

# The impact of childhood trauma on sensory processing and connected motor planning and skills: a scoping review

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## Introduction

Traumatic experiences during childhood have been suggested to alter the course of sensory and motor development due to the impact on neural connections within the brain (Holland & May-Benson 2014, Howard et al, 2020). This connection has been alluded to in literature and is discussed anecdotally by practitioners suggesting the impact is commonly seen in practice. Previous scoping reviews in this area have focused solely on the process of sensory modulation without exploring the broader impacts on sensory integration and motor planning.

This review sought to answer the question: What is known from existing literature about the impact of childhood trauma on sensory processing and connected motor planning and skills?

### Sub-questions:

- What is the nature of motor difficulties identified with children with a known history of trauma?
- What is the understanding of the connection of these motor difficulties with altered sensory processing?

## Methods



The scoping review process followed the JBI methodology for scoping reviews (Peters et al 2020).

Databases: CINAHL plus, Proquest, Scopus, PsycINFO, EThOS. Google scholar for grey literature. Citation chaining was also used.



Screening: Completed independently by two reviewers then discussed to reach a consensus. Third reviewer to adjudicate.



Data extraction: Two authors reviewed the articles to extract the study data independently and conferred to reach an agreement. Information was extracted about authors, year of publication, study location, context, participants, methodology, motor difficulties, sensory processing difficulties discussed and connection to life stage.

### Inclusion

- Children & adolescents 0-21
- Considers impact of trauma on sensory processing & motor skills
- Empirical studies, systematic reviews, literature reviews, conference presentations, unpublished theses



### Exclusion

- Presence of comorbid conditions e.g. foetal alcohol syndrome, traumatic brain injury
- Not in English
- Published pre 2006



Identified through databases n = 545

Other sources n = 21

After duplicates removed n = 524

Screened n = 524

Excluded n = 517

Full articles assessed n = 7

Excluded n = 1

Included in synthesis n = 6

Figure 1. Prisma chart

## Results

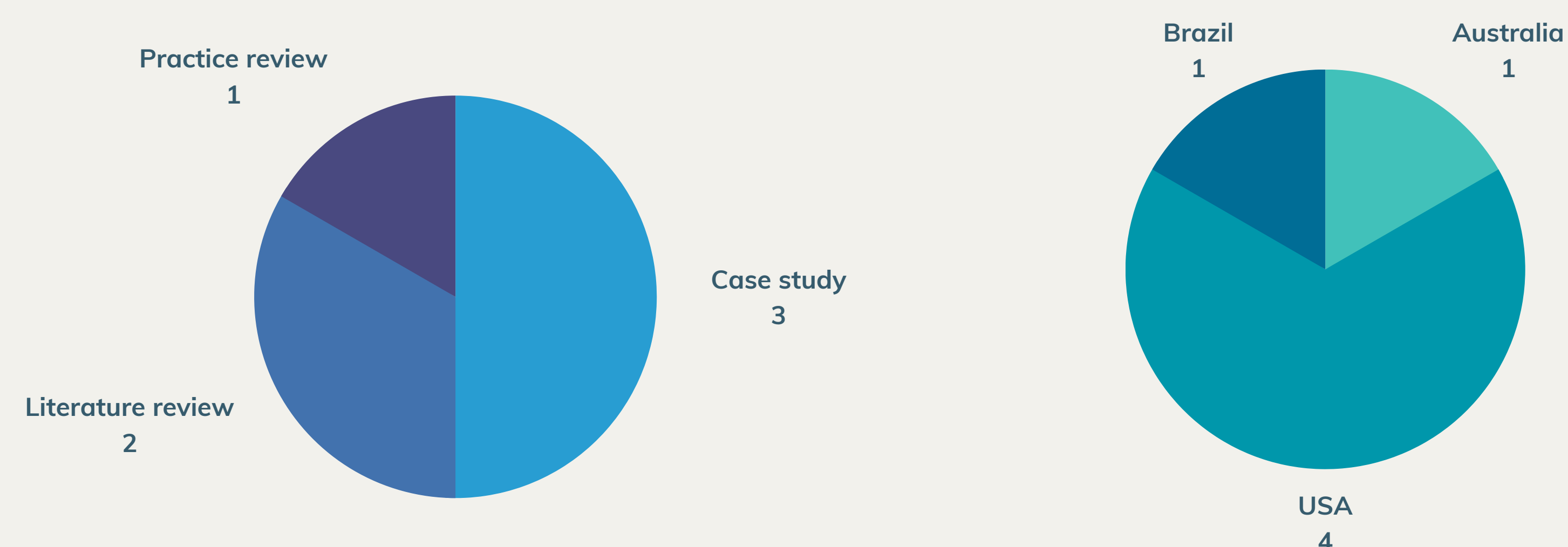


Figure 2. Pie chart detailing included article methodology

Figure 3. Pie chart detailing research location

## Narrative summary of overall findings from the review.

In order to consider the connection between childhood trauma, sensory processing and motor skills data was extracted from the studies in relation to four main areas outlined below:

### Sensory processing concerns:

Studies highlighted difficulties including reduced interoceptive awareness, impaired somatosensory and vestibular perception, hyper-responsivity to tactile and visual input, and poor visual-spatial processing. Certain areas of difficulty were more specifically connected with different forms of abuse for example the most significant impact on somatosensory processing as a result of sexual abuse. Increased seeking of sensory input for regulation was also noted particularly in relation to vestibular, deep pressure touch and proprioceptive input.

### Motor difficulties:

Difficulties were identified in relation to gross and fine motor skills, balance, coordination, spatial awareness, motor planning, postural control and visuo-motor integration.

### Life stage:

All studies considered trauma which occurred before the age of 7, an integral period of sensory and motor development (Ayres, 2005). The most significant impact on hippocampal development resulted from trauma occurring between 3-6 years of age. Grey matter development was most effected prior to age 6.

### Neurological impact of early trauma:

See Figure 4.

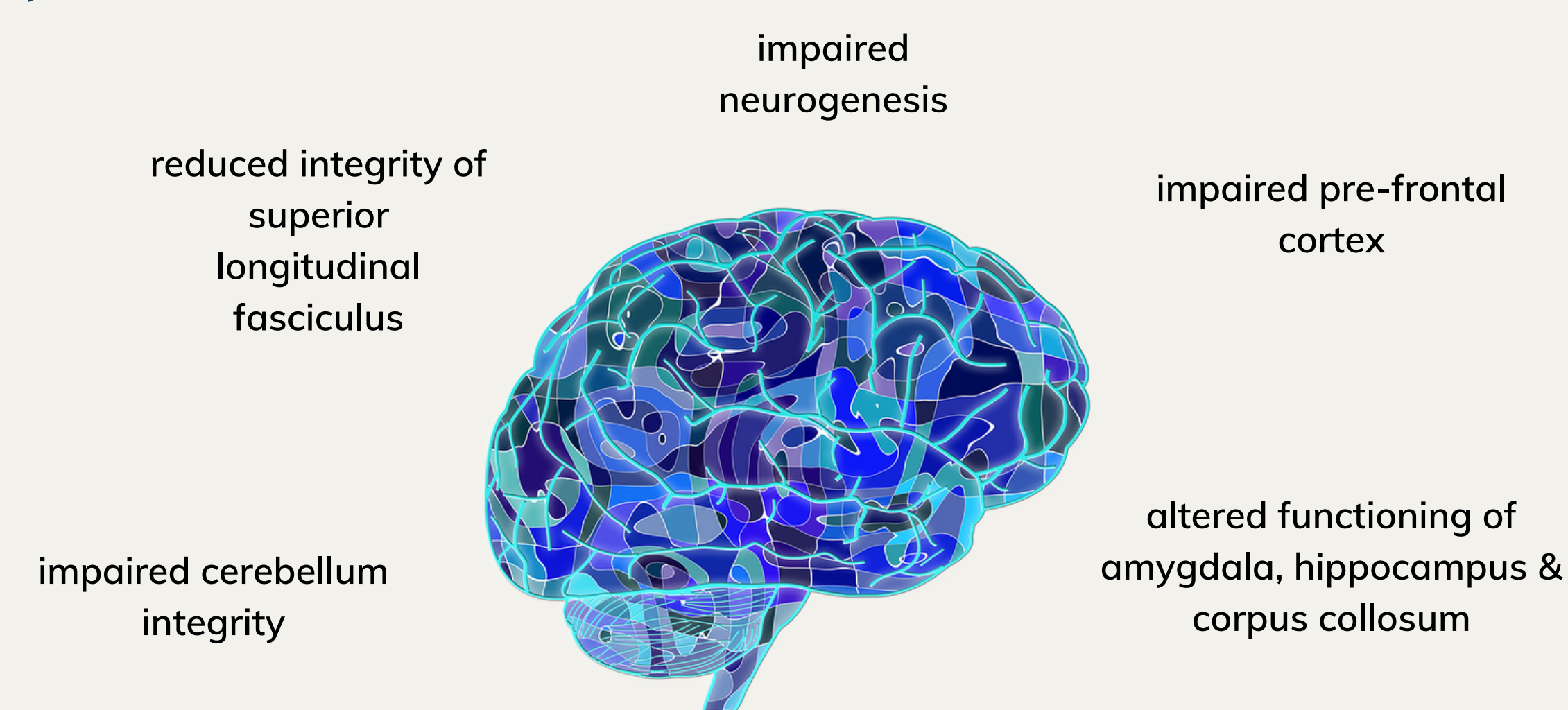


Figure 4 Neurological impact of early trauma

## Conclusion

Increasing attention is being given to the impact of trauma on sensory processing, both within and external to the field of occupational therapy, with this impact considered particularly damaging if the trauma occurs during childhood (Van der Kolk 2003, Holland & May-Benson 2014, Fraser et al 2017). However, currently there is emerging yet limited evidence to support the connection between childhood trauma, sensory processing and motor skills. Much of the available literature suggests an implied rather than a confirmed connection that while congruent with many of the needs observed by clinicians in practice needs a greater evidence base.

## Limitations and future recommendations

The current scoping review has several limitations. While the included studies come from a range of countries, they were restricted to those published in English. This restriction was applied at the start of the literature search, and therefore it is not certain how many articles were excluded that otherwise met the review's eligibility criteria. All studies were included, regardless of study quality, due to the sparsity of literature on the topic and to ensure as comprehensive a review as possible.

Further studies are warranted that use valid and reliable measurement tools to develop the evidence base in this area.

## References

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