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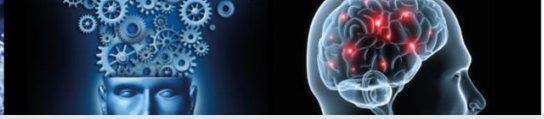

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Physiological reactivity at rest and in response to social or emotional stimuli after a traumatic brain injury: A Systematic Review

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1. Introduction

Physiological reactivity (PR) refers to bodily changes in response to an emotional or threatening event, under the influence of the autonomic nervous system and the hypothalamic-pituitary-adrenal axis (HPA axis). Patients with traumatic brain injury (TBI) frequently experience emotional difficulties, which have been associated with impaired PR (Rushby et al., 2013; de Soussa 2010; Francis et al., 2016). Although these disorders are known to exist, to date, no systematic review of the literature on PR abnormalities in TBI has been conducted.

2. Objectives

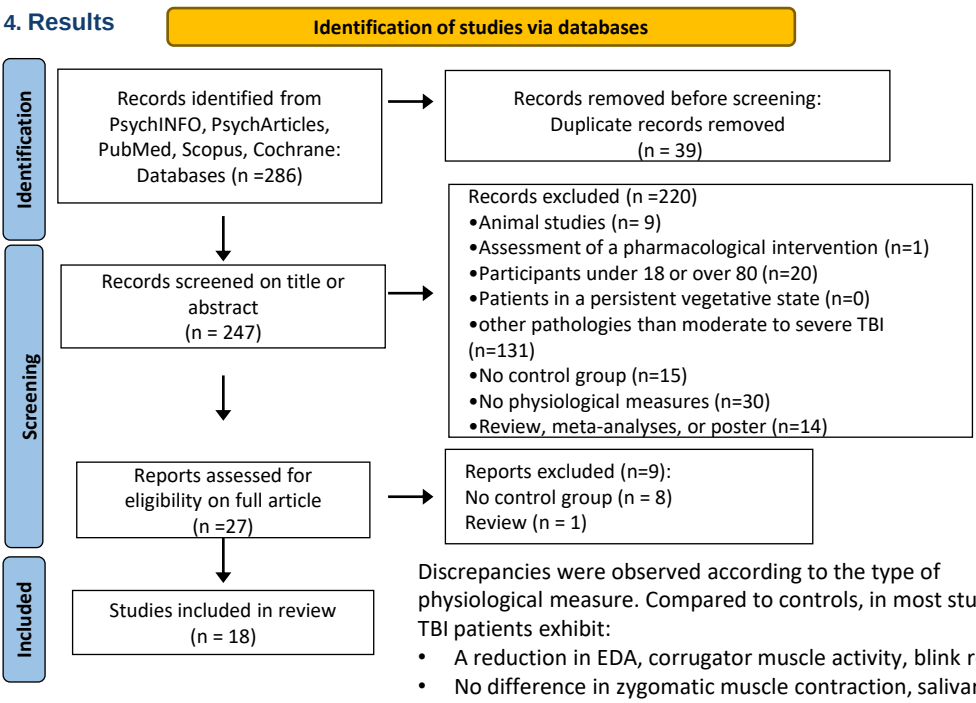
Conduct a systematic review of the literature on PR abnormalities after moderate to severe TBI

3. Method

In accordance with PRISMA guidelines, a systematic search across 6 databases was conducted including studies :

- Assessing PR at rest or in response to emotional stimuli
- In adults with moderate-to-severe TBI
- Compared to a control group
- Measured at least one of heart rate (HR), heart rate variability (HRV), respiratory sinus arrhythmia (RSA), electrodermal activity (EDA), salivary cortisol, facial electromyography (EMG), and blink reflex.

4. Results



Discrepancies were observed according to the type of physiological measure. Compared to controls, in most studies, TBI patients exhibit:

- A reduction in EDA, corrugator muscle activity, blink reflex.
- No difference in zygomatic muscle contraction, salivary cortisol levels and cardiac activity

5. Discussion

Although disturbed EDA responses were frequently reported in patients with TBI, other measures did not consistently indicate an impairment in PR. These discrepancies could be due to the lesion pattern resulting from TBI, which could affect the PR to aversive stimuli. In addition, methodological differences concerning the measurements and their standardisation as well as the characteristics of the patients may also be involved in these discrepancies. We propose methodological recommendations for the use of multiple and simultaneous PR measurements and standardisation.

de Sousa, A., McDonald, S., Rushby, J., Li, S., Dimoska, A., & James, C. (2010). Why don't you feel how I feel ? Insight into the absence of empathy after severe Traumatic Brain Injury. *Neuropsychologia*, *48*(12), 3585-3595. https://doi.org/10.1016/j.neuropsychologia.2010.08.008

Francis, H. M., Fisher, A., Rushby, J. A., & McDonald, S. (2016). Reduced heart rate variability in chronic severe traumatic brain injury : Association with impaired emotional and social functioning, and potential for treatment using biofeedback. Neuropsychological Rehabilitation, 26(1), 103-125. https://doi.org/10.1080/09602011.2014.1003246

Rushby, J. A., Fisher, A. C., McDonald, S., Murphy, A., & Finnigan, S. (2013). Autonomic and neural correlates of dysregulated arousal in severe traumatic brain injury. International Journal of Psychophysiology, 89(3), 460-465. https://doi.org/10.1016/j.ijpsycho.2013.05.009XXXX