



EARLY LIFE TRAUMA

Neurobiology of Trauma

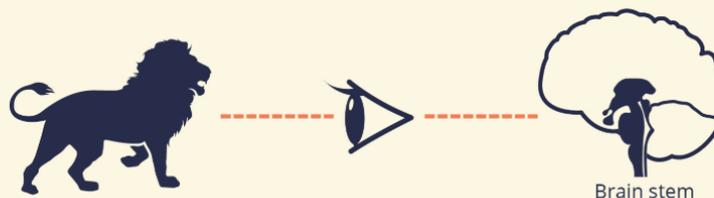
Overview

Emotional, physical, and/or sexual trauma, oftentimes occurring in early childhood, is highly prevalent in the population of people with complex needs. Current research shows a significant neurological change in people who have been exposed to traumatic events. Understanding how this exposure impacts brain development and function, especially in early childhood, is a critical component. Oftentimes this is a significant root cause driver for mental and physical health problems, substance use disorder and social determinants of health. This section is focused on the neurobiology of trauma. Upon completion you will better understand how our brain is wired for survival, the neurobiology of the stress response system (fight, flight or freeze), and the changes that occur from repeated exposure to trauma, i.e. child abuse/neglect or soldiers at war. The illustration below depicts how the brain and body respond to a perceived traumatic event. (NICABM 2017)

WHAT HAPPENS IN THE BRAIN during a potentially traumatic event?

The brain stem is critical in fast, defensive responses. It's directly connected with the retina.

The retina sends visual information to the brain stem immediately - before higher levels of the brain are even aware of the threat.





If the predator moves closer, the periaqueductal gray initiates a fight or flight response.

The periaqueductal gray activates the sympathetic nervous system.
Heart rate goes up. Blood flow to muscles increases. Blood pressure increases.
Pupils dilate.



But it's not always safe or possible to fight or escape.

That's when a person may enter the freeze response, or feigned death.

Now the periaqueductal gray activates the parasympathetic nervous system as well.

Muscles get tight and freeze. Both gaze and breath may freeze.

This is not a cognitive choice.

These "decisions" are made at the level of the brain stem and the nervous system.



If the predator doesn't move away, the person may shutdown completely.

Heart rate drops. Respiratory rate drops.
Some people stop breathing. Muscles become limp. Metabolism shuts down. Endorphins are released.

The person enters a state of "no pain". They are no longer aware of their surroundings.



During inescapable trauma, this is a very adaptive way for the brain and body to respond.



Core Videos to Watch:

- [John Rigg - The Effect of trauma on the brain and how it affects behaviors](#) (28 min)
- [American Museum of Natural History - Science Bulletins: Brains Change with Trauma](#) (2 min)
- [National Institute for the Clinical Application of Behavioral Medicine - Three Ways Trauma Can Change the Brain](#) (3 min)
- [Bessel A. van der Kolk - Trauma & Attachment](#) (3 min)

Competency Reflection, Assessment or Demonstration

Now that you have reviewed the materials about early life trauma, it is time to reflect on your experiences with this core competency. In the space below write two case examples – one where you have had a positive outcome or effective interaction with someone who has a known history of trauma and was either hyper or hypo aroused and one in which the intervention was not as effective. Please identify which type of arousal in each case.

Case Study #1 – The Effective Intervention

What were the characteristics, practices and values that contributed to an effective intervention?

What role did you play? How did you contribute to the success?

What impact or outcome did this have on the individuals with complex needs?



Case Study #2 – The ineffective intervention

What were the characteristics, practices and values that contributed to the ineffective intervention?

What role did you play?

What impact did this have on the individual with complex needs?

Reflecting on what you have learned from this module – what would you do differently if you were involved in it again.

Additional Resources for Deeper Understanding:

- [The Neurobiology of Trauma](#) (Australian Institute of Professional Counsellors) - This article focuses on the neurobiological effects trauma has on the brain.
- [Bessel Van der Kolk - Scientific Publications on Trauma](#)
- *The Body Keeps the Score: Brain, Mind, and Body in the Healing of Trauma* Book by Bessel van der Kolk