

Introduction

Horses' cognitive abilities have direct implications on their training and welfare. Chronic pain can impair cognitive functions such as attention and memory. Knowledge in this area is limited.

Objectives

Review what is currently known regarding horses' learning mechanisms, pain physiology and assessment and the relation between chronic pain and cognitive dysfunction in this species.

Methodology

Sources: PubMed, Google Scholar and Google.

Key words: “equine welfare”, “pain assessment”, “cognition and learning in horses”.

Inclusion criteria: papers published in English regarding horses, humans and rodents (preferably between 2010-2026).

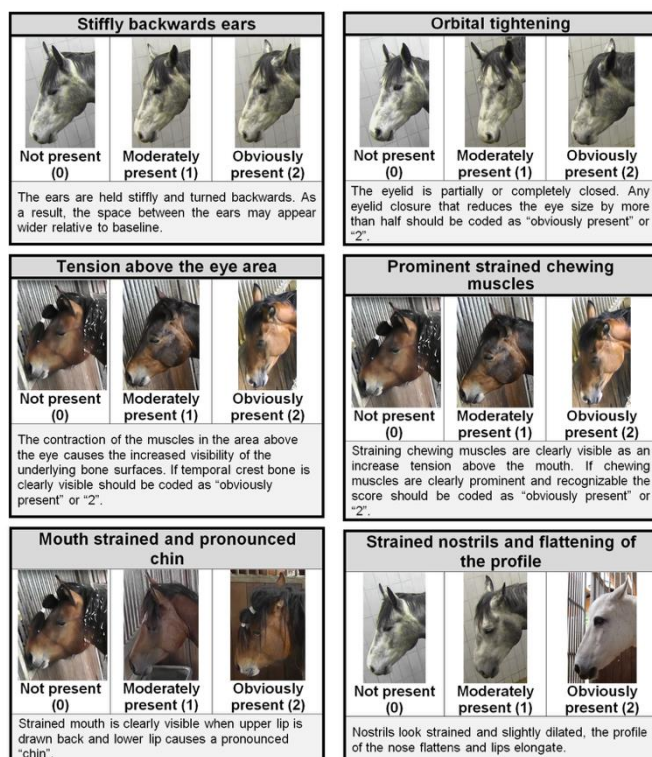
Learning mechanisms in horses

Classical conditioning	Learning to produce an automatic response to a new stimulus after repeatedly associating it with the original stimulus.
Operant Conditioning	Learning or changing behaviour based on its consequences, through positive (adding a pleasant stimulus) or negative (removing an aversive stimulus) reinforcement.
Discrimination learning	Learning to make decisions in response to different stimuli, some of which may closely resemble each other.
Concept formation	Extracting a general idea and learning the characteristics that define it.

Pain physiology and assessment

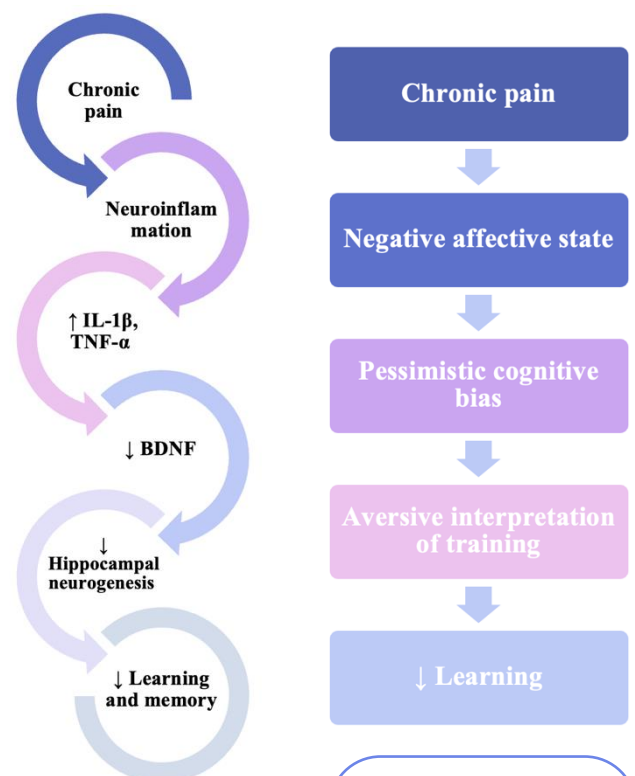
Pain activates the HPA axis and the SNS, increasing cortisol levels. Central sensitization shares synaptic plasticity mechanisms with learning and memory.

Fig. 1 Horse Grimace Scale (HGS). Costa *et al.* (2014)



Pain and learning

Uncontrollable stressors redirect attention towards the perceived threat, impairing learning performance. In humans, pain-induced stress causes maladaptive plasticity in the corticolimbic system, amplifying chronic pain and cognitive impairment.



Discussion and conclusions

Chronic pain impairs welfare and cognitive abilities through neuroinflammation and decreased hippocampal neurogenesis.

Stress and pain synergistically amplify their negative effects on learning.

Horses with chronic pain show pessimistic cognitive biases that hinder training.

Conflict behaviours indicate undiagnosed pain rather than disobedience.

Systematic pain assessment and positive reinforcement could improve welfare and learning.

References

