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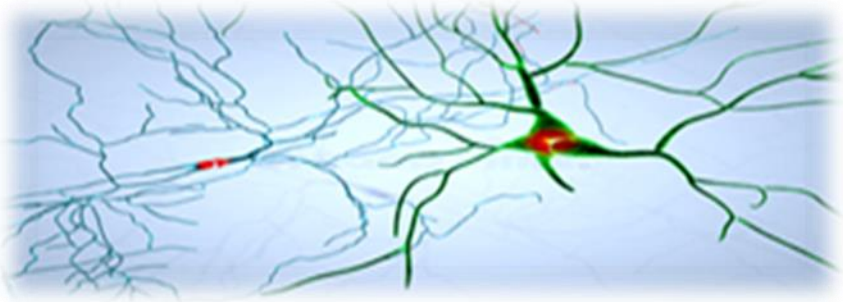
PAEDIATRIC ACQUIRED BRAIN INJURY

IT'S MORE COMMON THAN YOU THINK!

By: Jan Rock



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)

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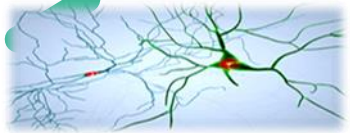

How are Acquired Brain Injuries Caused?

TYPE 1	TYPE 2
TRAUMATIC BRAIN NJURY (TBI)	NON-TRAUMATIC BRAIN INJURY (N-TBI)
CAUSES: • Falls / trips • Road traffic accidents • Concussion • Extreme sports • Cycling accidents • Sporting head injuries • Assault	CAUSES: • Stroke • Meningitis • Encephalitis • Hydrocephalus • Brain haemorrhage • Brain Tumour • Cardiac Arrest • Drowning • Strangulation • Suffocation • Poisoning • Chemotherapy Treatment

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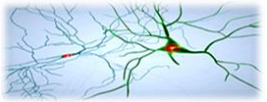

Causes of traumatic brain injury by age

• NHS REVIEW OF PAEDIATRIC TBI'S - 2010

AGE	% OF CHILDREN	CAUSE OF BRAIN INJURY
< 12 MONTHS	19%	• **BEING DROPPED** – from a metre + (Adult height/4 steps) • **SHAKEN BABY**
1-4	35%	• **FALLS** – from furniture, car seats, cots, Moses baskets • **CRUSHING** – Household item falling on a child • **BEING DROPPED** – from a height i.e. being carried by an adult • **COLLISION** – with other children, furniture walls, doors • **ASSAULT**
5-9	19%	• **FALLS** – above a metre or climbing • **SKULL FRACTURES**
10 - 19	25%	• **FALLS** • **ROAD TRAFFIC ACCIDENTS** • **SPORTS RELATED INJURY** • **RECREATIONAL ACTIVITY**

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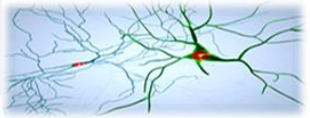
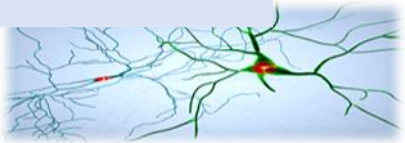


Prevalence of Neuro-disability in the general CYP population

- 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) DYSTONIA **SENSORY DEFICITS** VISUAL AUDITORY SMELL TASTE *TOUCH* *VESTIBULAR (BALANCE)* *PROPRIOCEPTION* *INTEROCEPTION* **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 LABILITY (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

(BSRM & RCP 2003)

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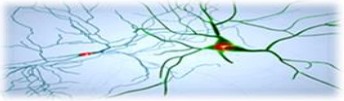

SHARED BEHAVIOURAL SYMPTOMS BETWEEN ASD & PAEDIATRIC TBI

dx **PART OF ASD DIAGNOSTIC CRITERIA**

X **HIGHLY PREVALENT WITH TBI**

***** **GREATEST AREA OF DEFICIT IN TBI**

SYMPTOM	ASD	TBI
PERCENTAGE OF POPULATION AFFECTED	**1.2%**	**31.6%**
ADHD	X	X
ANXIETY/ STRESS	X	X
BALANCE // COORDINATION	X	X
COMMUNICATION DEFICITS	dx	X
DPRESSION		X*
EMOTIONAL-EMPATHY LACKING		X
EMOTIONAL DYSREGULATION		X
EMOTIONAL RECOGNITION	X	X*
EXECUTIVE FUNCTION IMPAIRMENT	X	X
FAMILY RELATIONSHIPS		X
HEADACHES		X
LANGUAGE DEFICITS/DELAYS	dx	X
MENTAL RETARDATION	X	
REPETETIVE BEHAVIOURS	dx	X
RESTRICTED INTERESTS	dx	X
SEIZURES	X	X
SELF-REGULATION BEHAVIOUR IMPAIRED	X	X
SENSORY DYSFUNCTION	dx	X
SOCIAL LONELINESS + ISOLATION		X
SOCIAL INTERACTIONS SKILLS	dx	X
Number of associated symptoms	**14/20**	**19/20**

Source: PubMed; Pediatric Traumatic Brain Injury and Autism: Elucidating Shared Mechanisms

Rahul Singh,[1] Ryan C. Turner,[1] Linda Nguyen,[2] Kartik Motwani,[3] Michelle Swatek,[4] and Brandon P. Lucke-Wold[1,*]

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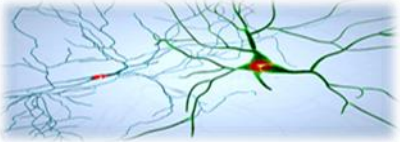

BRAIN INJURY FACTS

The younger the child at the age of injury, the greater the possibility of long-term difficulties

Injury to a child's developing brain with not yet established skills and functions, create increased complexity for treatment and has far reaching effects

Cognitive impairment may be masked in primary school and only become apparent in teenage years

Good outcomes (post brain injury) are very variable and patchy

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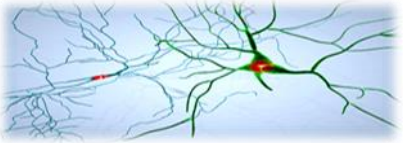

The Prevalence of neuro-disability in young people who offend 2012

65.1%-72.1%

young people in custody with a TBI

Many have mental capacity issues

40 – 49 %

reading & reading comprehension below the age of 10

60 – 90 %

Speech and language impairments

Ages and causes of TBI:

Age 14 or less – falls

25 – contact sports/RTA's

Highest risks of TBI: CYP & older adults

Rates of disability – HIGH

Elevated death rates: up to 15 years post injury

Highest mortality rates in younger adults

Impairments:

cognitive, communication, emotional & behavioural

Head injury –

links with aggression, violence & emotional deregulation

(Source: The Children's Commissioner: Nobody Made the Connection Report 2012)

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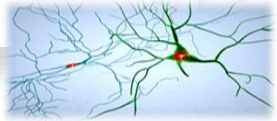

TBI and homelessness: The Evidence

2012 – Disabilities Trust Study undertaken in Leeds

48% homeless young people had experienced a head injury

90% were sustained before they were made homeless

These statistic are also reflected in homeless people in other countries

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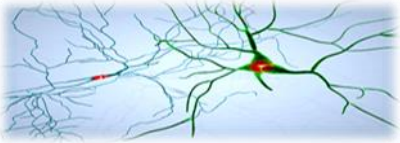

CAPACITY TO RECOVER

Neuroplasticity

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

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

COGNITIVE STIMULATION

– not medication!)

Outcome of paediatric ABI is directly related to

Family function

Social support &

Financial resources

Ages and causes of TBI:

Age 14 or less – falls

25 – contact sports/RTA's

The poorer the socio-economic resources + support networks

= poor outcomes

(Source: The Children's Commissioner: Nobody Made the Connection Report 2012)

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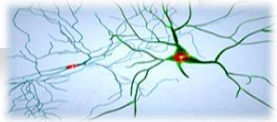
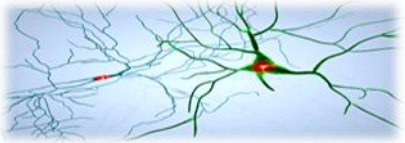


So if you are serious about:

"Accelerating the momentum to transform and improve the provision available to people with learning disability and/or autism"

THINK ACQUIRED BRAIN INJURY <u>FIRST</u>



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What needs to change?

Acknowledge that Acquired Brain Injuries as the biggest cause of death and disability in children and young people

By the age of 4 - 50% of all toddlers will have already sustained a TBI (Source: Public Health)

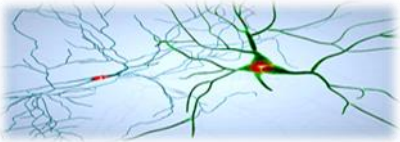
Well co-ordinated **neuro-rehabilitation that is aspirational to aid recovery**

Support to develop cognitive skills needed for learning, employment and life **– physical, communication, cognitive and emotional/behavioural**

A new pathway - Increased access to **appropriate community-based rehabilitation support – not mental health services**

Individualised 1-1 educational support which move between home and school

Ongoing Peer Mentoring, Education and Support for child ABI families – not parenting classes



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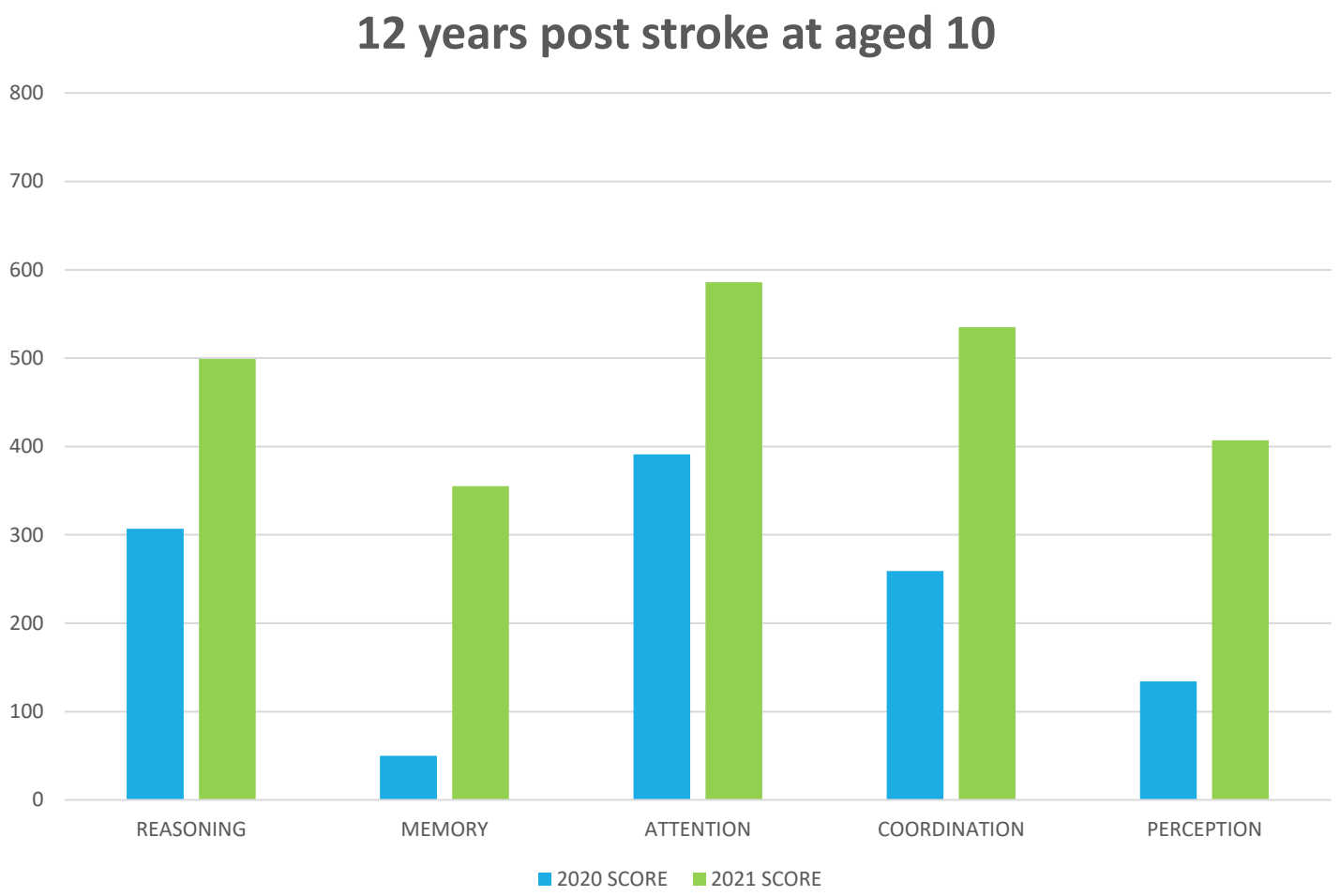
OUR APPROACH

- WE SCREEN ALL THE KIDS WE WORK WITH.
- WHERE THERE IS NO DIAGNOSIS, WE USE CLINICAL DECISION-MAKING MODEL:

1. DETERMINE THE PROBABILITY BASED ON THE CASE HISTORY, SYMPTOMS ETC. WHAT IS THE LIKELIHOOD?
2. GATHER DATA BY FURTHER EVALUATING THE PERSON. WHAT DO OTHER ASSESSMENTS STATE/HIGHLIGHT?
3. UPDATE OUR PROBABILITIES BASED ON THE DATA THAT HAS BEEN GATHERED
4. PRIORITISE THEIR NEEDS
5. PLAN AN INTERVENTION – BASED ON A LOGICAL STRUCTURED APPROACH

OUR OUTCOMES



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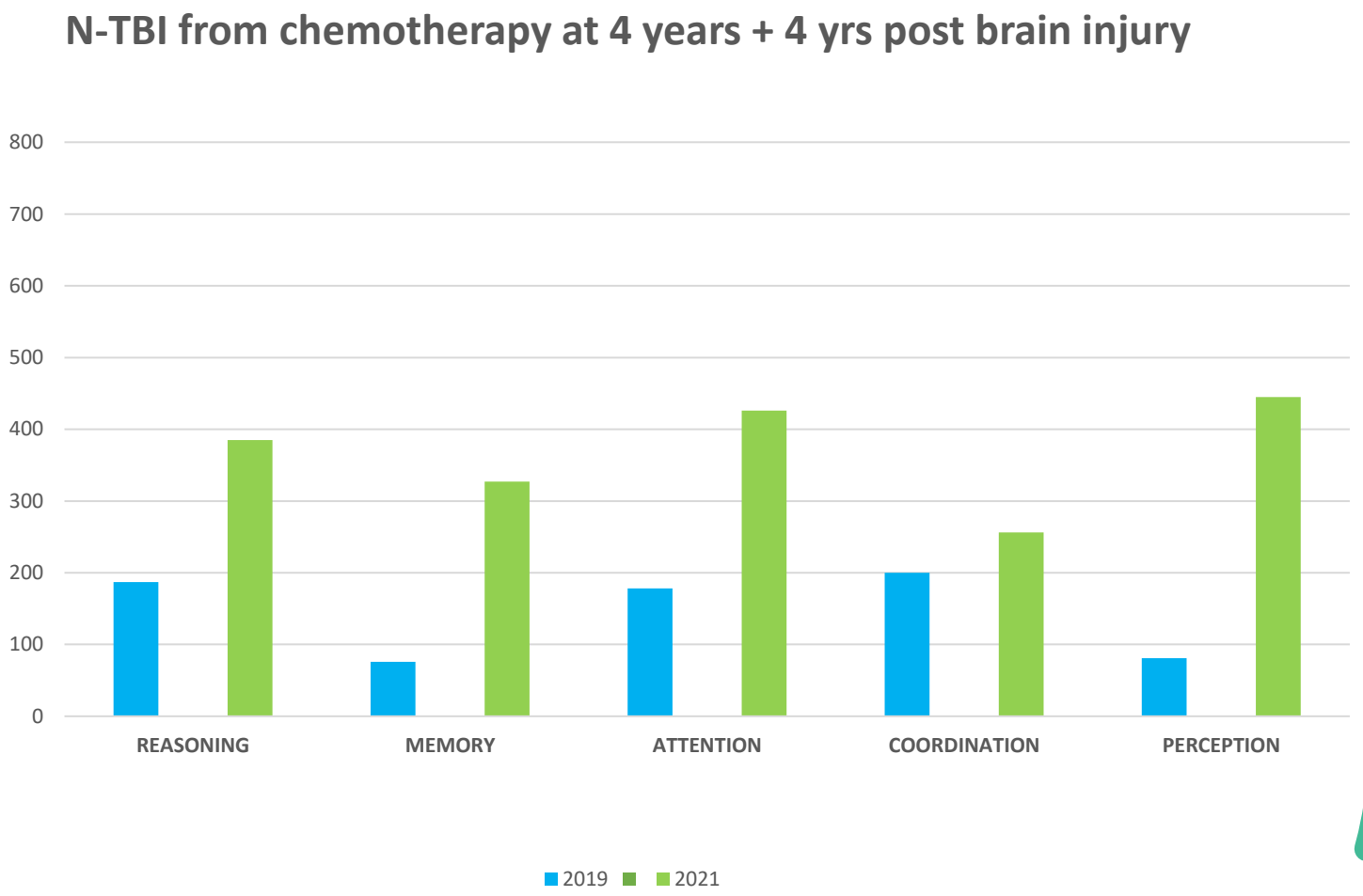

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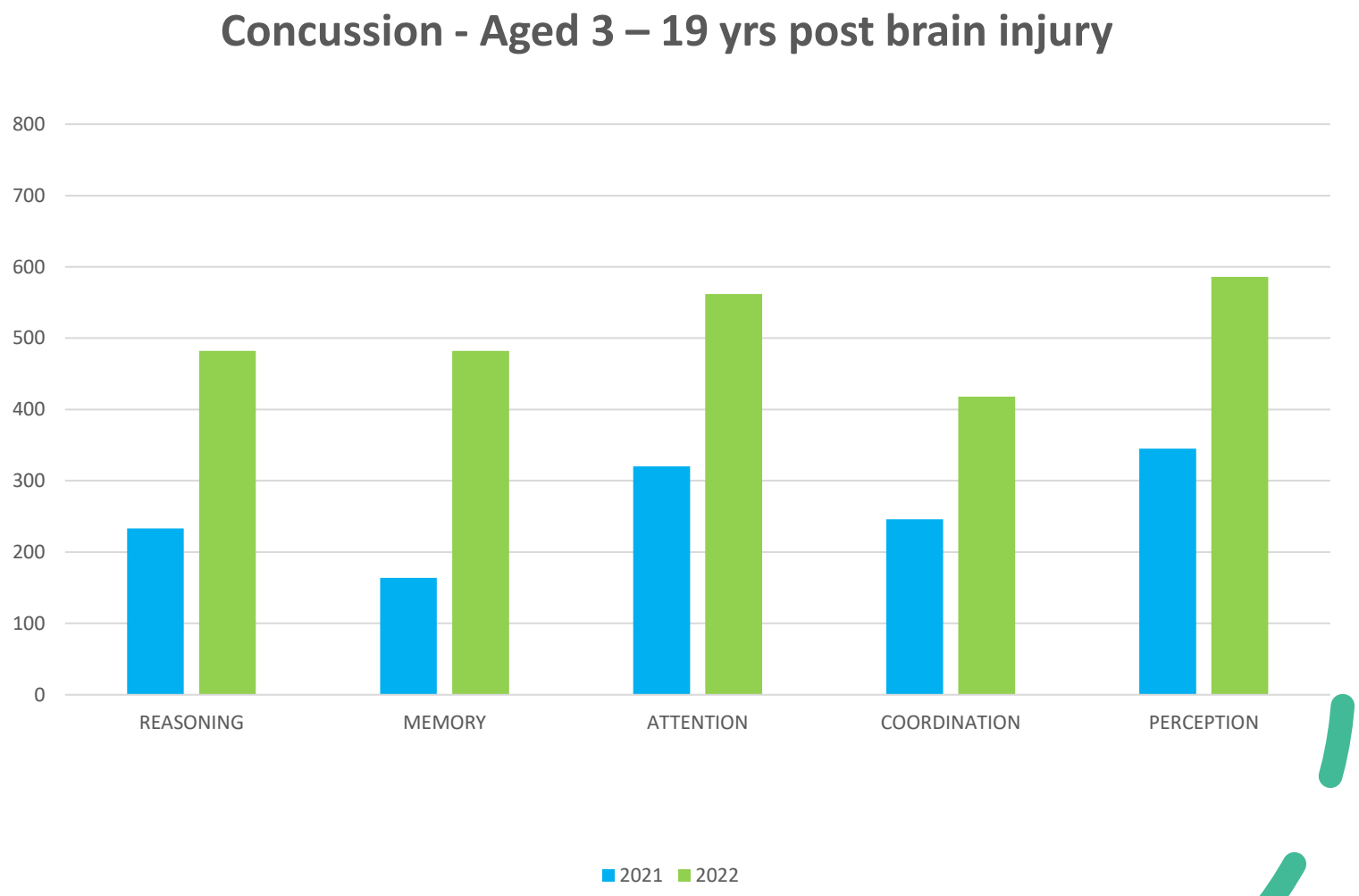

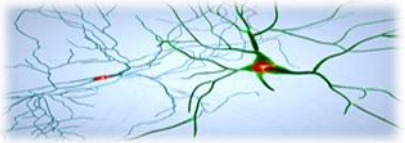

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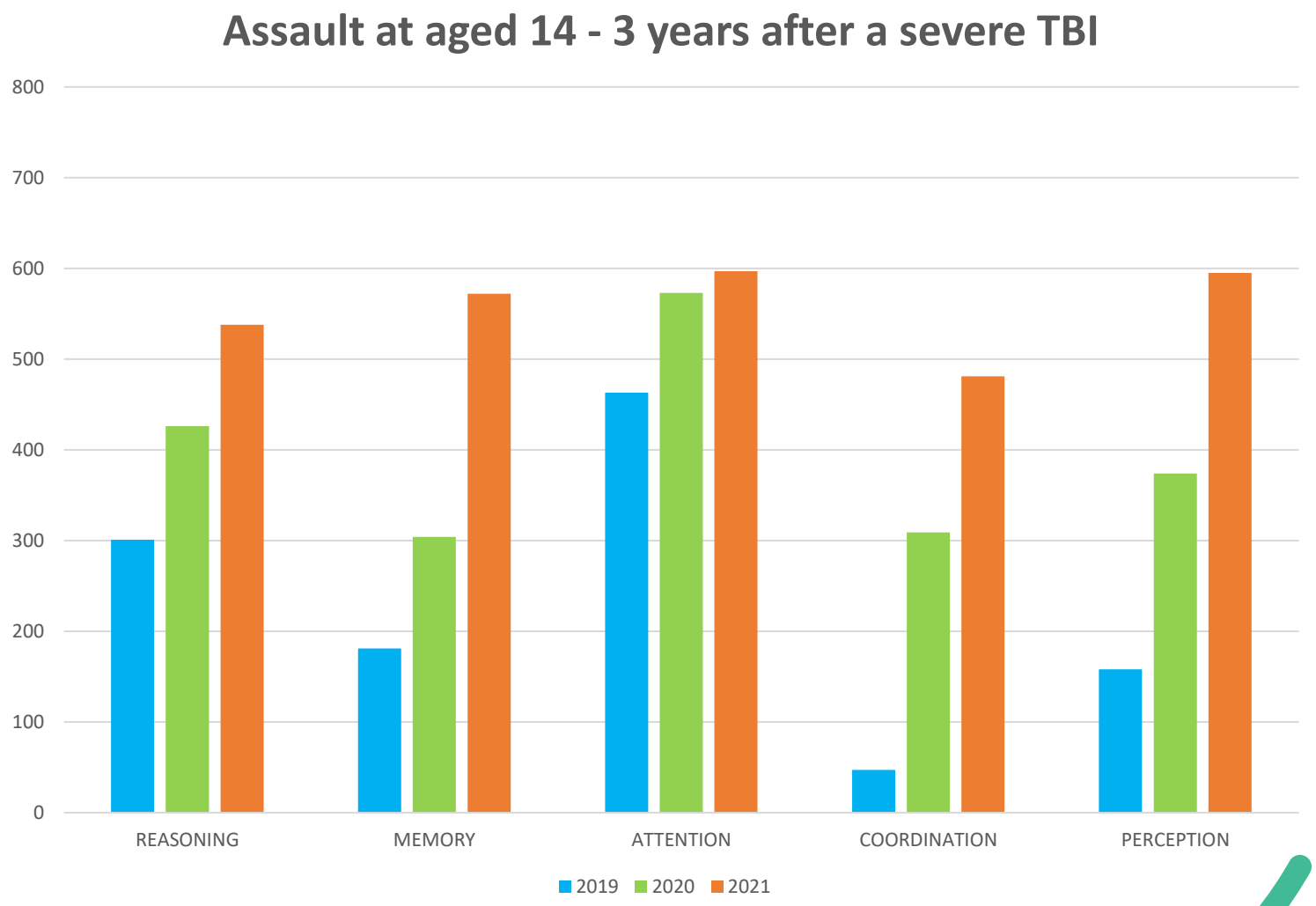

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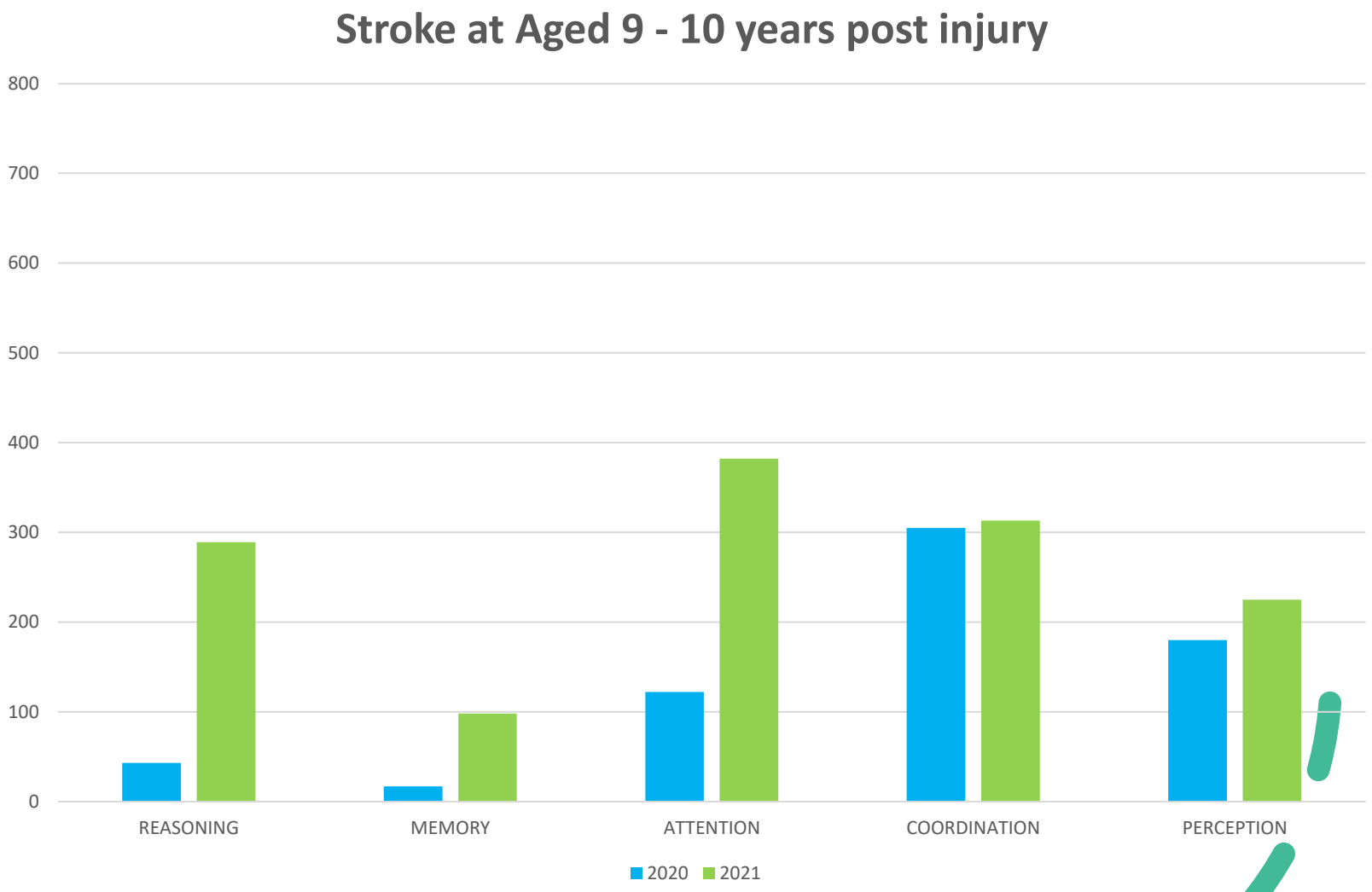

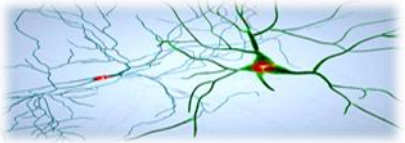

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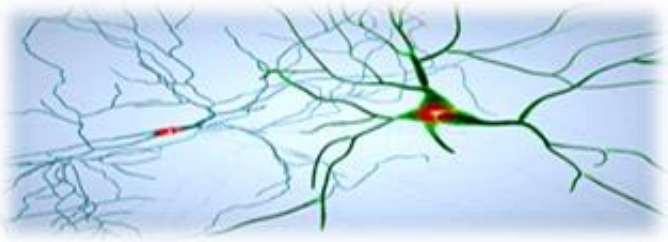
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