

Is autonomic function associated with (central) pain processing in individuals with chronic pain? A systematic review.

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Background and aims: Dysfunctions of the autonomic nervous system (ANS) are hypothesized to be associated with altered central pain processing (CPP). Altered CPP characterizes nociplastic pain, which is common in non-specific chronic pain conditions. However, the exact interaction between ANS function and chronic pain remains unclear.

Methods: PubMed, SCOPUS, and Web of Science were searched, followed by a two-phased screening by two independent researchers (IM & CQ). Risk of bias (Newcastle-Ottawa Scale), level of evidence and data collection were performed double-blind.

Results: Two cohort studies, 10 cross-sectional studies, and one case-control study were included. ANS function was measured by cardiovascular measurements, sympathetic skin response, plasma catecholamines, and skin temperature. All studies used questionnaires to assess pain, nine used additional quantitative sensory testing. Significant associations between autonomic function (heart rate and blood pressure) and pain intensity (VAS) were found in patients with Irritable Bowel Syndrome ($p < 0.05$). Patients with chronic musculoskeletal pain showed significant associations between conditioned pain modulation and cardiac autonomic response ($p = 0.002$) and increased hyperalgesia ($p < 0.01$). Conflicting evidence was found for patients with Complex Regional Pain Syndrome and fibromyalgia. No significant associations were found in patients with chronic Whiplash Associated Disorders and chronic pancreatitis.

Conclusion: There was heterogeneity in ANS and pain measurements, creating a pitfall to provide a qualitative comparison of results. Therefore, this review provides insight into the potential involvement of autonomic pathways in pathological pain mechanisms in several chronic pain populations, but clearly urges the need for standardized measurements.