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Traumatic Brain Injury

Hope Kent and Professor Huw Williams

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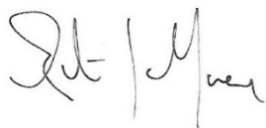
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Foreword

HM Inspectorate of Probation is committed to reviewing, developing and promoting the evidence base for high-quality probation and youth offending services. *Academic Insights* are aimed at all those with an interest in the evidence base. We commission leading academics to present their views on specific topics, assisting with informed debate and aiding understanding of what helps and what hinders probation and youth offending services.

This report was kindly produced by Hope Kent and Professor Huw Williams, highlighting the prevalence of traumatic brain injury (TBI) among children and adults in contact with the justice system, and its links with offending. TBI can lead to difficulties in relation to cognition, memory, social communication, and self-regulation of emotions and behaviours, which can be exacerbated by co-occurrence with other neurodevelopmental problems and risk factors. Training to support practitioners in understanding the impact of TBI is thus essential, and screening tools are required to identify TBI as soon as possible. Small intervention techniques, such as memory aides and strategies to manage emotions, can all make a significant difference to engagement. More generally, multidisciplinary working between the healthcare, education, justice, and social care systems is required to maximise individuals' life chances and prevent future 'revolving door' reoffending.



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Hope Kent is a PhD researcher at the University of Exeter, supervised by Professor Huw Williams. She has previously worked as a mental health practitioner in NHS mental health services. Her current research involves the use of large datasets to understand vulnerability to contact with the criminal justice system in children and young people with neurodisabilities. She is a member of the GLEPHA neurodisability and law enforcement Special Interest Group, and involved in advocacy for women and girls with Traumatic Brain Injuries via PINK Concussions.

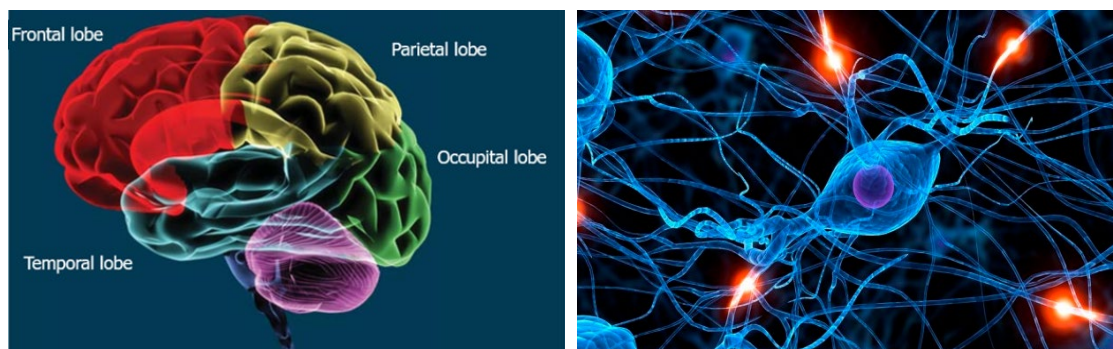
Professor Huw Williams is a Professor of Clinical Neuropsychology and Co-Director for the Centre for Clinical Neuropsychology at the University of Exeter. He gained his PhD and his Doctorate in Clinical Psychology from the University of Wales, Bangor. He then worked in London as a Clinical Psychologist in various services (Stroke, Neurorehabilitation, Neuro-Disability and Primary Care). Over the past 20 years he has published extensively in the field of Traumatic Brain Injury, and been an active advocate for better recognition and management of neurodisabilities in the Criminal Justice System. He is a Founding Co-chair of the law and brain injury stakeholder consortium for Parliamentary activities – Criminal Justice and Acquired Brain Injury (CJAABIG). He is also currently a co-convenor for the GLEPHA neurodisability and law enforcement Special Interest Group.

The views expressed in this publication do not necessarily reflect the policy position of HM Inspectorate of Probation.

1. Introduction

Traumatic Brain Injury (TBI) is a 'silent epidemic' among people in contact with the law. TBI leads to impairments in memory, cognitive ability, social communication, and the regulation of emotion and behaviour. It has been consistently linked with earlier, more frequent, and more violent offending, and is a barrier to engagement with rehabilitation when services are not designed to account for the impact of TBI.

In 2019, the United Nations recognised the impact of neurodisabilities including TBI in the general comment no. 24 on the rights of children in the justice system, representing a shift in understanding the importance of rehabilitation over punishment in promoting neurological development of children and young people in contact with the law. It details the risk of criminalising neurodisabilities, and highlights the risk of cyclical offending where vulnerable groups cannot engage with rehabilitation and get stuck in a 'revolving door' justice system (Hughes and O'Byrne, 2016). Training to support staff throughout the justice system in understanding the impact of TBI is essential, and earlier recognition and intervention following TBI could help to reduce the societal, human, and economic costs of crime.

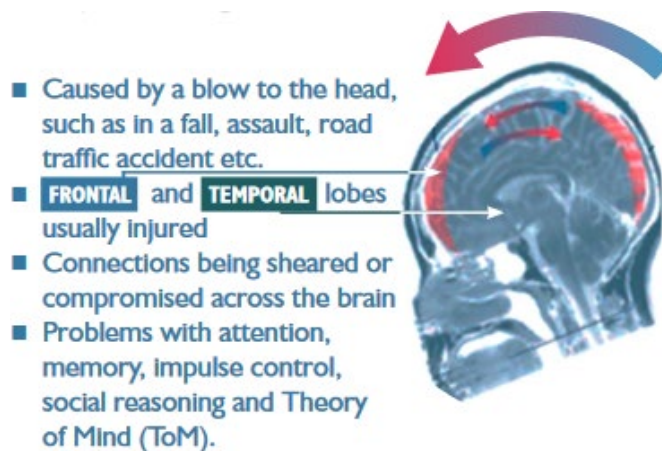


(Images taken from Williams, 2012)

2. Traumatic brain injury in the criminal justice system

2.1 An introduction to traumatic brain injury

TBI is a leading cause of death and disability worldwide, and has been identified as a global health priority (GBD, 2016). The brain comprises 100 billion neurons (nerve cells), and is highly complex – responsible for all our thoughts, memories, emotions, behaviours, and entire conscious experience of the world. It is organised into two hemispheres, and each hemisphere contains four lobes – the occipital lobes, the temporal lobes, the parietal lobes, and the frontal lobes. In general, each lobe can be linked to a particular brain function, although some complex functions involve networks across the whole brain. TBI occurs when the brain is subject to a blunt force or laceration, resulting from an external blow to the head. This causes the brain to move in the skull, and can lead to contusions (bruises), haemorrhages (bleeding), and swelling of the soft brain tissue as it hits the skull and is rebounded back. The inside of the skull is rough and jagged, so can damage the brain as it moves, and rotational injuries (e.g. being hit on the side of the head) can damage the bundles of connections (tracts) between neurons, such as those connecting the two hemispheres of the brain. Often, the frontal lobes (responsible for various functions including planning, memory, social skills, and emotion regulation) are affected, as they sit at the front of the skull. Common causes of TBI include falls, traffic accidents, fights, physical abuse, and sporting injuries.



TBI is a spectrum condition. Lasting effects can range from mild concussion symptoms (such as headaches, nausea, and confusion) to profound disability. Mild forms of TBI may lead to more problems depending on the degree of initial injury – such as, those with less than five minutes of loss of consciousness may largely recover in hours or days. With more moderate to severe forms (over 20-30 minutes or more loss of consciousness) symptoms may be longlasting – even lifelong. The specific symptoms vary depending on the severity of the injury, and the location of the neuronal damage. The impact of TBI is also cumulative – multiple TBIs (including mild) often result in more complex and severe symptom profiles than single injuries.

Generally, TBI leads to functional difficulties across cognition, memory, social communication, and self-regulation of emotions and behaviours. This frequently leads to problems with increased irritability, frustration, and agitation, and can cause stress and

anxiety, and mean that de-escalating potentially confrontational situations can be difficult. People with TBI are also often vulnerable to substance misuse, as they have poorer judgement of the consequences of actions, and higher levels of sensation or thrill seeking (Katzman et al., 2017), while those who misuse substances are also at high risk of TBI due to falls, fights, and antisocial behaviour (Ilie et al., 2015). TBI can also be linked to behaviours which are not directly criminal, but can escalate over time. For example, problems with social isolation, poor engagement with education or work, and problems with close personal or family relationships can create barriers for successful living (or reintegration) in society.

Certain groups are more vulnerable to TBI:

- children under five years old, and the elderly, are at high risk of TBI from falls
- adolescent males are at very high risk of TBI from sporting injuries, fights, and traffic accidents (Yates et al., 2006; Frost et al., 2013)
- children with low socio-economic status are particularly at risk of TBI, and are less likely to receive comprehensive health care and social support for the long-term effects, which can lead to poorer long-term outcomes (Haines et al., 2019)
- people who are homeless or marginally housed also have high levels of TBI
- those with TBI are more likely to have mental health problems (Stubbs et al., 2020).

Where TBI occurs during childhood and adolescence, it can severely impact normal brain development. Neural pathways in the brain are constantly reorganised as we learn, with new connections being made and old, unused connections being 'pruned' away. Stages of brain development and maturation are not linear; our brains undergo 'growth spurts' during which we learn and change rapidly. These occur particularly prominently during infancy and during adolescence, and the brain is not considered fully mature until the age of about 23 - 25. TBI can impact an individual's ability to learn, even years after the injury occurred. Children often appear to recover well in the short term, but developmental delays often become apparent later (for example during the transition from primary to secondary school, where social and academic pressures increase). This is called 'neurocognitive stall'.

It is known that in the general population, crime peaks in adolescence. Young people generally have a similar ability to adults to reason and consider consequences of actions when not in a state of emotional arousal, but are more vulnerable to 'peer pressure', and to making 'in the moment' rash decisions when emotionally charged situations arise which appear risky and irrational (Spear, 2013). They are generally less 'harm avoidant', and favour instant gratification over long-term reward. These problems are often compounded and exacerbated when the individual has experienced a TBI, even when the TBI was years beforehand.

There is also often co-occurrence between TBI and other neurodevelopmental problems (see the earlier [Academic Insights paper 2021/08](#) by Amanda Kirby). For example, a study of young offenders found that 29% of those with a moderate-severe TBI also had attention deficit hyperactivity disorder (ADHD), and 36% of those with moderate-severe TBI also had speech and language impairments (Chitsabesan et al., 2015). Longitudinal research has shown that children who have a TBI before the age of three are significantly more likely to have ADHD, Autism Spectrum Condition, or Developmental Delay in later childhood (Chang et al., 2018). These co-occurrences can compound and exacerbate functional difficulties, and complicate assessment and management processes.

2.2 Prevalence in the criminal justice system

TBI has been called a 'silent epidemic' by researchers, as there is chronic under-recognition and misdiagnosis, particularly in criminal justice populations (Rusnak, 2013). In the general population, estimates of TBI prevalence range from 8 to 12 per cent (Frost et al., 2013; Silver et al., 2001). It appears about 2 in 100 people may have had a moderate to severe TBI, whilst 8-10 people may have had a mild TBI.

There is compelling evidence that people in custody have far higher levels of TBI than the general population. In a UK study of 200 adult male prisoners, 60% reported that they had experienced a TBI of some kind. Around 15% had had a moderate to severe TBI. Most with mild TBI had multiple injuries. Those who had a TBI were on average younger at the point of their first prison sentence, and were more likely to reoffend (Williams et al., 2010). In another UK study of male young offenders aged 16 - 18, 74% reported a lifetime TBI of any severity, and 46% had experienced a TBI leading to a loss of consciousness. In this study, more severe lifetime TBI was found to be associated with higher levels of self-reported reactive aggression (aggression in response to perceived threats or provocation) (Kent et al., 2021). In another study of young offenders, comparing adolescent boys who went on to be lifelong persistent offenders with adolescent boys whose offending was 'adolescence limited', both groups had cognitive deficits but lifelong persistent offenders had significantly more head injuries leading to a loss of consciousness (Raine et al., 2005). In Australia, a study found that young offenders with a history of TBI were 2.37 times more likely to commit a serious violent crime than young offenders without TBI. The risk of violent crime was highest when offenders had a TBI combined with substance misuse (Lennings and Kenny, 2007). Young offenders with a history of TBI are also at greater risk of mental health problems, including self-harm and suicide (Chitsabesan, 2015).

There are far fewer studies of women and girls in prison, who make up only 7% of the global prison population, but the research that has been undertaken paints a similar picture in terms of the prevalence of TBI and the vulnerability of those with TBI. A study conducted in Scotland found that 78% of women in prison had experienced a significant TBI, and 40% of these women had associated disability. Many of these women had experienced multiple TBIs. Domestic violence was the cause of 89% of those injuries (McMillan et al., 2021). Another study of women in prison in the UK found lower rates of TBI (32%), but found supporting evidence that those with more severe functional difficulties (like cognitive problems, social problems, and problems with attention) were more likely to have mental health problems, and histories of self-harm and attempted suicide (Kirby et al., 2020). Women and girls in the criminal justice system face unique challenges, and often have extensive histories of psychological and physical trauma, including sexual abuse, childhood abuse, and domestic violence victimisation, all of which place them at high risk of having experienced a lifetime TBI (McDaniels-Wilson and Belknap, 2008; Kirby and Cleaton, 2019).

Cognitive impairments as a result of TBI can make it particularly hard for someone to navigate the justice system. Understanding legal proceedings, engaging with rehabilitation services, remembering appointments, and understanding rules about orders can be problematic for someone with TBI. Memory problems and social communication problems mean that, when TBI has not been identified, repeatedly forgetting appointments, or appearing to not be listening, or not following rules, can be seen as defiant or obstinate behaviour.

The economic cost of TBI, particularly in the justice system, is also considerable. The long-term cost of a case of head injury has been estimated (Williams, 2016) as:

- **£155,000** for a 15-year-old in the general population (£95,000 non-crime costs and £60,000 crime costs)
- **£345,000** for a 15-year-old young offender (£95,000 non-crime costs and £250,000 crime costs).

This makes economic cost an additional case for earlier intervention and diversion, alongside the human and social justice cost.

2.3 Screening and identification

The early identification of TBI is key to ensuring the best treatment and rehabilitation outcomes (Mohamadpour et al., 2019). However, the spectrum nature of TBI, and the variation in presentation depending on location and severity of injury, can complicate the process of screening for and identifying those with TBI. Additionally, where TBIs happen as a result of illegal behaviour, substance use, or domestic violence, there is less likelihood of seeking medical advice and receiving prompt treatment. The severity of TBI is, now, generally classified as Mild, Complicated-Mild, Moderate, or Severe. Exact definitions for these categories vary slightly by screening tool, but generally length of time spent unconscious following injury, and post-injury amnesia (memory loss) are used as indicators of severity. As a general guide:

- a loss of consciousness of 0 - 30 minutes constitutes Mild TBI
- 30 minutes to 24 hours constitutes Moderate TBI
- more than 24 Hours constitutes Severe TBI
- Complicated-Mild TBI tends to occur as a result of multiple mild injuries, or mild injuries of 10 - 30 minutes loss of consciousness.

Successful initial assessment in justice system settings should utilise brief screening tools at the earliest possible contact. Screening assessments should aim to identify:

- relevant TBI history (for example the severity and number of injuries)
- the cause of the injury
- any ongoing symptoms or functional problems.

This would enable police, court, or youth justice/probation/prison staff to assess whether further detailed assessment or referral is necessary, and allow for advice about management of functional problems to be given (Williams, 2012).

Various screening tools are available for use, and new tools are also in development. The Comprehensive Health Assessment Tool (CHAT) has a recently developed section including assessment for brain injury, which has been successfully validated in young offenders (Chitsabesan et al., 2015). The Disabilities Trust Foundation has also developed the Brain Injury Screening Index (BISI), which is a brief 11 question tool, which is not diagnostic but can be helpful to gain an understanding of the history and mechanisms of TBI (Disabilities Trust, 2021). This has also been well validated in offender populations (Da Silva Ramos et al., 2020). The BISI has also recently been adopted by the Devon and Cornwall police deferred caution and charge team with success (Kent and Williams, 2021), and staff involved in the project discussed how the tool:

- opened conversations about histories of TBI
- helped staff to understand the unique challenges faced by the people they were working with
- encouraged more planning and engagement (for example via the use of appointment reminders).

For any screening tool to be successful, it must be embedded within pathways of further support, with options for referral and intervention when TBI is identified.

2.4 Interventions

In 2016, the Disabilities Trust Foundation trialled a Brain Injury 'linkworker' service in UK prisons and young offender's institutions. This program used the BISI screening tool to identify people with brain injury, and involved the development of tailored support plans to address functional problems. It also promoted interdisciplinary working with, for example, substance use teams, social services, and neurorehabilitation services. Linkworkers also prepared discharge reports and supported community integration and transition after release. Outcomes were excellent, and there was very high demand for this specialist service (Disabilities Trust, 2016).

'Joint working with the brain injury link worker service provided by The Disabilities Trust Foundation was effective. The fulltime worker used SystmOne to record her interventions with boys, demonstrating a proactive joint approach with health services. Important issues were addressed, including sleep, memory, anger and the behaviours that may have led to criminal activity. Engagement with existing rehabilitation programmes within the prison such as education and training was encouraged.'

Keppel Unit Inspection Report (HM Chief Inspector of Prisons, 2015)

In 2019, the Disabilities Trust Foundation trialled a second 'linkworker' project providing support specifically for women with brain injuries in prison in a way that was tailored to gender-specific needs. They found that 64% of the women they supported had experienced a TBI, and 62% of those with a TBI had experienced it through domestic violence, highlighting the need for specific interventions to support survivors of domestic violence as they navigate the criminal justice system and rehabilitation. The link workers supported women with developing strategies and coping techniques to help with their ongoing functional difficulties (e.g. using memory aides and reminders for appointments), and worked with prison staff to provide advice about how to promote engagement with rehabilitation and education programmes. This was reported (Disabilities Trust, 2019) as successful:

- interviews with the women supported by the programme revealed that they experienced fewer mental health problems (e.g. severe anxiety and severe depression), and felt more able to cope with life in prison
- prison staff reported better engagement with rehabilitation plans, and more confidence when identifying and working with women with brain injuries.

There is clearly a need for more training for staff working in youth justice, probation and prison services. Promoting increased awareness and understanding of the effects of TBI is key, and specialist services such as the linkworker service can support justice system staff in

managing the impact of TBI. Small intervention techniques, such as memory aides, strategies to manage emotions, and organisation techniques can all make a significant difference to engagement and rehabilitation. Resources detailing these techniques can be found here: <https://www.thedtgroup.org/media/160228/2754-dt-foundation-leaflet-sets-adult-services-for-carers-v5.pdf>

Case example

In October 2018, Mark Royden, a 47-year-old man from Canterbury, Kent, was convicted of attempting to steal a priceless version of the Magna Carta from Salisbury Cathedral. The case was well publicised, and we describe here the case from available news articles.

The court heard that he had scoped out the Cathedral for CCTV coverage, and used a hammer to smash the security case holding the document. He was convicted of over £14,000 of criminal damage, and attempted theft. The prosecutor described the statement Mr Royden had prepared as 'odd', and stated that he had doubted the authenticity of the document. The court heard that Mr Royden had some 23 previous convictions spanning 51 offences. He reportedly received a four year sentence.

In 1991, Mark Royden had been in a car accident resulting in a serious TBI. The resultant disability he suffered was severe enough that he was subject to a court protection order regarding his finances, and he was supported by a carer. He had since struggled with substance abuse problems. His defending barrister was quoted in a news article as saying *"He has become a pest and a pain, mired in drink and drugs, heroin has been the drug of choice and alcohol has blighted him."*

Perhaps with different intervention, rehabilitation, and support this could have been a different story – substance use problems and a series of convictions have huge human and economic cost. We do not know if Mark Royden's current issues reflect a change from his pre-injury life. But, clearly his TBI is something which should be taken into account when planning for the future. There is opportunity for his TBI to be recognised in the justice system now, and for measures to be put in place to support reintegration into society and prevent more 'revolving door' justice system contact.

News articles about this case can be found here:

<https://www.theguardian.com/uk-news/2020/jan/30/man-convicted-of-trying-to-steal-magna-carta-from-salisbury-cathedral>

<https://www.bbc.co.uk/news/uk-england-wiltshire-53365634>

3. Conclusion

There is substantial and compelling evidence that people with TBI are disproportionately represented in the criminal justice system. Multiplicative risk factors including low socio-economic status, other neurodevelopmental problems, and substance misuse can lead to additive risk of poor outcomes. Ultimately, earlier intervention and diversion away from the criminal justice system must be a goal for the future management of TBI. Public health approaches to address the 'causes of the causes' of crime are critical, and school exclusion is likely to be a key intercept point in these models. Multidisciplinary working between healthcare, education, criminal justice, and social care systems will help to facilitate this. Recognising and supporting those with TBI within the justice system could:

- improve life chances after release from custody
- prevent future 'revolving door' reoffending
- reduce the human and economic cost of crime.

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