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Cognitive load and pain relief: a systematic review on the relationship between working memory and acute pain

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The IASP definition of pain emphasizes its subjective nature, highlighting its multidimensionality. Pain signals potential harm to the body and, due to its negative emotional impact, can attract attention and mobilize resources to deal with the threat. Managing pain thus requires a strong cognitive component, as evidenced by the overlap between neural systems involved in pain management and executive functioning. Specifically, the executive function of working memory plays a pivotal role.
According to the neurocognitive model of attentional selection proposed by Legrain et al. (2009), pain can influence working memory performance through bottom-up processes. Additionally, the model suggests that working memory may modulate pain perception through top-down processes. The present systematic review aims to elucidate the empirical evidence regarding this bidirectional relationship.
It was conducted according to the PRISMA method and registered and approved on the PROSPERO website; 49 studies investigating the bidirectional relationship between acute pain and working memory in healthy adults were included. Substantial agreement emerged that pain can worsen cognitive performance by acting as a distractor and that being engaged in a cognitive working memory task can reduce perceived pain. However, some studies show mixed results, probably due to the variety of the cognitive load of the task and the methodology of pain induction. These results may offer valuable insights into the daily functioning of individuals afflicted with chronic pain and could facilitate pain management strategies in nonpharmacological pain treatment.

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No

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