care and a multimodal rehabilitation programme.

Surgical considerations include:

- Surgical principles
- Reduction of surgical stress
- Pain relief
- Rehabilitation programme.

SURGICAL PRINCIPLES

Surgical principles and techniques aimed at improving surgical healing, reducing morbidity and improving recovery should be respected and utilized.

- Halsted's principles:
 - Gentle handling of tissue
 - Meticulous haemostasis
 - Preservation of blood supply
 - Strict aseptic technique
 - Minimum tension on tissues
 - Accurate tissue apposition
 - Obliteration of deadspace
- Application of supportive methods including feeding tubes
- The use of minimally invasive surgical techniques.

REDUCTION OF SURGICAL STRESS

Surgical stress results in pain, catabolism, immune dysfunction, nausea and vomiting, ileus, impaired pulmonary function, sleep disturbances and fatigue. Prevention requires a planned and coordinated response. Interventions and considerations to reduce exposure to surgical stress include:

- Appropriate patient management during surgery, including selection of anaesthetic regimes, fluid management, blood-pressure management, temperature etc.
- The use of minimally invasive surgery
- Afferent neural blockade
- Pharmacological intervention.

PAIN RELIEF

Chronic pain after surgical tissue trauma is a frequently recognized postoperative complication in humans and may have a lasting impact on functional recovery and subsequent quality of life. Often poor perioperative pain

management can be an important contributor to chronic postoperative pain. Despite this, chronic postsurgical pain is under-recognized and consequently under-treated. In response to injury or the threat of injury, an individual will try to maintain homeostasis. In some patients, this reaction turns into persistent and non-purposeful actions that long outlast the timeframe of tissue healing and involve both peripheral nerve changes changes in central connectivity as well as repetitive avoidance or endurance behaviour.

Tissue injury, whether intentional (surgical) or non-intentional (trauma), initiates a chain of responses that progress to tissue healing. Normal healing progresses through four distinct but integrated phases:

- Vascular
- Inflammatory
- Proliferative
- Remodelling.

Patient management during these different stages is likely to have significant bearing on both the duration of the inflammatory response and the quality of tissue healing. This in turn will affect long-term clinical outcomes in terms restoration of function, nociceptive signalling and descent into chronic pain. Surgical technique can influence the degree of tissue damage and subsequently whether tissues regenerate or merely repair.

Many factors can influence postoperative outcomes and the use of evidence-based practice in the medical profession has helped improve outcomes and identified factors such as enforced rest as harmful and early mobilization as beneficial. Early mobilization helps facilitate pain-free movement and maintain structural integrity of body tissues and organs. It helps limit adhesion formation and preserve the potential to slide and glide freely in perpetual motion within the range of normal mobility. Normal sliding surfaces include visceral and parietal serous membranes and well as the superficial and deep fascia of the neuromuscular system.

KEY LEARNING OBJECTIVES

- Understand how to optimize postoperative outcomes
- Have knowledge of the underlying principles of tissue healing
- Understand the role of prompt and appropriate rehabilitation in minimising chronic pain post surgery

MULTIPLE CHOICE QUESTIONS

1. Which of the following factors regarding postoperative recovery is correct?
 - (A) Enforced rest for a minimum of 72 hours post surgery enhances recovery
 - (B) Pharmacological intervention is always beneficial to recovery
 - (C) Meticulous haemostasis is essential for good surgical outcomes
 - (D) Prevention of perioperative tissue catabolism through nutritional intervention does not enhance surgical recovery

2. Which one of the following statements regarding fascia is correct?

- (A) Healthy fascia has a multidirectional fibre network
- (B) Immobility increases crimp formation in the fascial collagen
- (C) Healthy fascia has a clear two-directional lattice orientation
- (D) There is an inverse correlation between crimp formation and elastic recoil within fascial collagen

3. Which is the correct statement regarding traumatic muscle injury?

- (A) Muscle injury most commonly occurs in the body of the muscle
- (B) Inflammation plays a key role in muscle recovery
- (C) The most important cell in the inflammatory response is the neutrophil
- (D) Low macrophage numbers assist with muscle regeneration

When our patients hurt: examining the relationship between pain and behaviour

Sarah Heath

Perhaps the most obvious behavioural manifestations of pain are those which are directly associated with handling or interacting with an animal when it is in acute pain. In such situations, overt confrontational behaviour might readily lead to investigation of a potential medical cause for the behavioural response. In reality, the link between pain and behaviour is far more complex than that.

Acute pain is undoubtedly responsible for significant changes in behaviour and hostility is one potential response. However, more passive behavioural responses are also possible. Avoidance is perhaps the next most likely to be recognized and resentment of palpation is often manifested by attempts to withdraw. Responses which are more likely to be overlooked in cases of both acute and chronic pain are those of inhibition and appeasement. Misinterpretation of these responses can lead to perception that the patient is being 'good' or 'affectionate', respectively, and result in significant underdiagnosis of pain.

Diagnosis of chronic pain is particularly challenging in a standard veterinary consultation context and behavioural manifestations are commonly the first to be reported. Pain is not only a physical sensory and motor experience, but also an emotional and cognitive one. The emotional dimension is a form of fear–anxiety and results in behavioural responses which are designed to protect the patient from actual or potential harm. Such responses are diverse and can be further complicated by the role of associative learning, whereby pain becomes associated with a range of contexts and triggers. Links between chronic pain and behavioural responses to triggers such as noises are well documented and recent studies have highlighted the potential for pain to be a contributory factor in a range of behavioural presentations. In cases where individuals develop behavioural coping strategies in order to deal with the pain it is possible for these

responses to become ritualized and even compulsive in nature. It is important for the veterinary profession to remember that hostile behaviour is not the only potential behavioural manifestation of pain. It is essential to ensure that good clinical examination is combined with accurate behavioural and medical history taking, extensive observation, either directly or through the use of video footage, and trial analgesia where appropriate, in order to ensure that pain does not go untreated.

KEY LEARNING OBJECTIVES

- Recognize the importance of the emotional and cognitive components of pain
- Identify the key behavioural responses to pain
- Question the potential involvement of pain in clinical behavioural cases

MULTIPLE CHOICE QUESTIONS

1. If pain is a suspected component in a behavioural presentation and an analgesic trial is instituted, what is the appropriate initial duration of that medication trial?
 - (A) 5 days
 - (B) 2 weeks
 - (C) 4 weeks
 - (D) 3 months
2. What is the reported percentage of behavioural cases which are found to have a pain component when investigated at referral level?
 - (A) 10–30%
 - (B) 0–10%
 - (C) 60–80%
 - (D) 30–50%
3. Which of the following is the most appropriate **first** investigative step when a dog presents with a behavioural change and the clinical history and observation lead to suspicion of involvement of musculoskeletal pain?
 - (A) Radiography
 - (B) Analgesic trial
 - (C) Magnetic resonance imaging
 - (D) Hydrotherapy