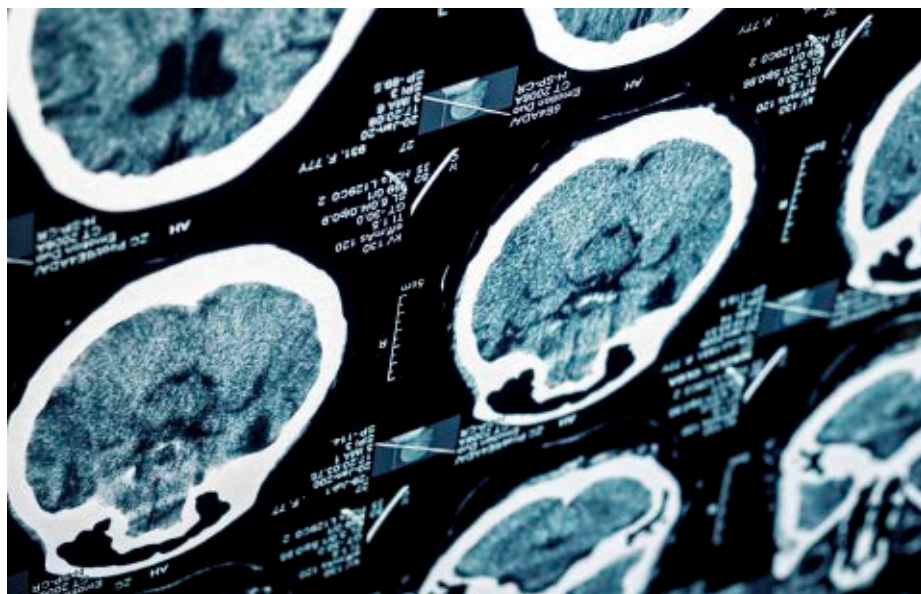


# Memory block

Linda Monaci considers the evidence linking traumatic brain injury & the onset of dementia



The legal implications of medical deterioration in brain injury cases and the rules governing provisional damages were discussed by Warren Collins in his recent *NLJ* article. As Mr Collins notes, the court can award provisional damages if the risk of disease or deterioration has a “measurable chance of occurring”, while the disease or deterioration must be “serious”. (see “Pushing boundaries”, *NLJ*, 24 April 2015, p 13). This article presents some of the challenges which complicate carrying out research in this field, and provides a brief overview of the findings.

## Established findings & mixed results

It is an established finding that repeated mild traumatic brain injuries (TBIs), such as those experienced by professional boxers, are associated with a high risk of chronic traumatic encephalopathy (CTE), originally termed “dementia pugilistica” (McKee et al, 2012). CTE is a type of dementia with distinctive neuropathological features, but clinically it can be mistaken for Alzheimer’s disease or fronto-temporal dementia (Gavett et al, 2010; 2011).

Research investigating the link between TBIs, such as those sustained in road traffic accidents, and dementia has yielded mixed results. Several peer-reviewed articles have not found a link between TBIs and dementia, however, other evidence indicates relationships exist between them.

A problem in this field of research is that the diagnosis of dementia (and the type

of dementia) can only be confirmed at autopsy, therefore the presence of dementia misdiagnosis is likely (McKee et al, 2012).

An issue which appears to be affecting many studies that found no link between TBI and dementia is the reliance on proxy reports as to whether an individual had sustained a TBI earlier in life (Dams-O'Connor et al, 2013; Launer et al, 1999; Mehta et al, 1999; Williams et al, 1991). Similarly, personal reports may not be accurate due to potential bias towards remembering a history of TBI for individuals who developed dementia (Tyas et al, 2001).

**“Research into the link between TBIs, such as those sustained in road traffic accidents, & dementia has yielded mixed results”**

Often TBI severity is difficult to categorise based on third party reports. To complicate matters studies showing no link included a variety of TBI severities, and most often were grouped in a single category for data analysis, which is likely to have obscured some

potentially significant results (eg Nemetz et al, 1999). For example, some studies have analysed individuals with self-reported “TBI with loss of consciousness”, which could also include mild brain injury (Dams-O'Connor et al, 2013; Launer et al, 1999; Mehta et al, 1999; Williams et al, 1991). Others (Amaducci et al, 1968; Tyas et al, 2001) included individuals who had been reported by relatives or whom self-reported head injuries.

Several studies which reported a link between TBI and dementia also reviewed the medical records and grouped individuals according to brain injury severity (eg Plassman et al, 2000; Gardner et al, 2014) or whether a loss of consciousness had been present (Guo et al, 2000). All these studies found a significant relationship between brain injury and dementia later in life.

Age at injury has also been found to be relevant, with moderate to severe brain injury sustained after the age of 55 and mild brain injury sustained after the age of 65 likely to increase the risk of dementia (Gardner et al, 2014). This risk appears higher if multiple TBI are sustained (Smith et al, 2013).

As reviewed above, different designs and sample sizes have been used, which may explain their different findings. When data from seven studies with conflicting results was re-analysed, an association was found between TBI and dementia (Mortimer et al, 1991). Similarly, a meta-analysis of 15 studies estimated that individuals who had sustained a TBI of sufficient severity to cause a loss of consciousness were 50% more likely to develop dementia later in life (Fleminger et al, 2003).

## Summary

It is clear that individuals differ in how they respond to a TBI, for instance it is known that not all boxers develop CTE, so there are likely to be some protective factors for some individuals (Smith et al, 2013). However, emerging evidence suggests that moderate and severe TBIs are a risk factor for dementia (although age at injury appears to be an important factor). Mild TBI may also be linked to an increased risk if sustained later in life (different hypothesis have been made in relation to this and a further article will discuss this topic).

It is possible that a reduction of the cognitive reserve (and therefore cognitive decline affecting functioning sooner than it would have been the case had the injury not happened) might be involved. Clinical neuropsychologists can comment on the risk of dementia following a TBI taking into account current cognitive and everyday functioning.

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