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Modulation of pain processing through emotional processes in patients with fibromyalgia syndrome

Autor: Sandra Kamping
Institut / Klinik: Zentralinstitut für Seelische Gesundheit Mannheim (ZI)
Doktormutter: Prof. Dr. H. Flor

The present thesis focused on the effect of emotion modulation on pain perception in fibromyalgia patients. Placing a clearer emphasis on the nociceptive system we applied laser stimuli with a specifically designed device. We showed that our device allowed for a safe, reliable and valid application of painful laser stimuli and that these stimuli resulted in comparable pain intensity and pain unpleasantness ratings and activated the pain matrix. Using this laser application device we then examined fibromyalgia patients using functional magnetic resonance imaging. We applied painful laser stimuli in positive, negative and neutral emotional contexts by presenting emotional pictures. We compared brain activation resulting from picture presentation alone and found no significant differences between fibromyalgia patients and healthy controls. Additionally, we could not find higher pain sensitivity, indicated by the same pain intensity and unpleasantness ratings and the same stimulator output in fibromyalgia patients. This lack of significant difference between our two groups was also reflected in brain activation. Fibromyalgia patients and controls showed the same brain activation in response to pain-only stimuli and to the picture stimuli alone. They also did not differ when nociceptive stimuli were administered in a neutral or negative mood. However, patients did not benefit from the pain reducing effects of positive emotions as well as healthy controls did. This was accompanied by less activation areas involved in emotion modulation (orbitofrontal cortex, anterior cingulate cortex) and in areas involved in the sensory processing of pain (secondary somatosensory cortex, posterior insula) as well as. Catastrophizing scores revealed a correlation with activation in the left anterior insula. We assume that fibromyalgia patients show a deficit in the modulation of pain by positive emotions, which in turn feeds back onto pain processing areas.