

Pain Processing in Older Age – Evidence from Event-Related Potentials

Dierolf, A., Rischer, K., González-Roldán, A., Montoya, P., Anton, F., Van der Meulen, M.

Aging is known to affect neurobiological and physiological aspects of pain perception and has been associated with reduced pain sensitivity and a deterioration of descending pain inhibitory mechanisms. To investigate age differences in neural electrophysiological correlates of pain processing, we induced acute pain in healthy older (60 yrs+) and younger adults (18 to 35 yrs), using short transdermal electrical pulses administered to the inner forearm, with individually adjusted stimulation intensities. Participants received alternating blocks of painful and non-painful control stimulation and rated the intensity and unpleasantness of each stimulus on two visual analog scales. Pain-related evoked potentials were recorded with a 64-channel EEG.

Preliminary results indicate that younger and older participants rated painful stimuli more intensive and unpleasant compared to the control stimulation, with older adults showing a slight habituation over time. In younger adults, ERP amplitudes (N2, P2 P3) of painful stimulation were enhanced compared to non-painful stimulation. In contrast, older participants showed generally reduced ERPs, no difference between pain and non-painful stimulation and by tendency longer latencies for painful stimulation.

This suggests that nociceptive neural processing is altered in aging, while the reported pain perception is unaffected. Given that aging is also associated with a decline of cognitive functions and PFC volume and activity changes, this could have implications for the efficacy of cognitive pain modulation. Altogether, our results highlight the need for a deeper understanding of the mechanisms underlying pain processing in older adults, and how these age-related changes affect (cognitive) pain treatments in this population.

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