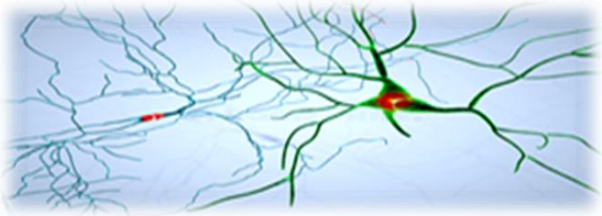
MATRIX NEUROLOGICAL

Understanding Paediatric Acquired Brain Injury

By: Jan Rock

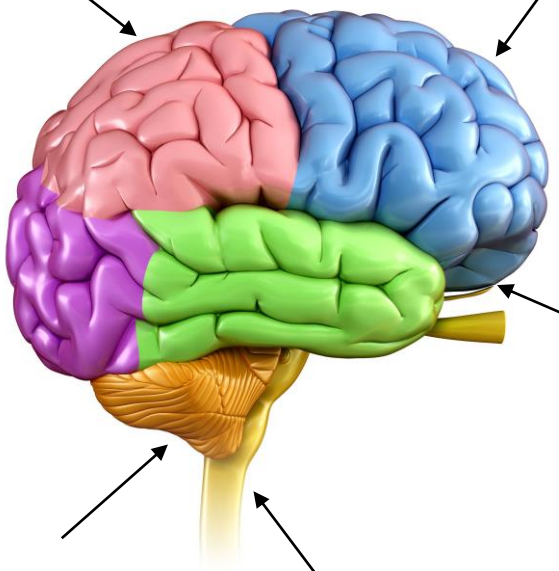
18 April 2024



The Human Brain

Parietal Lobe
- Knowing right from left
- Sensation
- Reading
- Body orientation

Frontal Lobe
- Problem solving
- Emotional traits
- Reasoning (judgement)
- Speaking
- Voluntary motor activity

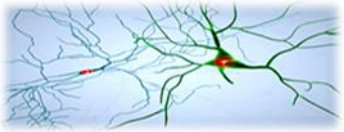


Occipital Lobe
- Vision
- Colour Perception

Temporal Lobe
- Understanding language
- Behaviour
- Memory
- Hearing

Cerebellum
- Balance
- Coordination & control of voluntary movement
- Fine muscle control

Brain Stem
- Breathing
- Body temperature
- Digestion
- Alertness / sleep
- Swallowing



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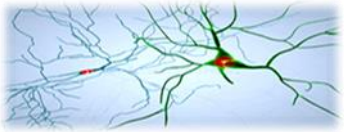
What is an Acquired Brain Injury? (ABI)

Brain damage caused by events *after birth to a 'NORMAL' brain*

(i.e. that which is assumed to have the potential for normal development rather than as part of a birth complication, genetic or congenital disorder)

(Source: Dr M O'Sulllivan, Paediatrician Neuro-disability)

It is not Autism!



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How are Acquired Brain Injuries Caused?

Type 1 Traumatic Brain Injury (TBI)

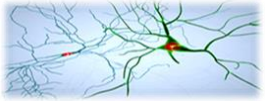
Causes:

- Falls & Trips
- Road Traffic Accidents
- Concussion
- Extreme Sports
- Cycling Accidents
- High Velocity Impacts (i.e. Golf Ball)
- Sporting Head Injuries
- Assault

Type 2 Non-Traumatic Brain Injury (N-TBI)

Causes:

- Stroke
- Meningitis
- Encephalitis
- Hydrocephalus
- Brain Haemorrhage
- Brain Tumour
- Cardiac Arrest
- Drowning
- Strangulation
- Suffocation
- Poisoning
- Chemotherapy Treatment
- Covid 19



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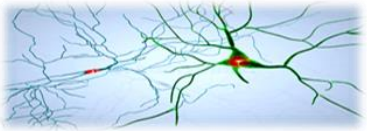
Prevalence of Neuro-disability in the general CYP population

- Source: McKinley et al, 2008; McGuire et al, 1998. – “Nobody made the connection” Report for Children’s commissioner October 2012 & Neuro Rehab Times

Autism spectrum disorder (ASD)	0.6 - 1.2%
Learning disabilities (LD)	2 - 4%
Attention Deficit Hyperactive Disorder (ADHD)	1.7-9%
Dyslexia	10%
Traumatic Brain Injury (TBI)	**24-31.6%**



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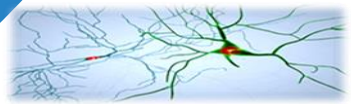
Deficits Caused by an Acquired Brain Injury

(KNOWN) DEFICITS OF AN ACQUIRED BRAIN INJURY			
PHYSICAL	COMMUNICATION	COGNITIVE	BEHAVIOURAL EMOTIONAL
Motor Deficits: • Paralysis • Abnormal Muscle Tone • Ataxia (co-ordination) * Sensory Deficits: * • Vision • Hearing Loss • Smell / Taste • Touch • Vestibular/Balance * Dysphagia (swallowing difficulties) Seizures * Other: • Headache * • Fatigue • Pain • Sleep	Language Deficits: * • Expression (finding the right words) • Comprehension (understanding) • Dysarthria (difficulty speaking) • Dyslexia (difficulty reading) • Dysgraphia (inability to write) • Dyscalculia (inability to do maths)	Impairment of: • Memory • Attention * • Perception • Problem Solving • Insight • Safety Awareness / Risk Taking • Self Monitoring * • Social Judgement	Deficits: • Emotional Liability * (unstable emotions or emotional over-reaction) • Poor Initiation • Mood Change • Adjustment Problems • Aggressive Outbursts * • Disinhibition • Poor Motivation • Inappropriate Sexual Behaviour • Psychosis • OCD * • Mental Health Issues



(British Society Rehabilitation Medication & Royal College Physicians 2003)

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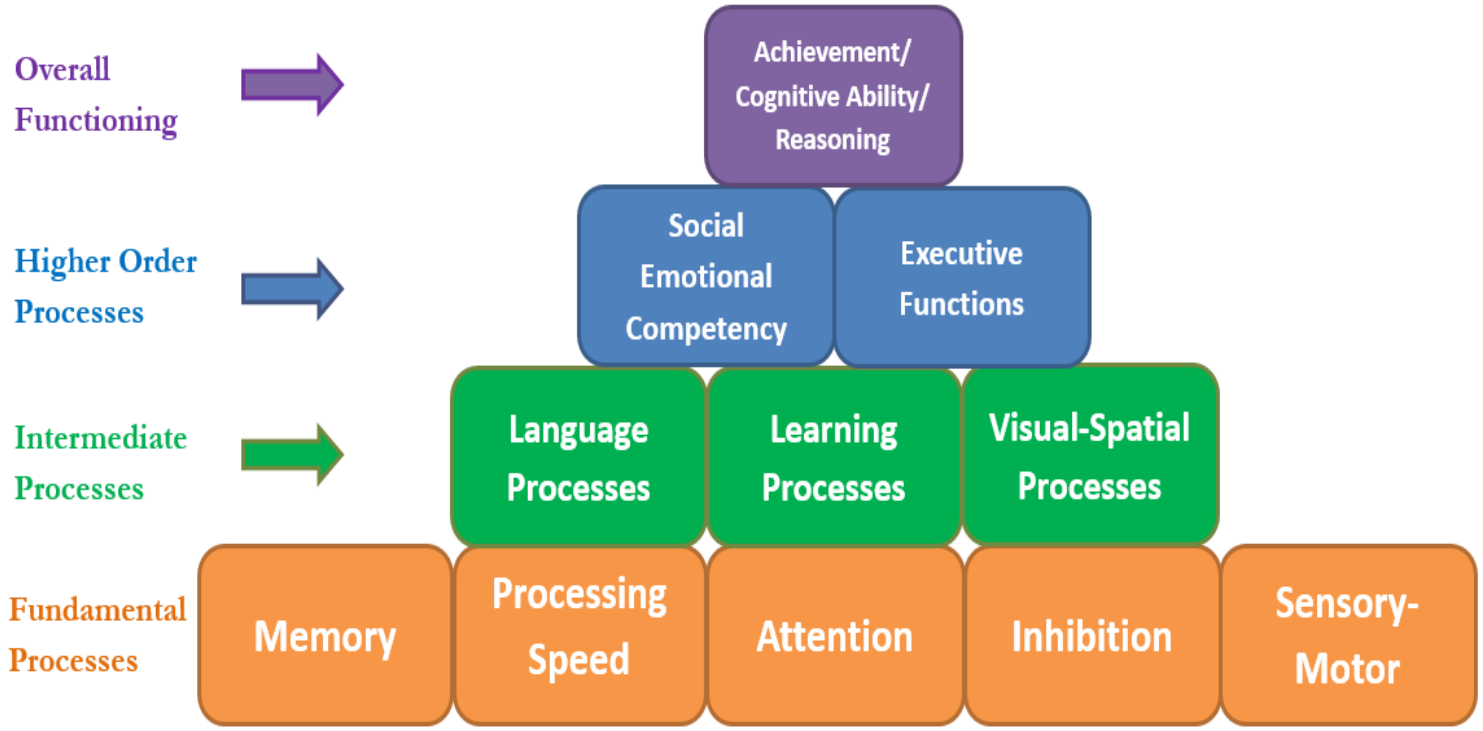
Improving Access to Effective Support – Brain Development

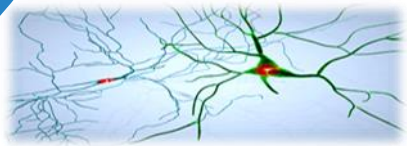
Colorado Department for Education

Building Blocks of Brain Development©



The Hierarchy of Neurocognitive Functioning © - created by Peter Thompson, Ph.D. 2013, adapted from the works of Miller 2007; Reitan and Wolfson 2004; Hale and Fiorello 2004.

The Building Blocks of Brain Development © – further adapted by the CO Brain Injury Steering Committee, 2016.



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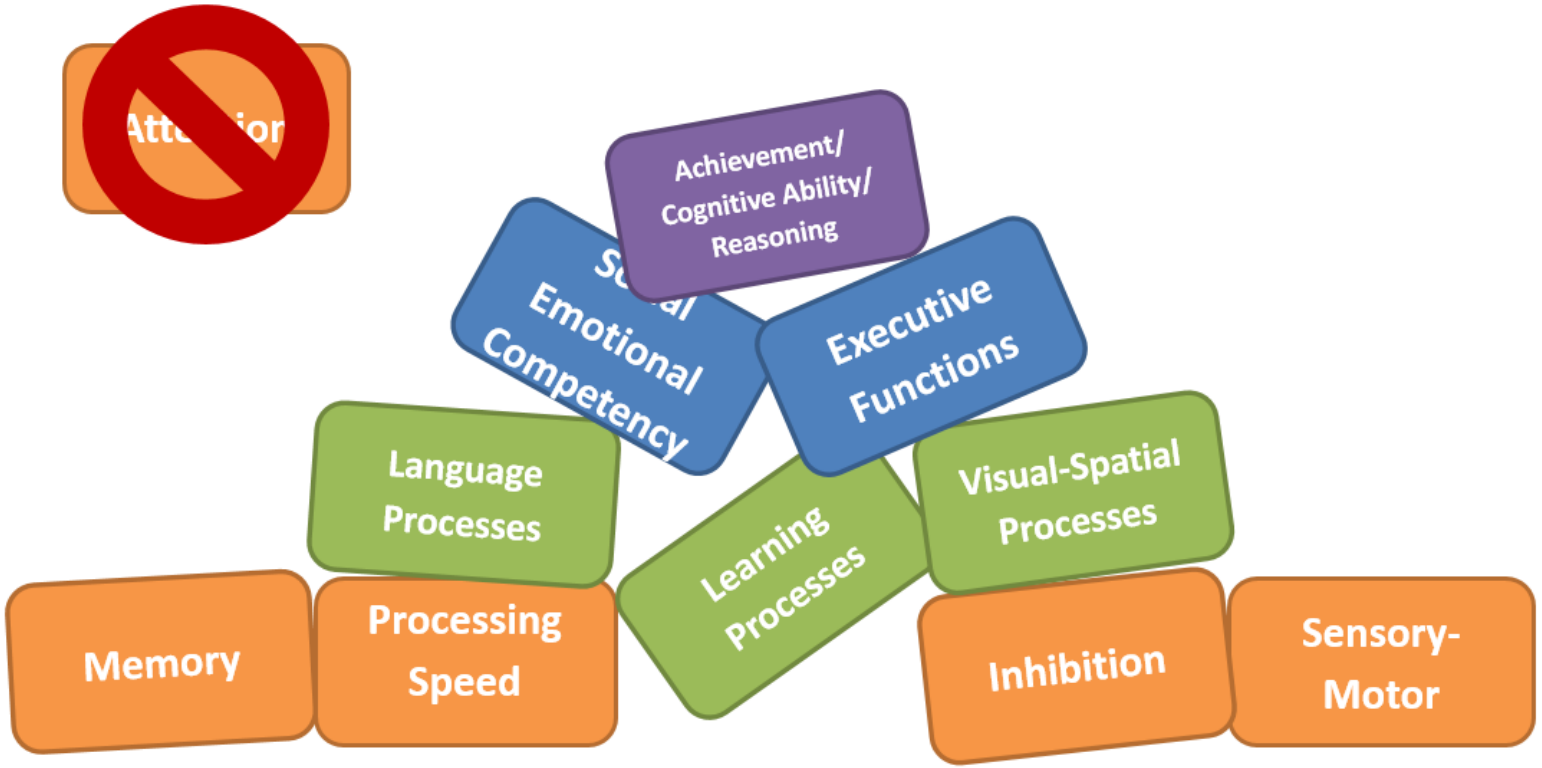
Improving Access to Effective Support –

Post ABI

Colorado Department for Education After a Brain Injury



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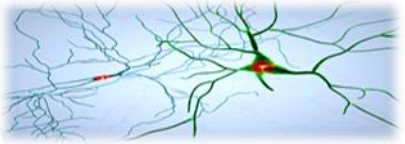

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Improving Access to Effective Support –

Lost Opportunities!

Neuroplasticity

The brain's ability to reorganize itself by forming new neural connections throughout life.

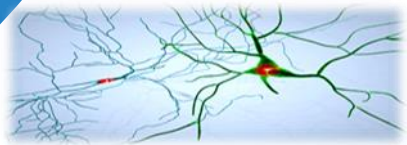
Neuroplasticity allows neurons to compensate for injury / disease by REWIRING around damaged parts.

COGNITIVE STIMULATION

- not medication!

The poorer the socio-economic resources + support networks

= poor outcomes



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Improving Access to Effective Support –

Current Approaches!

"I can't explain, and they don't understand"

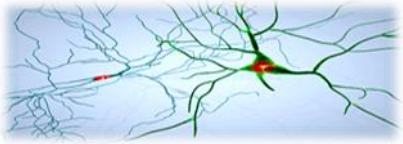
"Nobody cares, nobody understands, and nobody wants me"

"I self-harmed because they don't get it"

"They made me feel rubbish when they said I had low intellectual ability"

"It's a joke. I had a stroke when I was little. They have diagnosed me with Autism!"

"Why can you only get help for a TBI if there is a legal case to fund it?"



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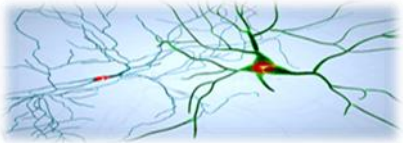
Improving Access to Effective Support –

How is MATRIX Different?



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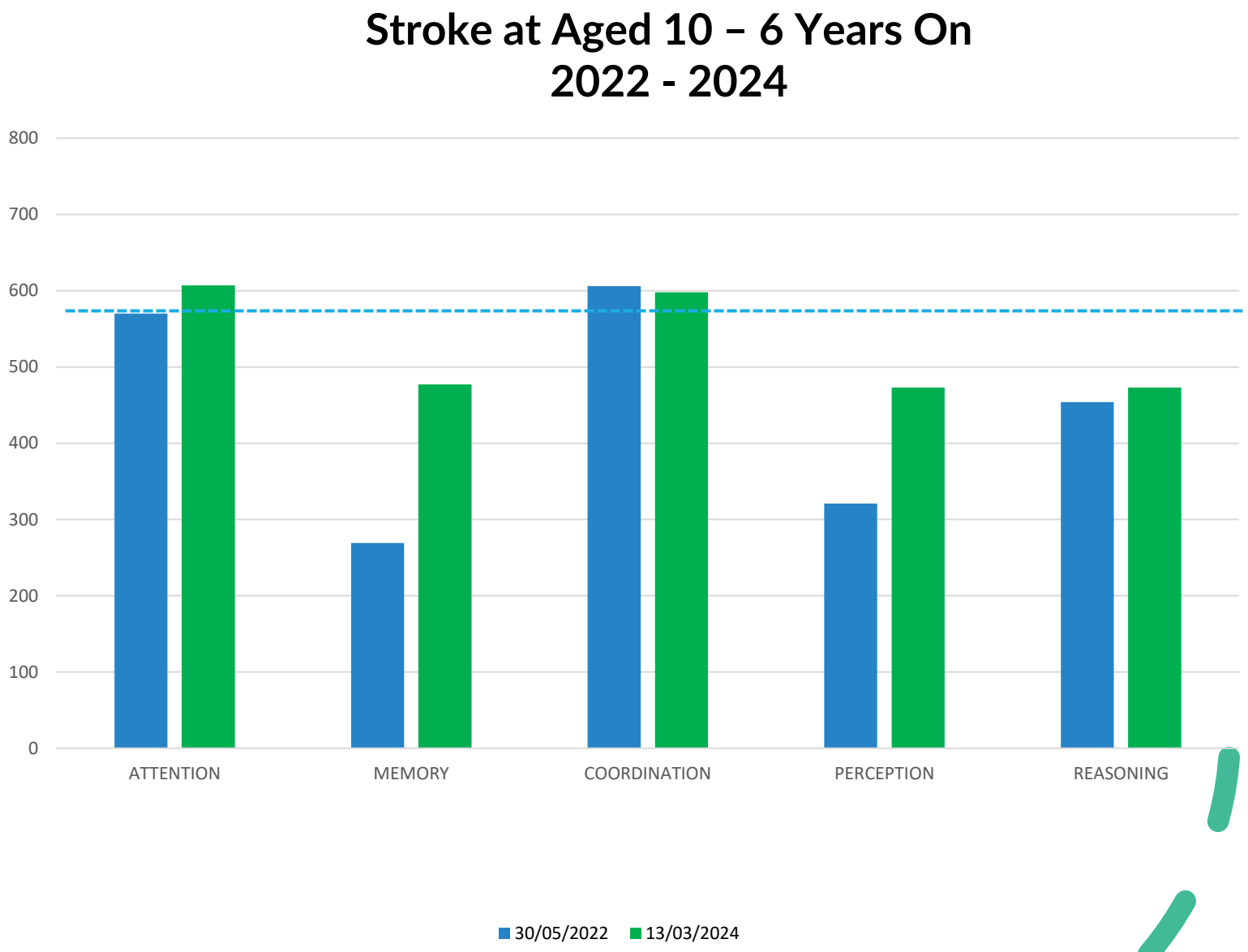
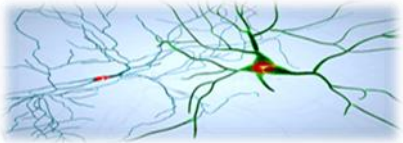
Our Outcomes





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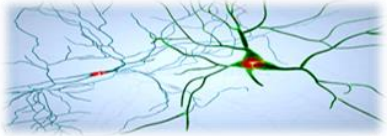

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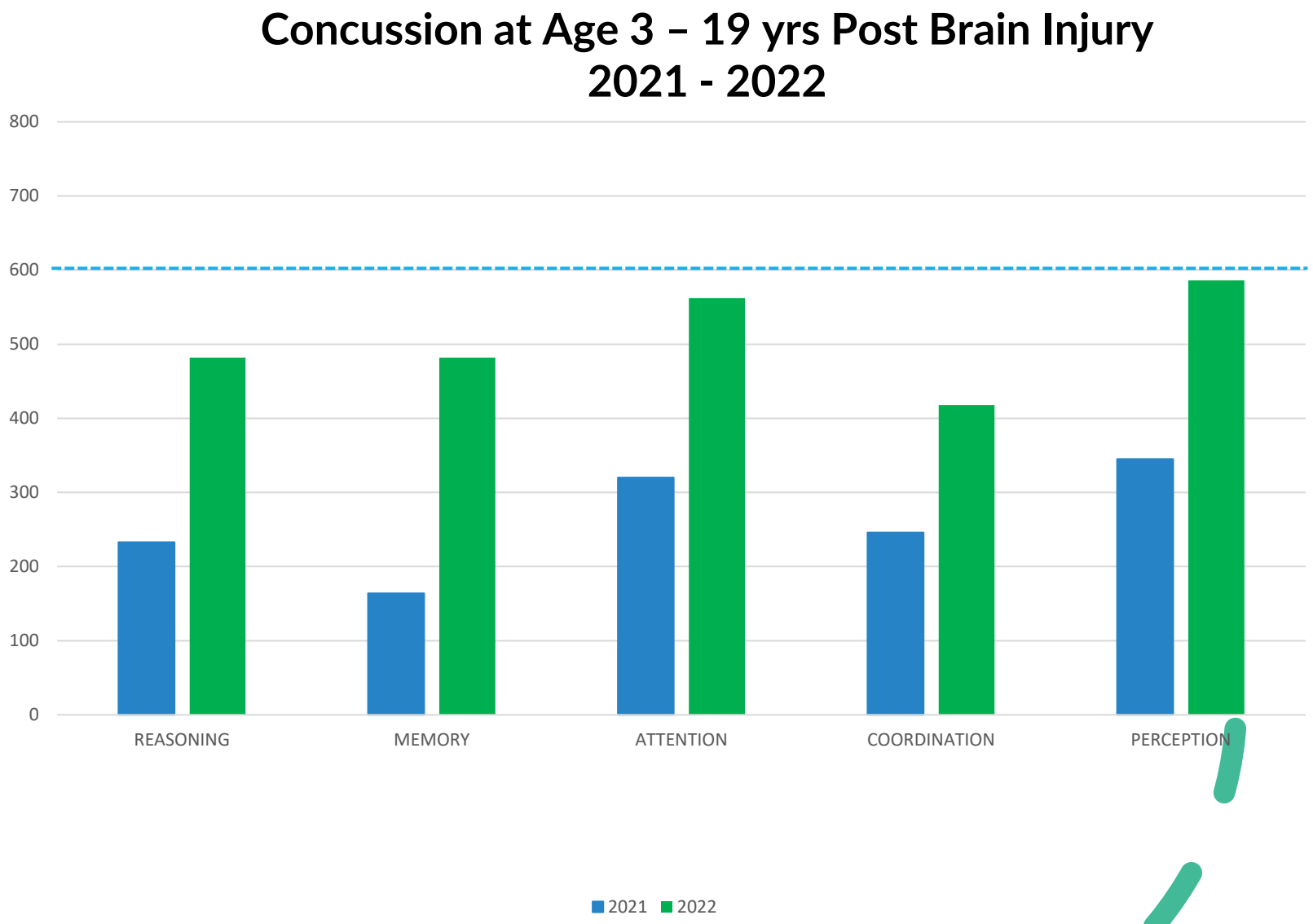
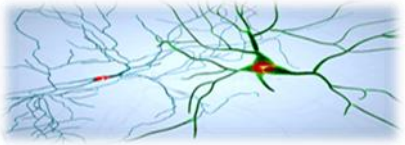
Our Outcomes





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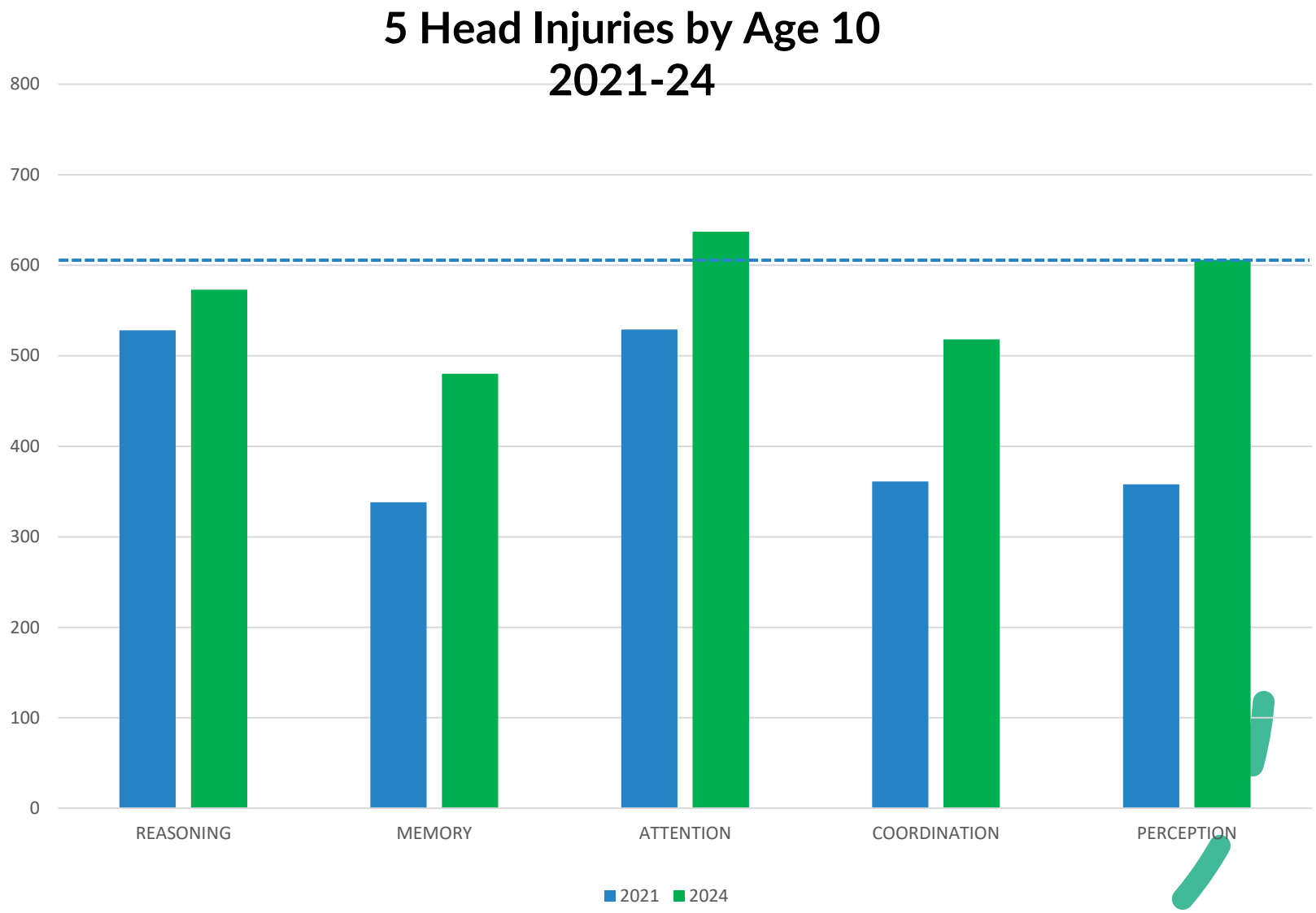
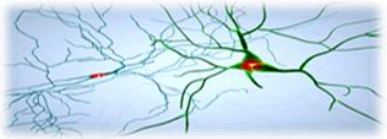
Our Outcomes





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