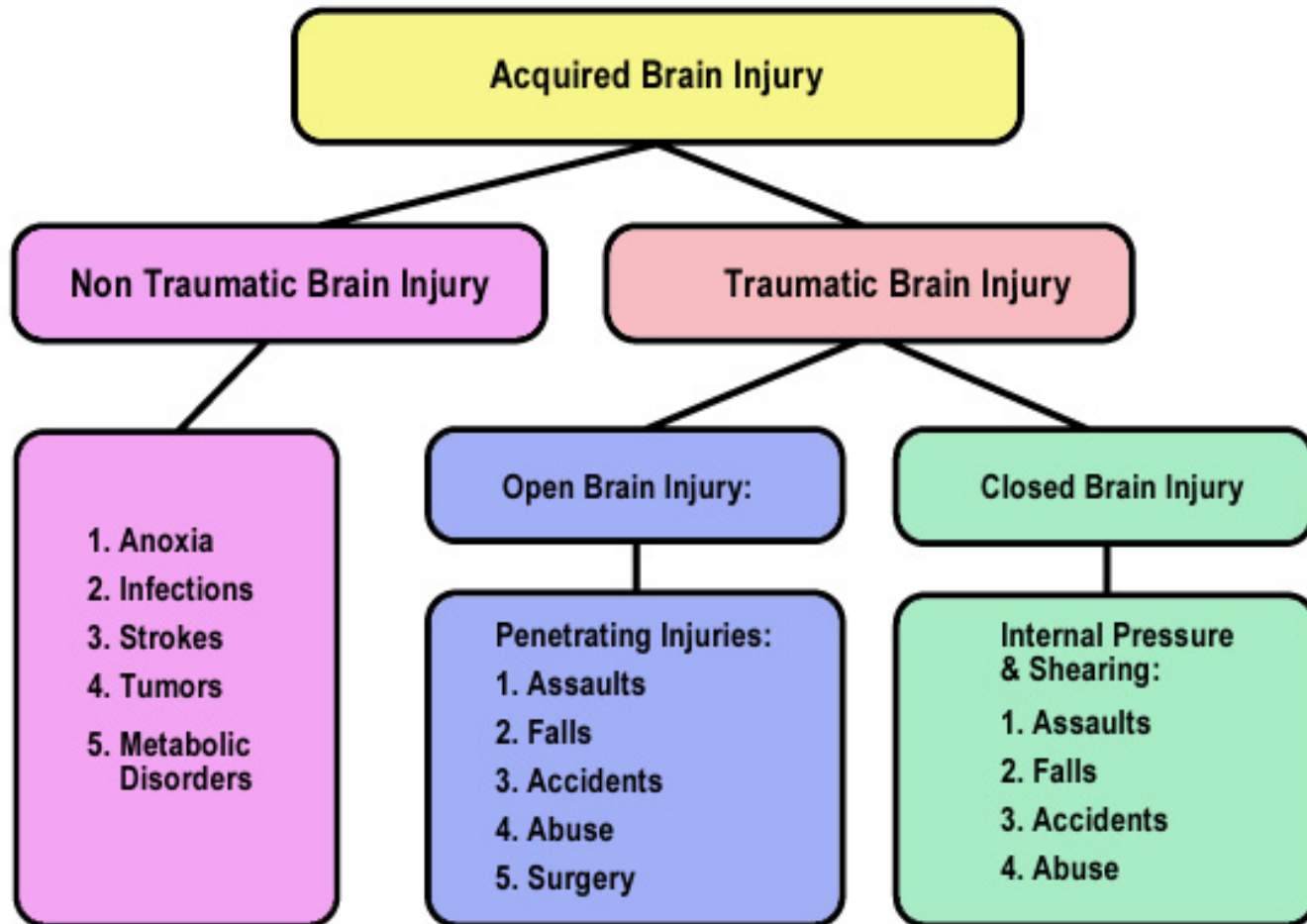


Changing your risk of dementia - what we know about head injury and alcohol?

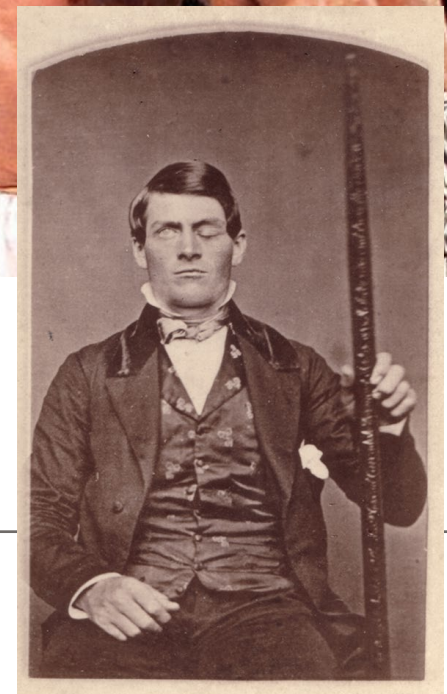


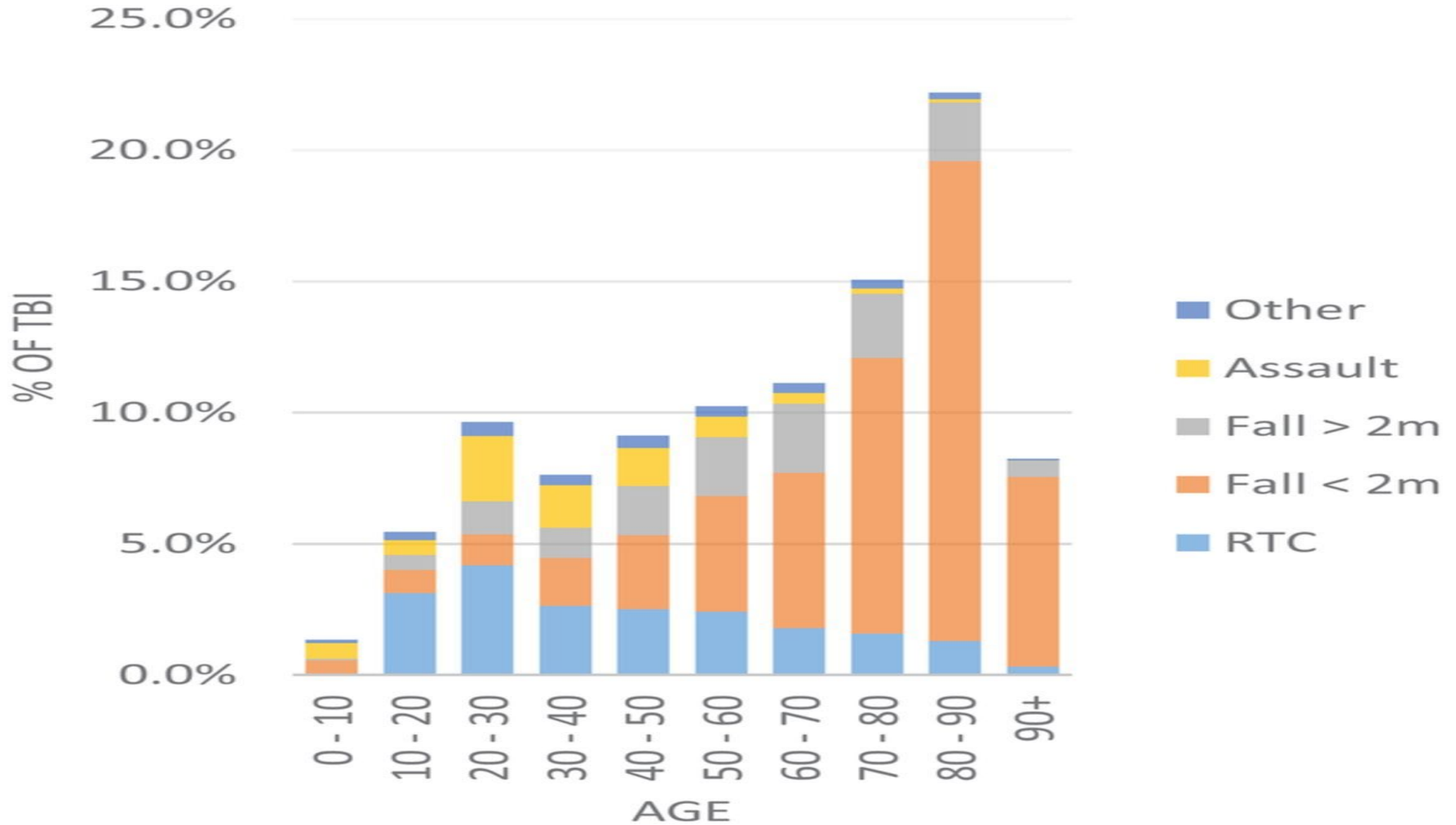
Vanessa Raymont
Senior Clinical Researcher &
Honorary Consultant Psychiatrist
University of Oxford





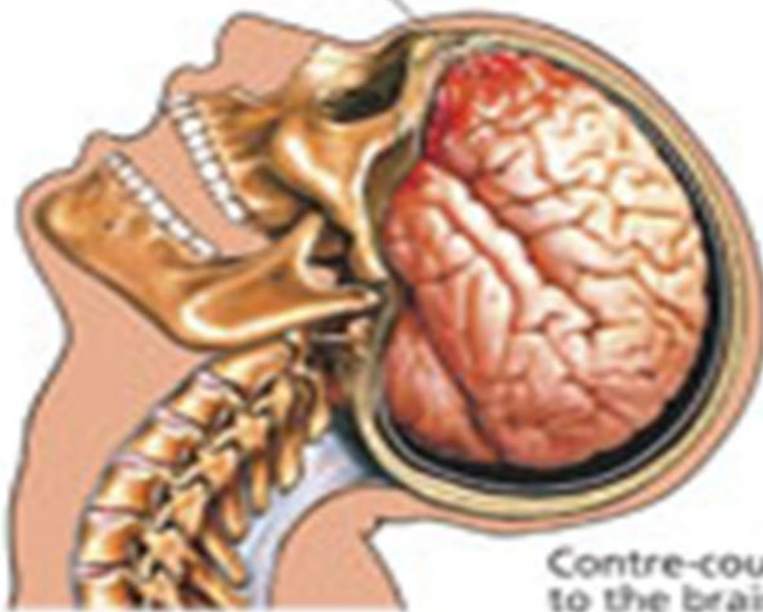
- Head Injury/Traumatic Brain Injury (TBI) = 'silent epidemic'
- In UK - TBI suffered every 3 minutes; 1million attend A&E/year, many unreported; 80% discharged
- 75% = concussions/mild TBI
- Leading cause of death & disability in over 45s
- 500,000 living with long term disabilities
- ↑ over 50% in past decade
- Acute & on-going costs £5-7billion/year = 0.5% of the entire annual global output
- WHO identified TBI as major public health problem with huge unmet needs



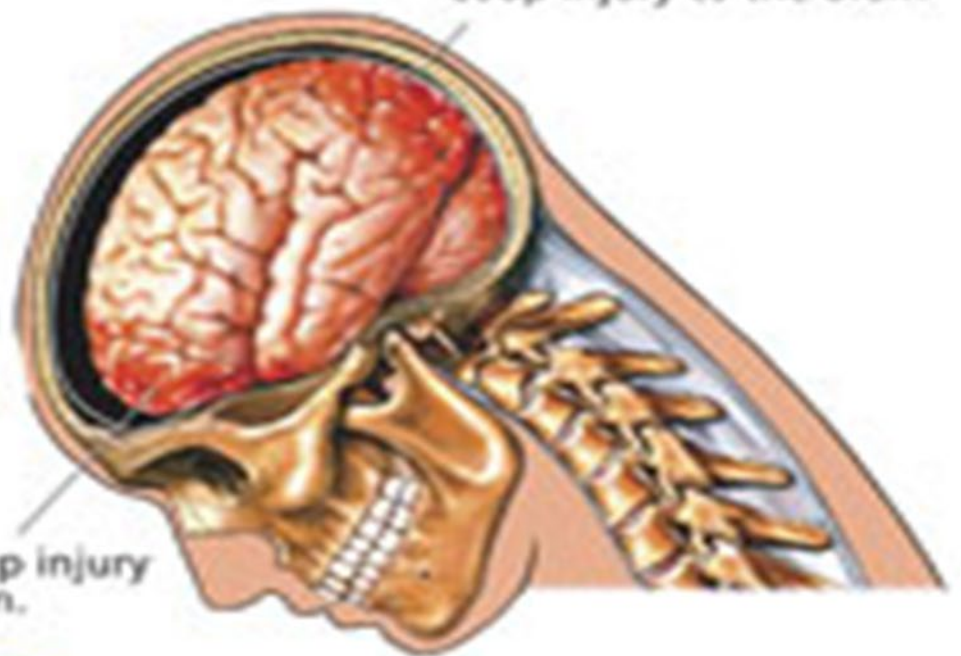




Contre-coup injury to the brain.



Coup injury to the brain



Contre-coup injury to the brain.

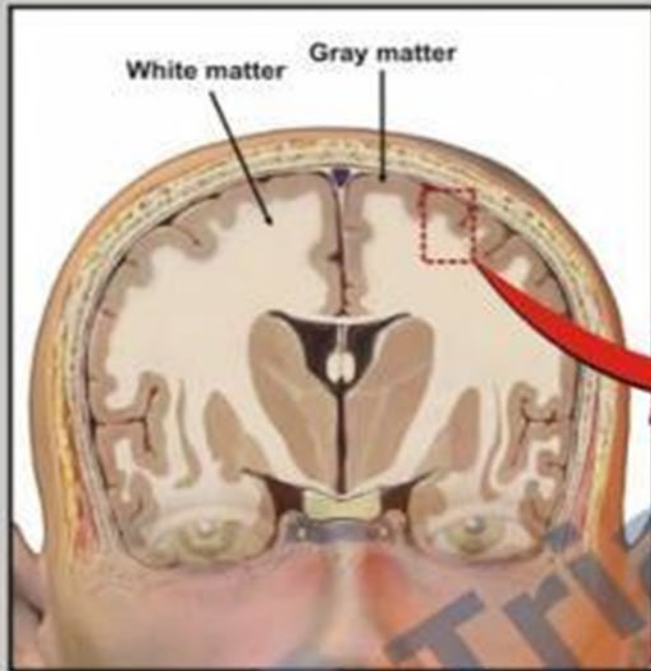


Contre-coup Injury to the Brain.

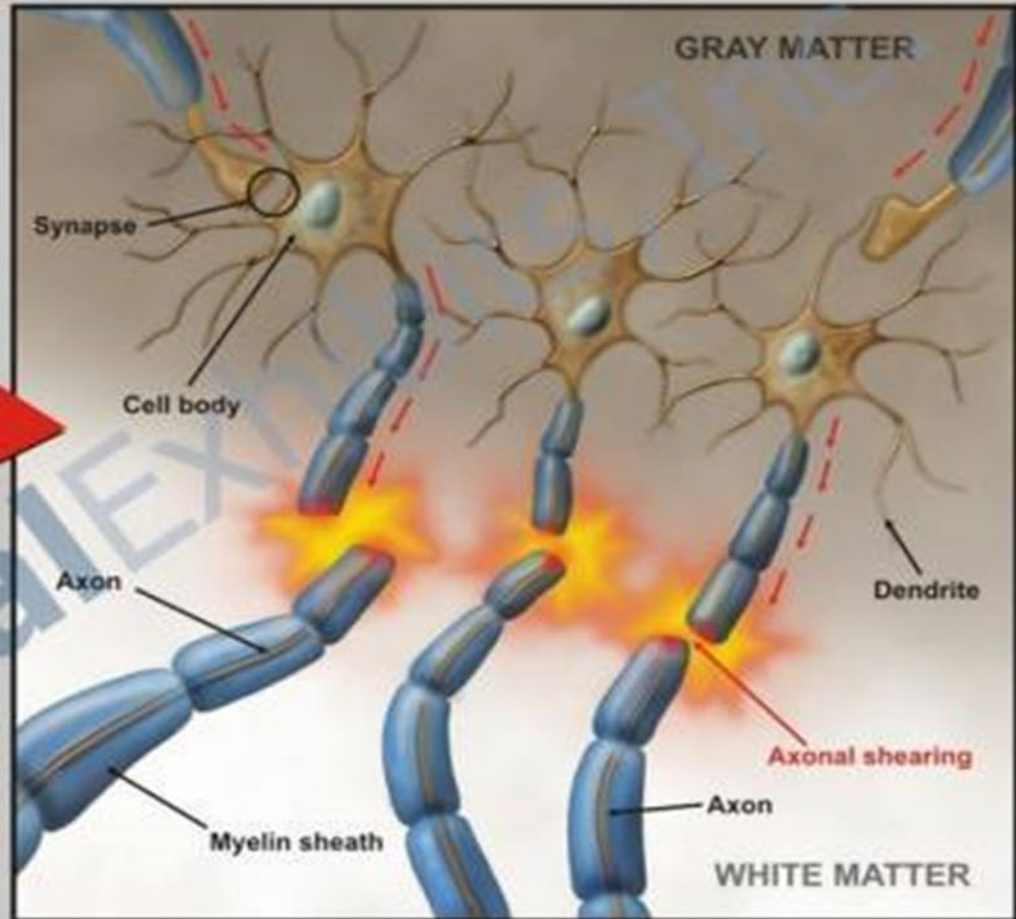
What does TBI do?

- Location - anywhere in brain, frontal lobe damage commonest
 - Visible - bruise, bleeding, tissue deformity
 - Invisible - 'axonal damage' - 43-68% of mild TBI have normal CT/MRI scan
-

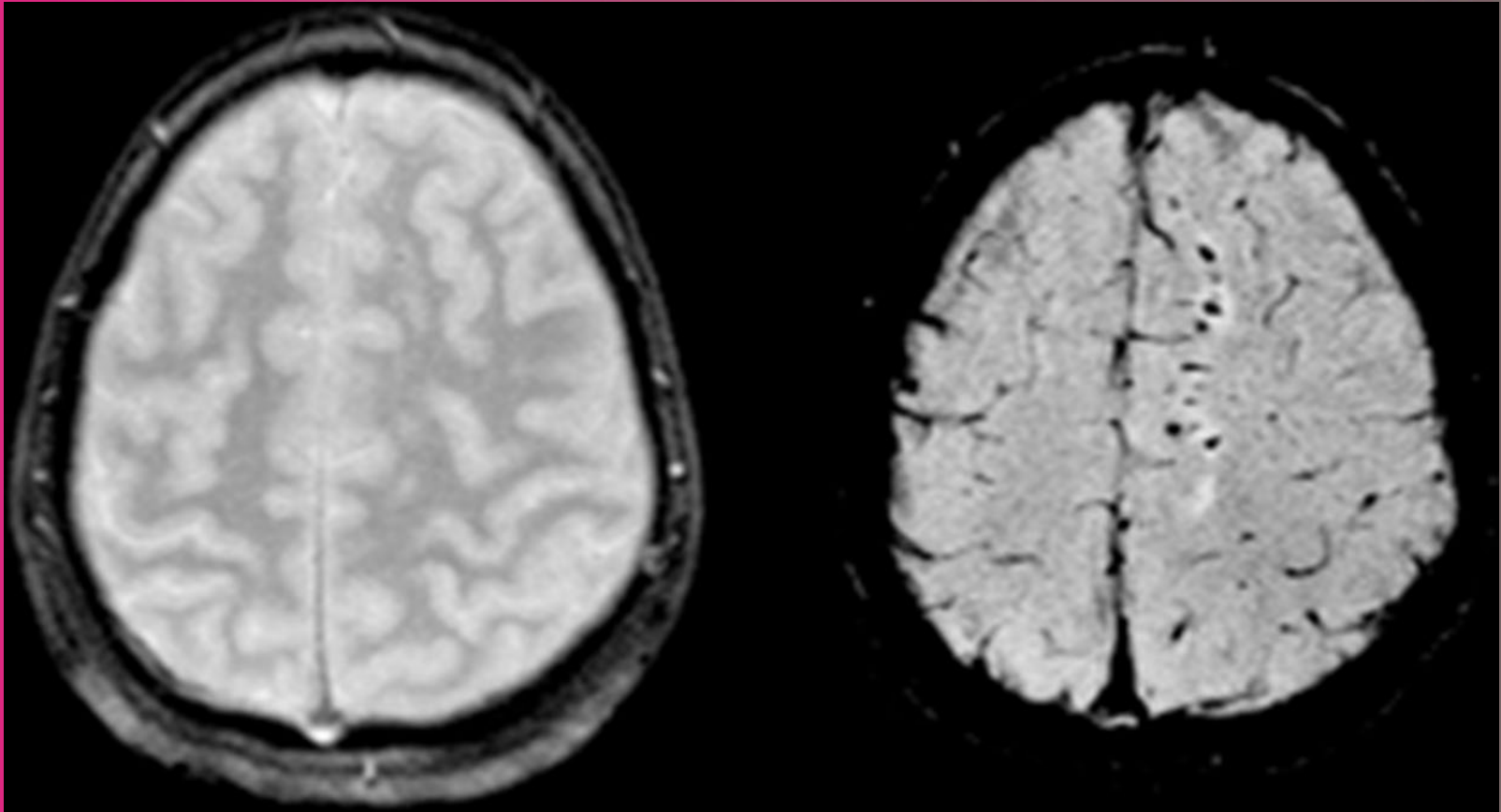
DIFFUSE AXONAL INJURY



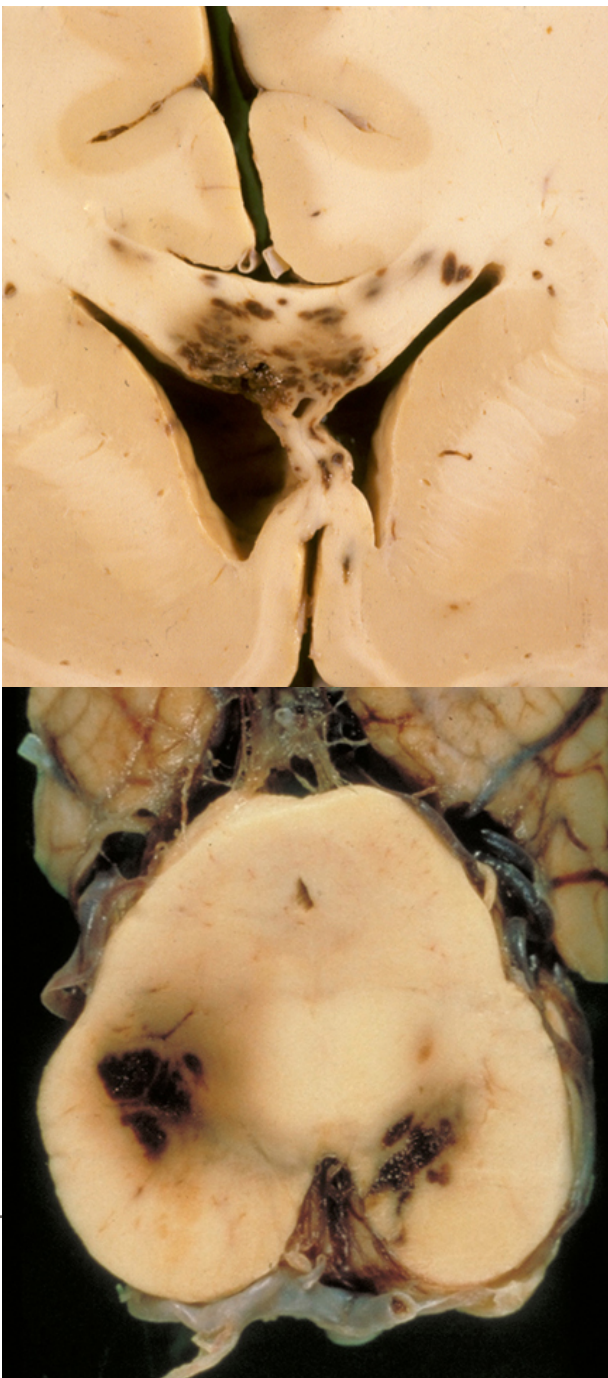
Sudden acceleration-deceleration forces cause injury to the brain.



The injury is greatest in where the density difference is greatest.
Most tearing occurs at the gray-white matter junction.

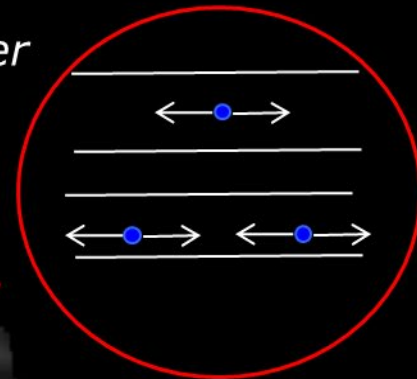
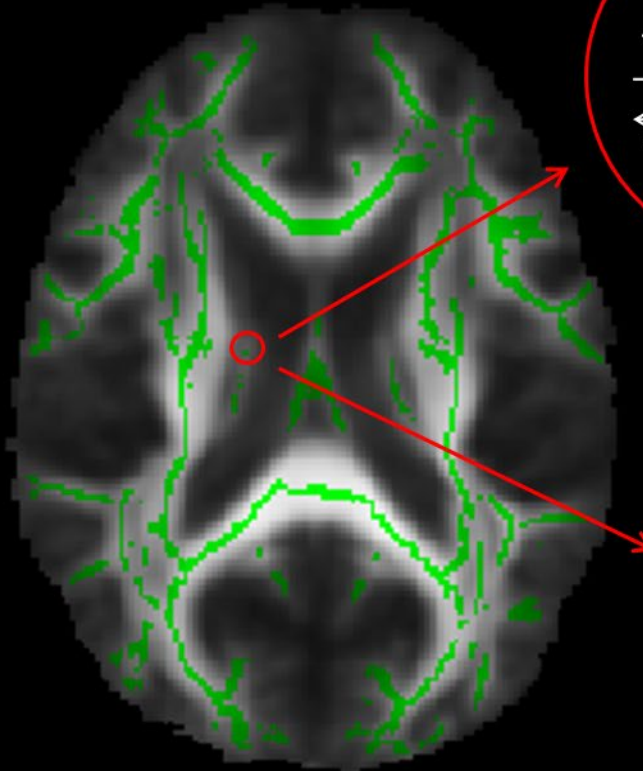


Comparison of diffuse axonal injury imaged with conventional MRI (left) and susceptibility weighted imaging (right)

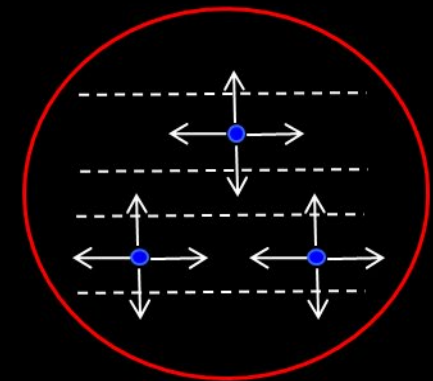


- Small lesions correspond to ‘traumatic microbleeds’
- While being the only marker of DAI, microbleeds may not correlate with the degree of axonal damage

Normal White matter



White matter in TBI

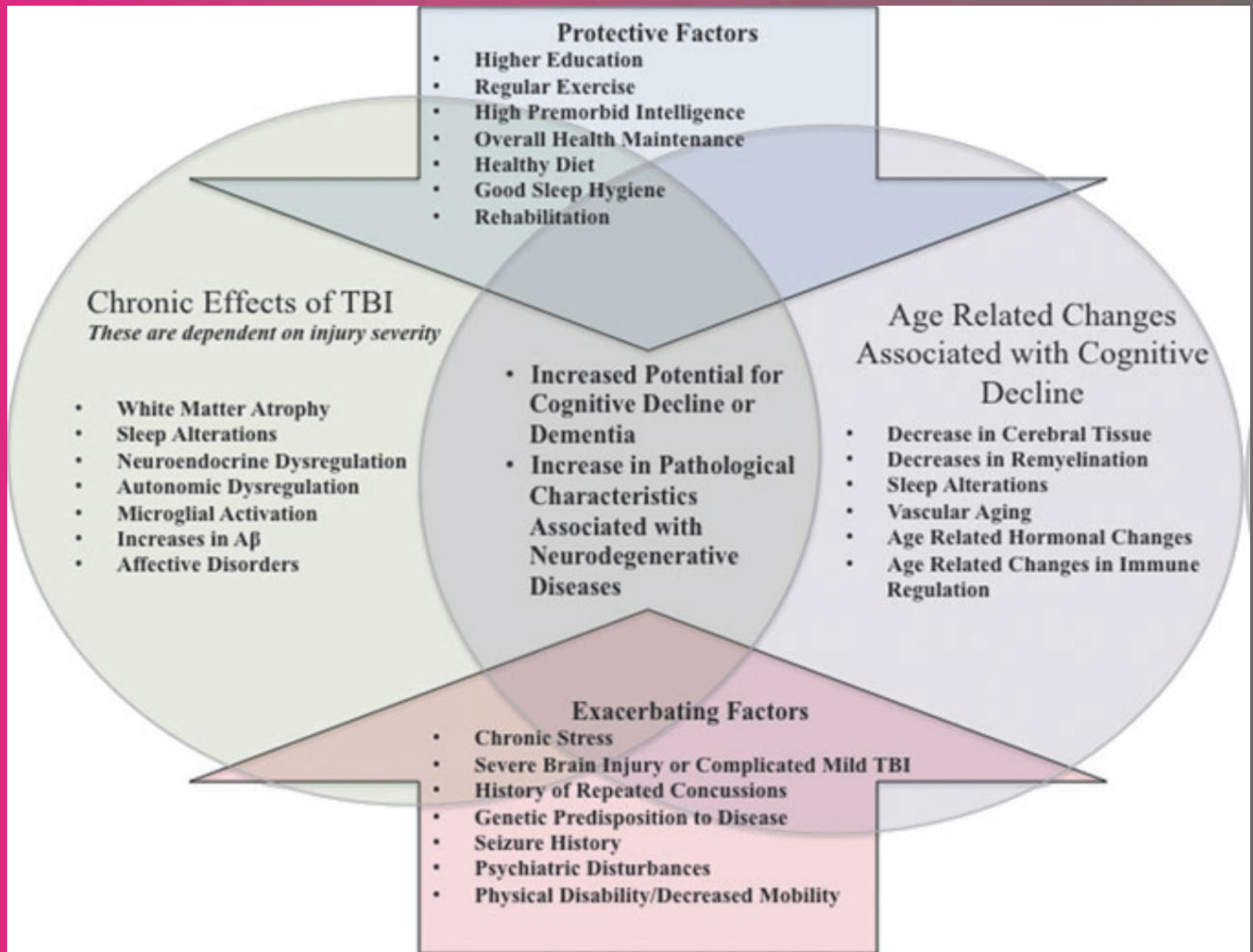


*Traumatic axonal injury
Low fractional anisotropy*

TBI & dementia



- Cognitive problems in former boxers reported 50 years ago (Roberts 1969)
 - 65% (moderate/severe TBI) report long-term cognitive problems (Whiteneck 2004)
 - 1991 meta-analysis = TBI → 1.82 ↑ risk for Alzheimer's
 - Many ranked TBI only after age, family history, APOE genotype in importance as risk factor, with some interactions e.g. higher in APOE carriers with TBI - ?worse in young, repeated TBIs
 - Greater amyloid levels 1-30+ years after moderate/severe TBI
 - **Overall - 1.6 ↑ risk for Alzheimer's Dementia with TBI - men more than women ≈ 5% of all dementia cases**
-



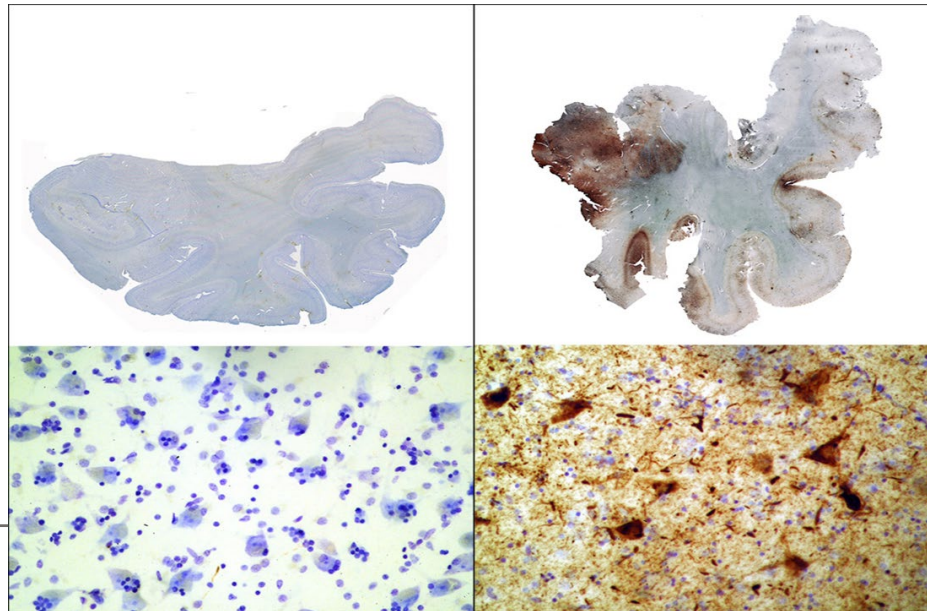
Conflicting evidence

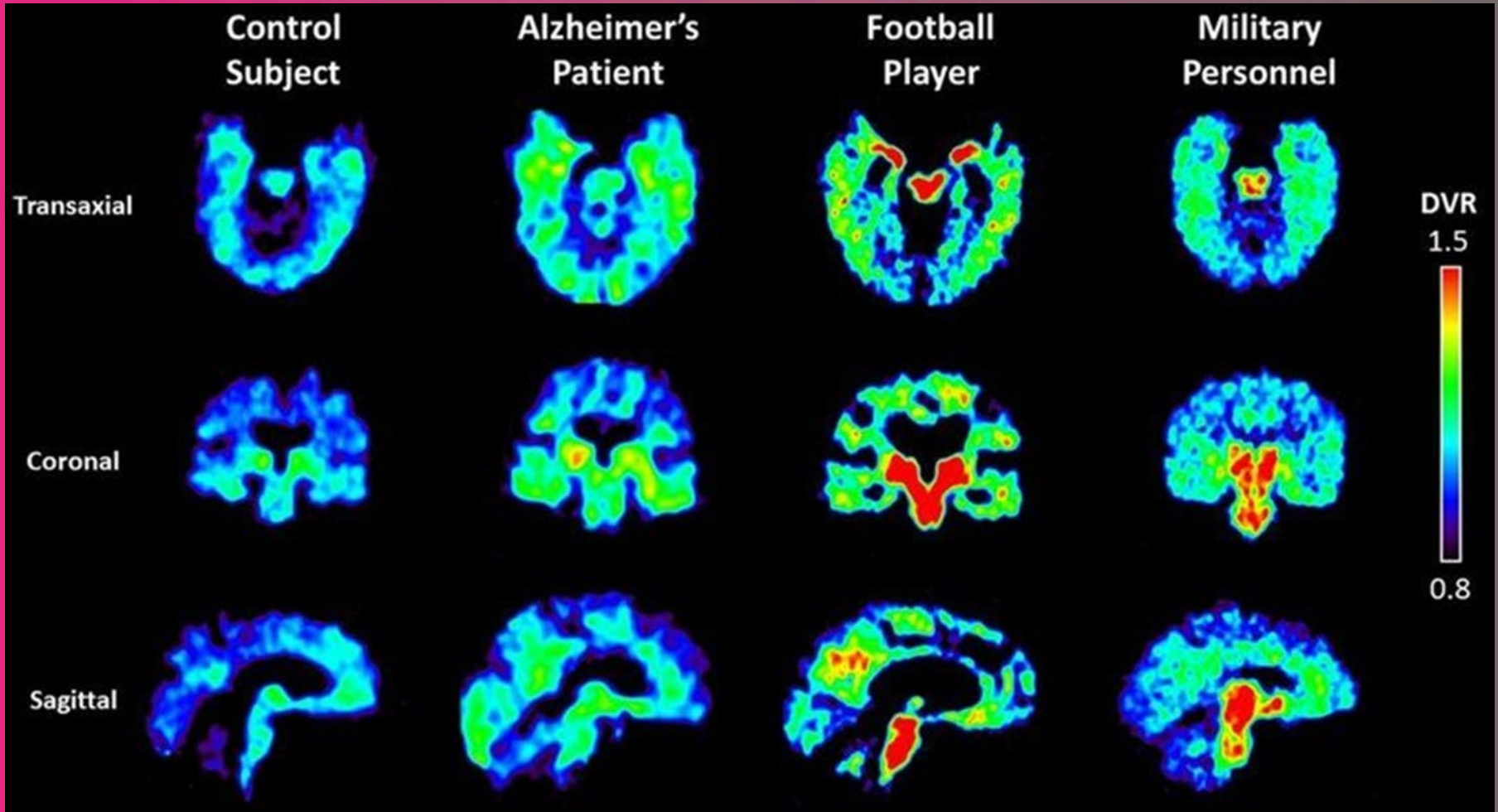


- 2016 - 3 large community-based studies - 7,130 participants, 1,589 underwent post-mortem from 1994-2014
 - history of moderate/severe TBI not associated with AD or the pathologic features of AD
 - 2017 - used medical records & established AD biomarkers e.g. amyloid PET - showed no effects of TBI history on cognition or AD biomarkers
 - No clear evidence with other types of dementia
-

Chronic traumatic encephalopathy (CTE)

- “Punch drunk syndrome” - 1928 case report → “Dementia pugilistica”
- 1973 - widespread neurofibrillary tangles
- Highly debated - ?mild TBI activates neurodegeneration → CTE OR ?accelerates other neurodegenerative conditions OR ?progresses over time to involve more brain areas





Chen et al., FDDNP-PET Tau Brain Protein Binding Patterns in Military Personnel with Suspected Chronic Traumatic Encephalopathy. *Journal of Alzheimer's Disease*, vol. 65, no. 1, pp. 79-88, 2018. 10.3233/JAD-171152

	Chronic Traumatic Encephalopathy	Alzheimer's Disease
Neurofibrillary tau tangles location	Layers II and III of cortex,	Layers V and VI of cortex and hippocampus
Clinical Features	Mood disturbances and Parkinson's like features, tangles and few or no amyloid plaques	Cognitive impairment with amyloid pathology in middle frontal and temporal lobes
Anatomy	Perivascular distribution of pathology	Severe cerebral atrophy

Mild TBI

- ~100-300 per 100 000; 10-15% Post Concussion Syndrome
 - Recent population-based studies =1.2-3.3 ↑ dementia risk even after adjusting for demographics, medical & psychiatric illnesses
 - Outcome is likely multifactorial e.g. pre-existing personality, stress (e.g. role change, relationships), psychiatric conditions e.g. depression/PTSD, substance abuse, chronic pain etc
-

Difficulties

- dementias have an insidious onset & may already be present
 - rely on retrospective information
 - lack of universal standard for classifying TBI & most not mTBI/repeated TBIs
 - lack of gold standard dementia criteria
 - most population studies - yet most not recorded in medical notes
 - not controlling for important confounding factors e.g. psychiatric disorders
 - poor matching of cases & controls
 - short follow-up periods
-

What do we know?



- TBI has a relationship with dementia in SOME - likely multifactorial & related to severity
 - Likely no link between TBI & accelerated ageing OR rate of decline of dementia
 - **Still unclear...**
 - mechanism/treatments
 - if changes stabilise or not or if mTBI causes persistent neurodegeneration
 - impact of psychiatric symptoms
 - gender differences - more females getting mTBIs - ?neck girth, metabolism, hormones
 - **We need...**
 - better research methods e.g. clinical assessments of TBI, head-impact devices
 - better markers of long term changes - atrophy, PET (amyloid, tau, inflammation)
 - treatments!
-

smithjones

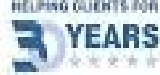
SPECIALIST LITIGATION SOLICITORS

smithjonessolicitors.co.uk

Freephone 0800 195 9590

'NO HEAD INJURY IS TOO SEVERE TO DESPAIR OF NOR TOO TRIVIAL TO IGNORE' HIPPOCRATES - 400bc

It's important for the victim of a head injury to be aware of the signs and symptoms this booklet describes, attempting to carry on may be harmful to your recovery. Accurate diagnosis of a subtle condition requires a specialist - ensure that those advising you have the experience to identify your needs and select the most relevant expert.



FUTURE

What is BBC Future? Best of... Future Planet Made on Earth



Why women are more at risk from concussion

MOSAIC@FUTURE HEALTH



By David Robson
31st January 2020

Women athletes are twice as likely as men to get concussed and the effects are more severe, but with research focusing mainly on men, is concussion in women being overlooked?

DON'T BE A HEADCASE
STOP! CHECK FOR CONCUSSION

LEADACHE | MOTIONAL | APPEARANCE | DROWSINESS | INFUSION | STATED | SCURE | IARS AND EYES

Check out the RFU's guide to concussion: Information, advice and resources for everyone involved in rugby!

The RFU takes the welfare of its players very seriously. Concussion is important to recognise and manage appropriately, so look below for information relevant to your role, and don't be a HEADCASE!



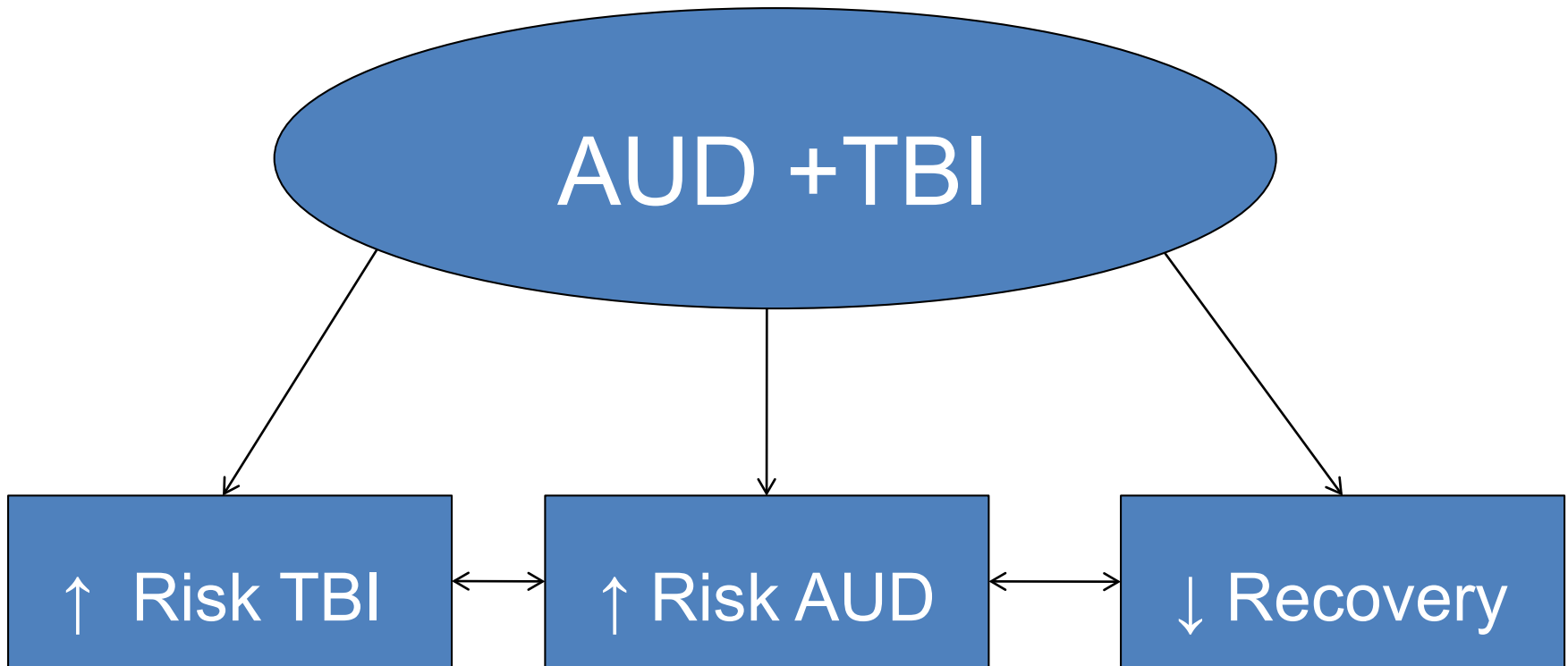
The Infrascanner 2000 has the ability to spot deadly brain bleeds just moments after the injury happening with up to 90 per cent accuracy. Australian boxing trainer Noel Thornberry (right) is

Alcohol Use Disorders (AUD) & TBI





AUD+TBI=Complex Relationship



Intoxication & TBI

- 35-50% TBI involve alcohol = can mask TBI & TBI can mask withdrawal
 - Intoxication under 19 years ↑ risk
 - 2x ↑ risk when driving after 5+ drinks
 - 1.8x ↑ risk when riding with drunk driver
 - Associated with more severe TBI, medical complications, ↑ neuronal damage
-

AUDs before TBI

- 43-66% of TBI have prior alcohol misuse
 - 38-53% of alcohol dependents have TBI history
 - Abuse/dependence ↑ risk TBI 60% in any year
 - Poorer outcome - worse TBI, ↑ mortality, ↓ balance & cognition, seizures, depression, ↑ unemployed, longer rehabilitation
-

AUDs after TBI

- AUD often worse 2-5 years post TBI (7-26%)
 - 25 % develop AUD post TBI
 - Risk factors - male, single,
younger
 - More severe TBI, ↑ neuronal damage, ↑ seizures,
suicide ↑ 4X, compounds TBI effects, interacts with
depression, ↑ unemployment
-

Challenges: AUD & TBI

- No evidence-based treatments
- Symptom barriers
 - ↓ Attention, judgment, memory
- System barriers
 - AUD programs may exclude TBI, physical disabilities
- Alcohol related brain damage (ARBD) - caused by drinking alcohol excessively over prolonged period; secondary to TBI, vitamin B1 (thiamine) deficiency, effects of alcohol on nerve cells, blood vessel damage





Prevention of AUD & TBI



Public Health Successes



- RTA's once #1 cause TBI, now #2
 - Mandatory seat belt laws → ↓ TBI by 38%
 - Laws ↓ BAL to 0.08% → ↓ fatalities & TBI by 36%
 - Highest rate drunk driving rate = motorcycles - 2x TBI deaths without helmet law
-

Summary

- TBI is common
 - Outcome is varied & difficult to predict
 - Intoxication, AUD before & after TBI leads to poorer outcome
 - Public health intervention important
 - Lack of longitudinal clinical support & research
 - Services need to be better adapted
-



For every complex problem there is an answer that is
clear, simple, and wrong.

(H. L. Mencken)

Questions?

vanessa.raymont@psych.ox.ac.uk
