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MEDICAL REPORT

IN CONNECTION WITH:

NAME OF CLAIMANT:	**Alfie NURSE**
DATE OF BIRTH:	**17.02.2003**
OCCUPATION:	**Student**
DOCUMENTATION AVAILABLE:	**Police Collision Records / photographs** **General Practitioners Records** **Medical Records:** - **Air Ambulance Kent Surrey Sussex** - **Brain Injury Rehabilitation Trust** - **Epsom & St Helier University Hospitals NHST** - **St George's University Hospitals NHS FT & imaging** **Bush rehabilitation Records.** **Witness Statement:** - **PC D Gibson**
DATE OF VIRTUAL EXAMINATION:	**9 December 2022**
ACCOMPANIED BY:	**Unaccompanied**
DATE OF REPORT:	**6 July 2023** mr

INSTRUCTIONS

This report is prepared for the Court on the instructions of Lyons Davidson Solicitors who represent the Claimant in a personal injury claim. This relates to a road traffic accident on 29 June 2021 when he was a passenger in a vehicle which lost control, struck a barrier and a tree before coming off the road and going down an embankment. Mr Nurse suffered a traumatic brain injury in addition to a hemopneumothorax, hepatic laceration, a fracture of the hip and right distal ulna. It is the Claimant's evidence that he was a front seat restrained passenger. However, the defendant alleges that he was unrestrained and there is also some dispute as to where within the vehicle he was seated.

My report should consider the matter of seat belt causation. Were a Court to find that Mr Nurse was unrestrained and travelling in the front near side of the vehicle I should consider the mechanism and forces involved and, in particular, the crash intrusion, and offer opinion as to whether a seat belt would have made a difference to the injuries sustained. If so, would they have been avoided or lessened? I should consider the same if the Court finds that the Claimant was in the rear of the vehicle and unrestrained. I should comment on whether his height and weight are of relevance to causation. In addition, I should classify the severity of the Claimant's brain injury, its nature, how and when the injuries were caused. In particular, I should consider whether there is any evidence of a secondary hypoxic ischaemic injury and, if so, comment on when and how this was caused, and its significance. I should comment on the relevance of speed, rotational forces and then deceleration in terms of the Claimant's brain injury.

I understand that my overriding duty is to assist the Court on matters within my expertise and that this duty overrides any obligation to the person who instructed me, or their clients. I confirm that I have complied with that duty and will continue to do so and that I am aware of the requirements set out in Part 35 of the Civil Procedure Rules and the accompanying Practice Direction, the Guidance for the Instruction of Experts in Civil Claims 2014 and the relevant Pre-action Practice Direction/Protocol.

SUMMARY

A) My opinion is provisional because I have not had sight of the records of the land ambulance crew that attended Mr Nurse at the scene. Expert engineering evidence will also be required in relation to the mechanism of the accident and any physical evidence in relation to the vehicle relevant to Mr Nurse's injuries.

B) His premorbid psychological history, and the psychological sequelae to the index accident, are not matters of neurosurgery opinion.

C) At the age of 18 years Mr Nurse was a passenger in a vehicle involved in a single vehicle RTC.

D) Whilst rightly a matter for expert engineering opinion, it appears that the vehicle left the nearside of the road at speed and at a time when it had already started to rotate anticlockwise. The front nearside of the VW struck the end of an Armco barrier which caused it to barrel roll clockwise onto its offside. The roof of the vehicle over the front compartment then struck a mature tree. The vehicle descended an embankment, probably rolling as it did so, and came to rest on its offside.

E) There is a dispute as to whether Mr Nurse was travelling in the front or the rear of the vehicle. Mr Brindley, another passenger, states the Claimant was restrained in the front passenger seat. Mr Hewson also reports that he was in the front. However, the paramedic first responder documents finding Mr Nurse in the rear of the vehicle, unconscious, with his right arm trapped outside the window.

F) The HEMS crew record that he was in the rear and unrestrained, but whether that was how they found him, or whether that information was handed over by the land ambulance crew is unknown.

G) Mr Nurse was unconscious from the outset (Glasgow Coma Score 4 / 15), and could

not have moved position before the arrival of the emergency services.

H) The CT head scan is consistent with a right frontotemporal head strike. There is report that his airway was partly obstructed, probably due to his resting position within the vehicle. Unfortunately, oxygen saturations could not be obtained before he was extracted from the vehicle.

I) My provisional opinion is that his resting position within the vehicle did not result in a secondary hypoxic ischaemic brain injury secondary to airway obstruction. The risk of airway obstruction is greater for an unrestrained occupant.

J) The mechanism of traumatic brain injury (TBI) is of a severe right frontal head strike in an oblique direction giving rise to a right frontal / left parietal coup / contrecoup pattern. In addition, there is evidence to suggest diffuse axonal injury (DAI). The latter is very probably the consequence of a direct head strike and not non-impact rotational forces.

K) Mr Nurse also suffered pulmonary contusions secondary to blunt chest trauma.

L) Physically, he has made a good recovery but has the typical sequelae to frontotemporal brain injury affecting cognition and executive function. He suffered a severe TBI [moderate-severe (definite) on the Mayo Classification].

M) If he was in the rear of the vehicle, then it is unknown where he was seated. Currently there is insufficient evidence to form an opinion as to whether, if it is found that Mr Nurse was seated in the rear of the vehicle and was unrestrained, nevertheless he would still have suffered a severe head strike, even had he been wearing a seat belt.

N) If my interpretation of the mechanism of injury is correct then the vehicle barrel-rolled first in a clockwise direction before striking the tree and then in a counterclockwise direction as it rolled down the embankment. Therefore, regardless

of side on which he was seated, Mr Nurse would have been vulnerable to a lateral head strike with the region of the side window.

O) In view of the crushing to the roof, it is remarkable that the driver avoided catastrophic injuries. Although rightly a matter for expert opinion, I suspect this is because he was unrestrained and was ejected through the windscreen before the roof of the vehicle was crushed by impact with the tree. If that is correct, and if it is found that Mr Nurse was travelling in the front of the vehicle, then he would probably have suffered a very severe head strike with the roof / tree, had he been restrained.

HISTORY FROM CLAIMANT

1. I conducted a remote assessment of Mr Nurse via Zoom. He is currently 19 years of age, and is right-handed. He reported being in good health at the time of the index accident, with no previous history of head injury. He had suffered from anxiety in around 2014 but this improved with a combination of moving school and receiving medication, which he took for 1 or 2 months. He reported having no problems thereafter. He had just completed A-Levels in business studies, media studies and IT technology and had applied to study IT at University.

2. Mr Nurse has no memory of the index accident on 29 June 2021, or even sitting his A-Levels. His first memory post-accident is the ambulance transfer from St George's to Epsom but he has only patchy memory of his time there and did not regain continuous memory until he was at the Brain Injury Rehabilitation Trust (BIRT). He can recall having right-sided weakness, being wheelchair dependent and being fed naso-gastrically. He does not recall any significant scalp injury. He had pain in his right hip and right forearm. Subsequently he was mobilised without the need for walking aids. He does not recall having any difficulties with his speech but was aware that he was forgetful.

3. At the time of discharge to the care of his father in November 2021, Mr Nurse was self-caring. Levetiracetam was discontinued about a month post-discharge. He began privately funded therapy arranged via his case manager within a short time of discharge, including educational psychology, neuropsychology, and occupational therapy. He has recently begun speech and language therapy (SLT). He continues with therapy sessions weekly. He does not have a support worker

4. Mr Nurse started re-engaging in education and learning 3 - 6 months post-accident, but was limited by a combination of impaired short-term memory and poor attention, as well as low mood. In the autumn of 2022, he began a foundation course at Plymouth University. He has difficulty keeping up in lectures, but does not require additional help with these because they are all made available online. He self-funds additional support from a maths PhD student 2 or 3 times per week. Mr Nurse thought that he was making reasonable progress with the course, although he does have specific difficulty with graphs.

5. He is able to organise himself to get to lectures on time and to complete his assignments, and sets reminders to do so on his phone. He reported that mood has worsened since starting at Plymouth and that he feels quite lonely.

6. Mr Nurse has been discharged from all NHS follow-up. His only medication currently is sertraline 50mg om which is managed via the University GP service. He has been seen remotely twice since starting the course. He has had no readmissions to hospital since the index accident, other than when he dislocated his thumb. Although for a time he made progress post-accident, Mr Nurse feels that this is no longer the case and that his recovery has plateaued.

MEDICAL RECORDS

7. A GP consultation, 6 October 2014, notes anxiety low mood. It was noted that his father suffered from OCD and suffered from intrusive thoughts, for which he was

under the care of psychiatry. His older brother suffered from ADHD. A referral was made to CAMHS (Childhood & Adolescent Mental Health Services).

8. A GP consultation, 17 March 2015, notes a history of recurrent anxiety and low mood for which he had been receiving counselling. A further referral was made to CAMHS.

9. A GP consultation, 21 October 2015, notes reports that he was depressed, suicidal at times and that behaviour had deteriorated at school. He was referred to A&E: "Acutely suicidal."

10. Mr nurse was seen in the GP emergency clinic on 20 September 2016. "Seen with mum initially. Struggling with emotions. School refusal today…. Low mood." He was referred to Supportive Listening.

11. Ms Hipkin, clinical psychologist, prepared a report on 13 July 2017 with regards to his behaviour and executive function. "In Alfie's case the executive function screening highlights clinically significant difficulties with several aspects of executive function…. Alfie's elevated scores on the inhibit scale and the behavioural regulation and metacognition indices suggest that he has poor inhibitory control and/or suggest that more global behavioural and emotional dysregulation is having an effect on active metacognitive problem solving….

12. ……. It is also significant that Alfie's working memory is impacted such that he will find it harder than his peers to hold information and use it to form opinions, plans and interpretations. Alfie's areas of executive difficulty will impact on his relationships (particularly those in authority), and aspects of his learning. He may cope very well with academic work that requires knowledge of rehearsed formulae and operations such as maths and science, but will struggle with other subjects such as history, English comprehension / literature, or modern languages where slower,

more complex, transformative, flexible or opinion-driven answers are required. He will also potentially struggle to organise information and self-monitor for revision, despite clear interest or skill in some subjects. Without support in this area he may struggle to achieve his potential". She goes onto discuss strategies.

13. A GP consultation, 9 March 2018, notes fatigue and low mood since the previous September. "Not enjoying school…. Behaviour is withdrawn, not concentrating, a couple of school exclusions on account of behaviour towards staff. Cannabis has been smelt on him at home and at school…. Difficult relationship with brother." He was noted to be seeing a psychologist monthly.

14. A letter from a chartered psychologist, dated 23 March 2018, notes that he had been seen over the previous year with: "underlying processing difficulties and impulsivity, have been assessed and formulated in terms of difficulties with executive function…. Alfie is struggling with adolescent drives and relationships and is in regular conflict with his younger brother and his mother at home. He has also experienced contact with a group of peers who have used drugs, and his parents are highly concerned that given his low mood and self-worth, he may possibly be using them himself. More recently Alfie has been expressing despair, disillusionment and hopelessness, and his progress at school has dropped off." Ms Hipkin concluded that he was in urgent need of a risk assessment in terms of his mental health and potential for self-harm.

15. He was seen at the surgery with his mother on 27 March 2018 with regards to low mood. "Says feels no joy in life. Hates school. Sounds like difficult relt. with siblings…. Struggling to manage mood." An urgent referral was made to CAMHS.

16. A telephone consultation with the Claimant's mother on 19 April 2018 notes "worried ++ as son about to get expelled from school and has suicidal tendencies".

The request was to expedite the CAMHS referral.

17. Review by a child psychiatrist on 8 June 2018 notes that he was constantly tired. He slept well but never felt rested. He lacked focus and was frustrated at a lack of ability to start things he needed to do. He had suffered from anxiety since 2014, for which he had received counselling. Over the previous year his mood had dropped. He had been dropping all activities, interests and contact out of school with friends. There is report of lethargy, poor focus, and a fall in educational attainment. Dr Ferreira-Lay concluded that he was depressed. Mr Nurse was commenced on fluoxetine 20mg on 15 June 2018 at the request of the psychiatric clinic. Fluoxetine was increased to 40mg om at the next consultation on 10 August 2018.

18. Out-patient psychiatric review on 30 October 2018 notes that life remained problematic, school attendance remained challenging and he had been arrested previously for cannabis-related matters. The family were being supported by the Child Protection and Exploitation Team because of concern that he was being groomed by older boys to undertake criminal activities. A case conference, held on 5 December 2018, concludes that he was beyond parental control, was under the influence of others who were exploiting him for their own gain, and his behaviour was deteriorating. He was deemed vulnerable to risk of physical harm. It was noted that he was not attending education and was using cannabis regularly as well as ecstasy. He was suffering from moderate to severe depression.

19. A letter from Dr Ferreira-Lay, dated 26 July 2019, notes that Mr Nurse had a full-time job which he enjoyed and that he did not wish to attend for review. It was recommended that he continue with fluoxetine 40mg om for at least 12 months and he was discharged from follow-up. Child Protection ceased following a conference on 17 July 2019. This noted that Mr Nurse was no longer offending, was more relaxed at home and was no longer involved in criminal activity. He had sat his GCSEs and his behaviour had improved.

20. A GP consultation, 27 April 2021, notes: “wanting a ref. for ?ADHD. Says a friend of his recently got diagnosed and he has the same Sx as them: could only cite inability to concentrate. Denied mood/sleep issues. Denied other factors/situation or issues…. Poor connection…. Looks well but often looking away from the camera. Well kempt. Reasonable rapport. Normal speech. Mood normal. No psychotic Fx.”

21. A paramedic attended Mr Nurse at the scene of the accident at 17:16hrs on 29 June 2021; around 7 minutes after the 999 call. “RTC. Pt was found in back of single vehicle RTC. Car in ditch on driver’s side. Pt unconscious. Noisy breathing on arrival.” At the first assessment, Glasgow Coma Score (GCS) was 4/15 (ie. no eye opening, no verbal response and extending to pain). Pupils were 2mm and fixed. Other than his head, no other obvious injury was apparent on the primary survey. There was swelling to the right side of the forehead. “Isolated head injury with minor lacerations to arms and knees…. RTC notes: car found in ditch on driver’s side with extensive damage, inc. to roof. Single vehicle RTC. Appeared to have hit tree……

22. …… On arrival, MOP (member of public) stated 3 x patient. 1 lying on roadside moaning and talking. 2 trapped in vehicle. Made down to vehicle to assess and triage. Rapidly established 1 x patient (driver) alert with no immediately obvious injuries and other patient (Alfie) lying supine, inverted and trapped by other passenger and by car on arm. Alfie head at 45º with ear to shoulder, unresponsive and noisy breathing. All efforts on Alfie as patient …. Window smashed on car to gain access and alert driver largely self-extricated with some assistance. Rear passenger still trapped by positioning and arm under part of car and airway secured and high flow O_2 applied. Car required rocking to free arm while crews moved patient in a position to make extrication possible. No evidence of any seat belt in place and not released by any crew. With assistance of fire service, patient

extricated via boot with c-spine precautions in place……

23. ……. Extricated onto scoop and handed to awaiting HEMS crew…. Pt had brief seizure-like activity, pt. RSI'ed (ie intubated and ventilated)… Respiratory notes: noisy breathing on arrival. Jaw thrust applied. OPA (oropharyngeal airway) attempted. Trismus/position of head made insertion impossible. NPA (nasopharyngeal airway) inserted and snoring resolved. 15L O_2 on immediately. Auscultation and monitoring not possible due to access issues and environment." Oxygen saturations are not recorded. The name of the paramedic has been redacted [Note: it is unclear whether this is the same person whose witness evidence was obtained by the police - Mr Hewson – see below].

24. Mr Nurse was transferred intubated/ventilated via Air Ambulance to the Emergency Department at St George's Hospital. The HEMS notes: "on approach, driver of vehicle in back of ambulance. Talking and appeared distressed (emotionally) but well. SECAMB with. Red car on side in ditch. Patient 2 lying on ground on mat. GCS 15. No acute injuries but in pain. Patient 3 being extracted on scoop as we arrived…. One patient priority (Alfie, unrestrained passenger in rear)… Being extracted as we arrive but had been upside down unconscious in footwell. ?Obstructed airway. On extraction he was extending, airway partially obstructed. Eyes deviated. ?Seizing. Obvious swelling over right eye but no other obvious injuries. RSI uneventful (though note right pupil started to dilate just before but came down immediately with RSI). Given hypertonic saline 350mls anyhow as well as TXA (tranexamic acid)…. Straight to CT." Observations were satisfactory during transfer. On admission, pupils were 2mm and sluggish.

25. A trauma CT head scan, dated 29 June 2021, showed no evidence of a skull vault / skull base fracture or fracture of the facial bones: "(1) Acute haemorrhagic contusions in the left frontal lobe, right frontal lobe peripherally, right inferior

frontal lobe, and left parietal lobe. (2) Right shallow acute subdural haematoma affecting the right frontal lobe and parietal lobe with associated effacement of the adjacent sulci. No midline shift or hydrocephalus. The grey-white matter differentiation is preserved. (3) Sulci at the vertex are less conspicuous indicating increased intracranial pressure (ICP). (4) Right frontal subgaleal haematoma."

26. CT of the cervical spine was unremarkable. CT of the thorax identified a small right-sided pneumothorax, a left haemothorax and multiple bilateral lung contusions, but no sternal or rib fractures. CT of the abdomen and pelvis identified a large area of hypodensity within the liver affecting the right lobe, consistent with a grade 4 liver laceration with a surrounding perihepatic haematoma. There was free fluid in the pelvis in keeping with haematoma. The margins of the pancreas were indistinct and appeared oedematous, suggestive of a pancreatic contusion. There was haematoma within the pelvis. CT of the thoracolumbar spine and pelvis was unremarkable. [Consultant review the following day identified a 13 x 17 mm incidental right adrenal nodule].

27. An intracranial pressure (ICP) bolt was inserted in A&E on 29 June 2021, after it was concluded that it was inappropriate to wean sedation because of the liver laceration and chest injury. ICP at insertion was >30mmHg, but fell to the 20s following hypertonic saline.

28. General surgery review on 29 June 2021 notes: "back seat passenger without seat belt. Car travelling at speed and then ended up rolling over several times…. Liver laceration with intraparenchymal disruption, moderate free fluid in abdomen along right paracolic gutter into pelvis, and small volume around spleen. No contrast blush is seen…. At the moment the patient is stable with no physiological compromise". The plan was for conservative management, but with a repeat CT angiogram were he to become hypotensive.

29. A transthoracic echocardiogram performed on 30 June 2021, was unremarkable. A 3.5cm laceration to the helix of the ear with exposed cartilage was debrided, a plastic foreign body removed, and sutured.

30. Neurosurgery review on 30 June 2021 anticipated that cerebral oedema would worsen significantly over the following 12-24 hours. The plan was to continue neuroprotective measures.

31. An EEG was performed on 1 July 2021 to exclude non-convulsive seizure activity in view of ICP spikes with unreactive pupils. There was no evidence of sub-clinical seizure activity.

32. On 1 July 2021 it was questioned whether Mr Nurse would require ECMO (extra corporeal membrane oxygenation) on account of the severe chest injury.

33. ICPs 1 July 2021 were consistently in the range 18-20mmHg. Neurosurgery review of the repeat CT concluded that there had been some resolution of the subdural haematoma and that there was less sulcal effacement. He was started on Co-Amoxiclav on 1 July 2021 after gram positive cocci were identified from blood culture.

34. Neurosurgery review on the evening of 1 July 2021 notes: “overnight the patient had an ICP spike to 39 and dilated unreactive pupils bilaterally and was scanned…. Happy that RSDH was resolving. ICP now 5. CTH showed tight brain but happy no need for further intervention currently. Believed ICP secondary to chest or seizure activity.”

35. Thoracic surgery review on 2 July 2021 notes severe bilateral traumatic lung injury with contusions and pneumatocoele with severe bilateral consolidation but the conclusion was that he did not require thoracic surgery intervention.

36. Review on 2 July 2021 notes unstable ICPs spiking at times to 34mmHg and with worsening respiratory function. The CT was repeated on 2 July 2021 due to increasing oxygen demands and was noted to show increasing extensive consolidation involving most of both lower lobes. The bilateral pneumothoraxes had resolved. The hepatic laceration was unchanged. A small incidental right adrenal nodule was noted.

37. A repeat CT head scan, 2 July 2021, was reported: "intracranial appearances looks stable since 01/07/2021. Compared to 29/06/2021 a left anterior frontal ICP bolt has been inserted. The shallow right cerebral convexity subdural haematoma has redistributed. A shallow layer of acute subdural blood is now appreciable tracking over the right tentorial leaf and a sliver of parafalcine subdural blood in the posterior frontal region. There has been some blooming of the haemorrhagic cortical contusion in the anterolateral left parietal lobe. As shown previously there are multiple small juxtacortical and subcortical haemorrhagic contusions in both cerebral hemispheres with a predilection for the anterior frontal lobes, with a few more becoming apparent such as one just deep to the posterior left insula. There is also evidence of deep traumatic brain injury with a small volume of acute blood in the cingulum region above the callosal body and the impression of some oedema in the posterior colossal body and splenium. Of note, some evolution of changes early in the course of traumatic brain injury is a common observation, in particular haemorrhagic contusions becoming more apparent/blooming".

38. Muscle relaxation was weaned on 7 July 2021 and spikes of raised pressure managed with boluses of sedation.

39. CT of the chest/abdomen/pelvis was repeated on 7 July 2021, noting interval improvement in the appearances of the lunges but with small bilateral pleural effusions. There remained a small volume of pneumomediastinum, but less than on the previous imaging. The liver laceration appeared stable. There remained some

diffuse subcutaneous stranding, which was most prominent in the right flank/lateral abdominal wall.

40. A repeat CT head scan, 7 July 2021, was reported: “the intracranial appearances are stable to the previous head of 02.07.2021.”

41. Review on the ward round, 8 July 2021, notes that pupils were 2.5mm and reactive. ICPs were fluctuating up to 34-39mmHg on full medical management, but settled with a combination of increased sedation and hypertonic saline. There was a spike of ICP up to 50mmHg on 8 July 2021 which responded to a bolus of sedation and hypertonic saline. Noradrenaline was increased to maintain CPP.

42. Review on the ward round, 8 July 2021, notes recurrent ICP spikes reaching 40-50mmHg and responding to boluses of sedation and two of hypertonic saline. Neither was associated with pupillary change.

43. A CT venogram was performed on 9 July 2021, and showed no evidence of venous sinus thrombosis to account for ongoing spikes of raised ICP. This was reported: “There is a subdural collection adjacent to the right transverse sinus just above the tentorium. Significant callosal splenium swelling is again noted consistent with a major deep brain injury.” The conclusion was that there was no indication for neurosurgery intervention.

44. A portable EEG was performed on 9 July 2021 to exclude non-convulsive seizure activity in view of ICP spikes with unreactive pupils. The EEG showed no epileptiform activity.

45. On 9 July 2021 Mr Nurse was converted from Co-Amoxiclav to a combination of piperacillin and tazocin. Vancomycin was added on 10 July 2021.

46. Review on the ward round, 9 July 2021, summarises his treatment. “Had a turbulent last week with difficult ventilation, inflamed lungs and an E coli VAP (ventilator

acquired pneumonia). ICPs are periodically spiked and has received hypertonic therapy with rapid correction. No sustained spikes…. Lung base is densely consolidated on imaging…. Small bil. effusion." The plan was for an EEG and to consider weaning sedation and to continue with extensive chest physiotherapy.

47. On 10 July 2021, ICPs were noted to be stable at 15mmHg but with spikes the previous night. ICPs remaining sensitive to repositioning. Tazocin was commenced on 10 July 2021 for the treatment of VAP.

48. On 11 July 2021 he began a slow wean from sedation after a CO_2 challenge resulted in only a slight rise in ICP, although Mr Nurse was still requiring boluses of sedation for spikes of raised pressure. Sedation was discontinued on 12 July 2021. There was no eye opening and he was extending to pain. The ICP bolt was removed on 13 July 2021. Clonidine was commenced on 13 July 2021 for the treatment of agitation.

49. On 14 July 2021 he was noted to have intermittent episodes of up-gaze that self-terminated. He was given a further bolus of Keppra for suspected seizure activity. By 15 July 202, Mr Nurse was localising with full power in the left upper limb. There was grade 4 power in the left lower limb, but severe weakness on the right [Note: On the MRC scale, power is graded from 0 (no movement) to 5 (normal power). Grade 1 = a flicker of movement; grade 2 = movement with gravity eliminated; 3 = movement against gravity but not resistance; 4 = reduced power against resistance].

50. Review on 16 July 2021 notes that, at best, he was eye opening spontaneously, making no verbal response but obeying commands. There was mild weakness on the left side and severe weakness/flexion on the right. Mr Nurse was extubated later that day. An OT assessment on 19 July 2021 notes only a flicker of movement on the right side. He was transferred to HDU on 21 July 2021. At that stage he was on a

combination of levetiracetam, propranolol, risperidone, clonidine, docusate and lansoprazole.

51. Review on 21 July 2021 records that he was eye opening spontaneously, making incomprehensible sounds and flexing to pain. Mr Nurse was noted to be moving all four limbs. Tazocin was discontinued on 22 July 2021. Review on 23 July 2021 recommends that levetiracetam be weaned at a rate of 250mg every 2 weeks.

52. SLT review on 26 July 2021 notes that Mr Nurse responded non-verbally to simple commands. He remained nil by mouth on account of drowsiness. Review on 28 July 2021 notes that he was eye opening spontaneously, making inappropriate speech and obeying commands with normal power in all four limbs. OT review on 30 July 2021 concluded that Mr Nurse was emerging from a minimally conscious state.

53. He was commenced on intravenous Co-Amoxiclav on 30 July 2021 for PUO but possibly related to a urinary tract infection.

54. An MRI head scan, performed 3 August 2021, was reported: "There is evidence of diffuse axonal injury in multiple different lobes, the corpus callosum, pons and in the right cerebellum. A significant proportion of the microhaemorrhages are in the bilateral frontal lobes, corpus callosum and bilateral temporal lobes. There is also a small haemorrhage at cortical contusion in the lateral left post-central gyrus, bilateral shallow subdural collections and subarachnoid haemorrhage in the convexity sulci. No hydrocephalus."

55. An entry, 3 August 2021, recommends weaning from propranolol, clonidine, risperidone and morphine if there was no evidence of agitation.

56. Mr Nurse was transferred to St Helier's Hospital on 5 August 2021. The transfer summary notes that he required assistance of two for transfers. He had an improving receptive and expressive aphasia, with reduced auditory processing and word

finding difficulties, as well as features of a cognitive communication disorder. There was impaired attention, flat affect, tangential speech and reduced self-monitoring / insight. The admission assessment notes current issues of confusion, bilateral limb weakness, faecal incontinence and respiratory infection. He remained catheterised and nasogastrically fed. SLT review the following day notes reliable yes/no responses to simple questions but with confused / incoherent speech which was tangential. The conclusion was that "likely cognitive communication disorder." He was noted to be anxious and agitation.

57. He suffered a fall on 7 August 2021, sustaining a minimally displaced fracture of the right olecranon. OT review on 9 August 2021 notes improved alertness but cognitive fatigue, impaired short-term memory and perseveration.

58. Physiotherapy review on 10 August 2021 notes very poor mobility, requiring the assistance of two, and that he was limited by fatigue and poor cognition. Neuropsychology review on 11 August 2021 notes that he remained sleepy and forgetful, with low mood and impaired attention. The nasogastric tube was removed the following day. Orthopaedic review concluded that the olecranon fracture was old. The urinary catheter was removed on 16 August 2021.

59. An ophthalmological assessment on 18 August 2021 notes visual acuities of 6/7.5 bilaterally, with no strabismus, good binocular vision and full eye movements. Visual fields were full to confrontation. There was slight bilateral ptosis which was thought to be a consequence of fatigue. Neuropsychology review on 23 August 2021 notes improved orientation and attention, but comprehension remained impaired. He was noted to be fatigued.

60. Psychiatric review on 27 August 2021 notes that symptoms of anxiety and paranoia had reduced. It was questioned whether risperidone should be withdrawn. Neuro OT review on 31 August 2021 notes lack of insight, perseveration, and reduced ability

to sequence and problem solve, although it was questioned whether fatigue was a contributory factor.

61. Neurophysiotherapy review that day notes that he was able to mobilise 50 metres with distant supervision. Continence was improving. Weaning from risperidone began on 31 August 2021.

62. A CT of both hips was performed on 31 August 2021 because of report of pain in the right thigh. "CT confirms the presence of a linear minimally displaced fracture within the anteroinferior part of the right sacral ala, located parallel to the SI joint. The right SI joint outlines normally…..There is a subtle sclerotic line noted at the right femoral head, neck junction…. A subtle impaction injury cannot be excluded. No definite fracture line identified." Orthopaedic review on 31 August 2021 advised that Mr Nurse could weight-bear as tolerated.

63. Neurophysiotherapy review on 3 September 2021 notes impaired right-sided coordination, but preserved proprioception in all four limbs. Psychiatric review on 12 September 2021 found no evidence of low mood or psychotic features. Risperidone had been withdrawn with no issues. He began weaning from propranolol on 23 September 2021.

64. Review by liaison psychiatry on 14 September 2021 notes that he was drowsy but not overtly anxious or paranoid. There is report of short-term memory impairment and limited speech, but mood was satisfactory. No further review was proposed. On 1 October 2021 Mr Nurse was given a trial of weekend leave. The plan was to consider discharge whilst awaiting a bed at BIRT.

65. He was discharged from St Helier Hospital on 7 October 2021 taking levetiracetam 750mg om but with a plan for it to be weaned and discontinued on 15 December 2021. His other medication was propranolol 10mg om and paracetamol 1g qds prn.

66. Mr Nurse was admitted to BIRT Kerwin Court on 12 October 2021. On assessment it was concluded that he lacked capacity. Out-patient orthopaedic review on 12 November 2021 notes that he had made a full recovery from the right sacral alar fracture and was able to run without pain. A clinical meeting on 15 November 2021 concluded that Mr Nurse would finish his in-patient rehabilitation early because he was finding it difficult to be away from home.

67. A neuropsychology report, 15 November 2021, notes slow processing speed, fatigue, and impaired short-term memory as well as poor concentration and impaired insight. He also had difficulties with divided attention. Mood was noted to be very low. Mr Nurse was discharged from Kerwin Court on 19 November 2021.

68. The MRI head scan was repeated on 11 April 2022, and reported: "The previously seen subdural collections have resolved. Multiple microhaemorrhages are again noted particularly in the frontal lobes bilaterally although, these are less conspicuous than on the previous MRI study. A small area of mature damage is seen in the left post-central gyrus subsequent to a previous haemorrhagic contusion. No appreciable volume loss since the previous MRI study."

PRESENT COMPLAINTS

Memory

69. He compensates for impaired memory by setting reminders on his phone. If interrupted during a task he will forget where he had go to. Concentration is poor and he estimated being able to do so for only around 10 minutes at a time. He cannot keep up in lectures and is reliant on the recordings that are made available online. Similarly, he struggles socially when in groups. He is unable to follow the plot when watching a film.

Mood

70. Mr Nurse described himself as "super anxious," and that sees everything as the

"worse case scenario." He worries how other people perceive him due to the injury. As a result, he lacks social confidence and this, in turn, leads to him being socially withdrawn. This adds to his feeling of loneliness, leading to low mood. He is however able to tell people that he has suffered a brain injury. He reported being a little anxious all the time, even when in his own company, and said that this is because he worries about the "big picture," particularly his future. He reported that his mood was low all the time and that this makes him withdrawn, although he is not tearful. Despite low mood he is able to motivate himself to attend lectures but, when nothing is scheduled, this is not always the case. I asked whether he would be willing to see a psychiatrist and he said that he would consider it. Although he harbours dark thoughts, Mr Nurse said that he would never act upon them.

Fatigue

71. He suffers from cognitive fatigue which affects both his academic work and activities such as reading for pleasure or watching films. Typically, he goes to bed at around 23:00hrs and is up at 07:30hrs on days when he has lectures. However, sleep is poor and he reported ruminating. If there are no lectures then he may not get up until midday. At times will dose intermittently during the day. Fatigue is not improving, but he does not adopt any pacing strategies to mitigate its effects. He suffers from physical fatigue after 10 to 15 minutes of activity.

Executive Function

72. Mr nurse reported no problems with organisation or planning, but becomes stressed if things do not go as he anticipates. His personality has changed in that he is no longer positive about the future and he becomes angry easily, although he internalises this and does not either shout or become aggressive physically. He is not disinhibited. He reported having difficulties interpreting other people's emotions and other social cues. He considers himself less empathetic than pre-accident.

Speech

73. He suffers from word finding difficulties but reported no dysphasic errors. At times people do not understand what he is saying and will ask him to repeat himself. He acknowledged a tendency to mumble.

Other

74. There are no ongoing symptoms from his right arm, right hip or chest. He does not suffer from headaches. Mr Nurse reported that his vision was normal and he is not aware of any problems with hearing. Sense of smell is not as acute as before the accident but he does retain an ability to detect odours and, in particular, things such as burning. He thought that taste was also diminished although he is able to detect spoilt food.

SOCIAL HISTORY

75. At the time of the index accident Mr Nurse was living with his father, who works as a software architect. He has two older brothers who live independently, and one younger brother who lives with his mother in Exeter. Currently he lives in Halls of Residence at Plymouth University where he is in a foundation year in computer science. He is in receipt of Disability Support Allowance. Mr Nurse said that he would not have needed to undertake a Foundation Year had it not been for the index accident and that he would have applied directly to start his degree course. He thinks that he will need extra help when starting the latter next year. Prior to the injury he played football weekly and also went running once a week. He enjoyed watching boxing and said that he would have taken up boxing as a sport at University, had it not been for the head injury.

76. He did not have a partner at the time of the injury, and this remains the case. He is able to cook and wash for himself. He does still socialise, but prefers small groups and is aware that he socialises less than his peers. He estimated going out perhaps

once a week. He has been able to make new friends at University. He joined a sailing club, but went only once, saying that he prefers instead to "chill out." He is able to manage his own finances and does not consider himself vulnerable to exploitation. He can plan and undertake train journeys without supervision. Because of his anxiety he prefers to do things in a planned way rather than spontaneously. He did not drive pre-accident and has no ambitions to do so in the future, reporting anxiety in relation to car travel, which he considers "risky." Instead, he prefers to travel by train.

77. He drinks little alcohol, having found that he has been excessively sensitive to its effects post-accident, both in terms of mood and balance. If very stressed he will smoke cigarettes, but estimated doing so only about 10 times a week. Pre-accident he did smoke cannabis but this is no longer the case. His mother lives around an hour away and he goes to see her about once every 2 weeks. He has no problems walking and is able to ride a bicycle, reporting that this did not make him anxious, unless cars pass him quickly. He described being "extra cautious" crossing roads.

EXAMINATION

78. Mr Nurse avoided eye contact. His affect was flat and his responses were often mumbled. He told me that his height was 5ft 9 inches (175cm) and his weight 75kg. Speech was fluent, with no dysphasic errors. He demonstrated his walking within the confines of his small room, and which appeared unremarkable. He was Romberg negative, with no dysdiadochokinesia, but was unable to stand on either leg independently. There were no impairments of rapid fine hand movements and no pronator drift.

IMAGING

79. The admission CT head scan, dated 29 June 2021, shows a large subgaleal soft tissue swelling in the right frontal region, which contains a small locule of air. Beneath it there is a thin acute subdural haematoma and several small superficial

contusions. There is a further small contusion in the left parietal region and several very small contusions at the left frontal pole. The ventricles are not dilated. There is minor midline shift from right to left, and sulcal effacement. There is no evidence of a calvarial or skull base fracture and the air cells are normally pneumatised. CT of the chest/abdomen/pelvis shows no evidence of acute spinal injury.

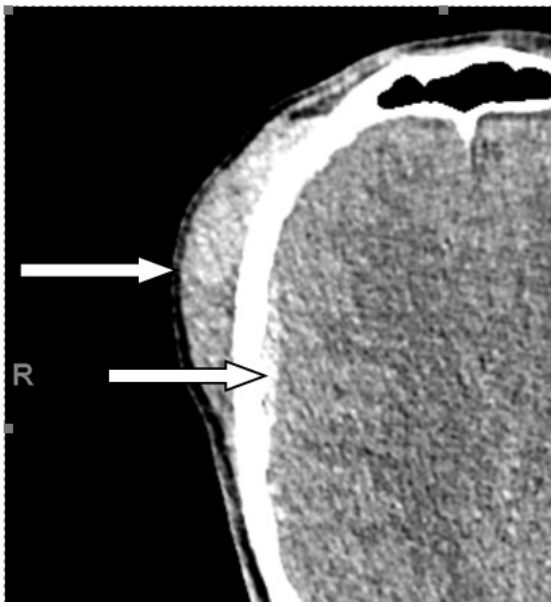


Figure (i) Axial CT on admission demonstrating a large right frontal subgaleal soft tissue swelling with a thin underlying acute subdural haematoma (arrows – note that right and left are transposed on this and all subsequent imaging, as marked). There is a small contrecoup left parietal contusion.

80. A repeat CT head scan, dated 1 July 2021, demonstrates a left frontal parenchymal ICP monitor. The right acute subdural haematoma has resolved but there has been some blossoming of the contusion in the left parietal region. There is less sulcal effacement than previously and midline shift has resolved. There is probably a thin acute subdural haematoma beneath the tentorium.

Figure (ii) the repeat CT head scan demonstrates a parenchymal left frontal ICP monitor (seen at the top of the image). There has been some blossoming of the left parietal contusion.

81. A CT head scan, dated 1 July 2021, again demonstrates a left frontal parenchymal ICP monitor. Intracranially, there is a small volume of subdural blood beneath the tentorium. Multiple small contusions are evident in both cerebral hemispheres, the largest of which is in the left posterior frontal/parietal region, and which is unchanged from the previous imaging. There are multiple petaechial haemorrhages in the frontal lobes, the corpus callosum and the left insula. The ventricular system is not enlarged. The appearances are consistent with diffuse axonal injury.

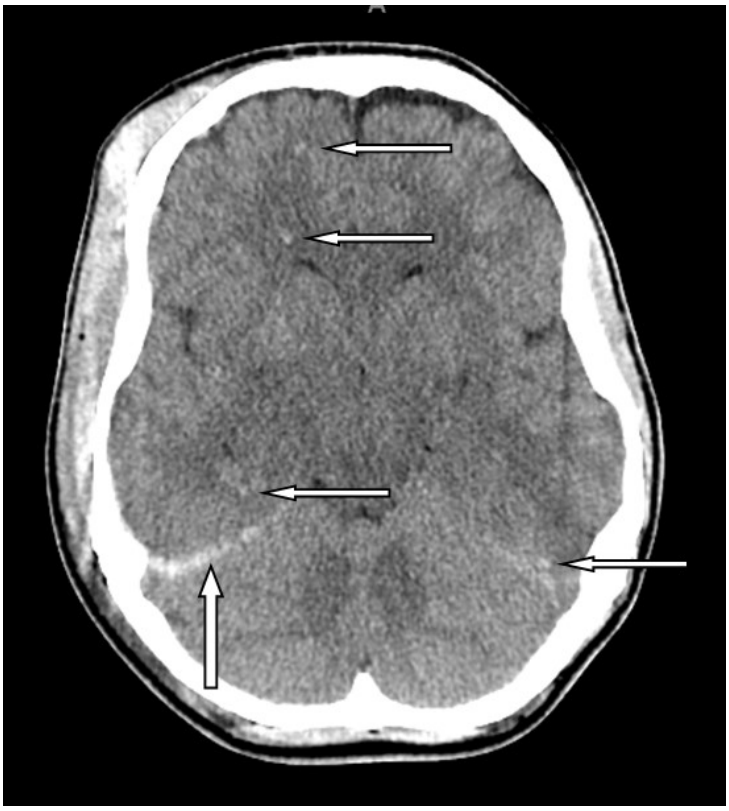


Figure (iiii) Axial CT dated 1 July 2021. Multiple microhaemorrhages within the brain are marked with horizontal arrows. A thin subdural haematoma beneath the tentorium is marked with the vertical arrow.

82. The repeat CT head scan, dated 2 July 2021, shows minor evolution of the previously noted petechial haemorrhage, particularly in the right frontal region, but with no associated mass effect. The ventricles remain of normal size.

83. The repeat CT head scan, dated 7 July 2021, shows further maturation of the previously noted contusions. There is now a very thin acute subdural haematoma evident at the right occipital pole.

84. A CT venogram performed on 9 July 2021 shows no evidence of sinus thrombosis. The intracranial appearances are unchanged from the previous imaging.

85. An MRI head scan with hemosiderin-sensitive sequences, dated 3 August 2021,

confirms the CT appearances of diffuse axonal injury. There are scattered areas of microhaemorrhage in both frontal lobes, but particularly on the right, as well as in the left parietal region, the corpus callosum, the left insula, the splenium of the corpus callosum, the lateral aspect to the right temporal lobe and with a single microhaemorrhage in the left side of the midbrain but with sparing of the cerebellum. The ventricles are not enlarged. Thin subdural hygromas are evident at the frontal poles, particularly on the left.

Figure (iv) Areas of microhaemorrhage (seen as black dots) are evident particularly in the right frontal and left frontoparietal regions.

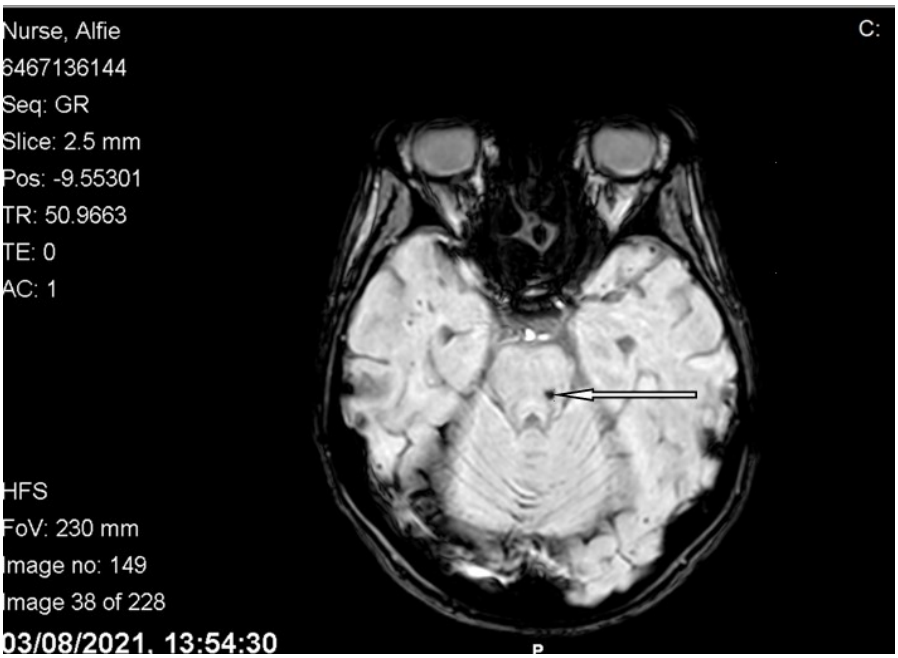


Figure (v) A solitary haemorrhage is evident in the brainstem.

86. The repeat MRI of 11 April 2022 shows complete resolution of the previously noted frontal pole hygromas. On gradient echo imaging the previously noted areas of microhaemorrhage are considerably less conspicuous, although there remains evidence of microhaemorrhage in the left parietal and bilateral sub-frontal regions, in particular. The ventricles are not enlarged.

87. The CT venogram dated 9 July 2021 shows further resolution of the previous contusions. There is no evidence of venous sinus thrombosis. The ventricles remain of normal size.

POLICE EVIDENCE

88. The police collision report states: "V1 has…. approached a sharp right-hand bend in the road with a protection barrier to the nearside due to a ditch…. and appears to have been travelling too fast for the conditions due to heavy rain and slippery road surface. V1 has lost control and has possibly hit mud on the marginal strip on the nearside and has then tried to correct this and collided with the barrier before impacting with a tree and exiting the carriageway to the nearside down an

embankment."

89. The *driver and vehicle details* suggest that the driver had sustained a "less serious" head injury. Mr Brindley, a rear seat passenger, had sustained a fractured arm/leg and multiple soft tissue injuries. Also included are the names of two females but it is unclear whether they were in the vehicle or witnesses.

90. PC D Gibson, forensic vehicle examiner, prepared a witness statement (09.09.21) having attended the scene of the accident. He notes that the vehicle was a 3 door VW Polo hatchback, had gone down an embankment, passing through a gap between the end of the crash barrier and a large tree. He concludes that, whilst negotiating a right-hand bend, the VW Polo began to rotate anti-clockwise. "The vehicle has then travelled to the nearside of the road, before colliding with the crash barrier, followed by the large tree." There is no discussion of either the damage to the VW Polo or its movements after it started to rotate anticlockwise.

91. Mr B Brindley prepared a witness statement (14.07.21) in which he states that he had left the car to by some items from the Co-op. "I then returned to the car and got in the back seat, Alfie got into the front passenger seat, and Dillon remained driving…. From my recollection we were all wearing our seat belts throughout the journey." He states that, post-accident: "I looked over at Alfie and he was hanging from the seat belt and his head was laying over to one side. He was still in his seat at this point." Mr Brindley had managed to exit the car by pulling the glass from the rear left side window and had then crawled up the ditch to the road where he collapsed and waited for someone to come. He states: "I sustained bruising and grazed my head, heavy bruising and torn ligaments to my shoulder, fractured three ribs, minor break to my wrist, and heavy bruising and ligament damage to my ankle, this was all on my right side. I also had concussion injuries."

92. PC L Mackie (29.06.21) was the first police officer on the scene, although a number of ambulance and fire units were already in attendance. “On approaching to the first ambulance I observed a male inside the back… with a paramedic present, the male was conscious and breathing and appeared to be engaging with the paramedic. I proceeded up towards the scene of the collision and observed two further males being treated by ambulance. One male was lying on the roadside whilst the second had been placed onto a stretcher…. I returned to the first ambulance and spoke to the first male who was conscious and breathing in the back of the ambulance. The male identified himself as Dillon Falconbridge.” He had denied being the driver of the vehicle and reported that he was at the side of the road and had been hit. PC Mackie then spoke to the mother of Mr Brindley, but she was unable to say where her son had been located in the vehicle, or who was driving. Pc Mackie was unable to speak to either of the remaining two males because of their medical condition.

93. An account was obtained from Mr Hewson. “I noticed a male lying near the verge of the road, he was clearly in distress. I got out of my vehicle to tend to the male, he told me his mates were in the car, this prompted me to look for a vehicle. I climbed down the bank, I could see two males in the car almost lying on top of each other on their sides in the car. They looked both knocked out. I tried to get them out, there was no way I could due to the damage. They were both positioned in the front of the vehicle. I am not sure how the male walking around manged to get out of the car. I don’t recall whether seat belts were being worn by the males. I went back up to the road and spoke to other witnesses and waited for ambulance to arrive.”

CCTV FOOTAGE / ACCIDENT PHOTOGRAPHS

94. I have reviewed the CCTV footage. I have no expertise in accident reconstruction. I make the following observations only because the movements of the vehicle are important to head injury causation and because the police report makes no attempt to fully analyse these. I will defer to expert engineering opinion when it becomes

available.

95. The driver is attempting to negotiate a right-hand bend in wet conditions. The underlying mechanism of loss of control appears to be understeer followed by lift-off oversteer. The car initially starts to rotate clockwise but, as a result of snatch back, rotates sharply anticlockwise. The front nearside corner strikes the end of an Armco barrier on the outside of the bend, causing it to lift and commence a barrel roll, clockwise about the long axis of the vehicle. This presents the roof of the vehicle to an adjacent mature tree, resulting in very heavy impact. The vehicle then travels down a short embankment, probably having barrel-rolled 360 degrees anticlockwise, before coming to rest on its offside.

96. The still photographs show heavy intrusion into the roof over the front of the vehicle, with greater crushing on the driver's side, but with only minor intrusion into the rear, although the offside "B" pillar has been displaced inwards both inwards and backwards. The windscreen is missing, but no sign of occupant ejection is seen on the CCTV.

CASE MANAGEMENT REPORTS

Dr C Copestake (01.04.22)

97. Dr Copestake, consultant clinical psychologist, undertook a remote assessment of the Claimant on 1 April 2022. She obtained a history of a turbulent childhood but that he was due to attend university to study computer science. He described a history of anxiety and low mood during some periods of his teenage years. Post-accident there had been a re-emergence of anxiety. He felt his emotions more strongly than before. He had become hypervigilant to other's judgment and interpretation of him. He was less able to read the emotions of others as easily as before.

98. Symptoms had impacted upon his self-worth and had reduced his self-confidence, particularly in social situations. As a result, he was more socially isolated. He reported reduced attention/concentration. He was not aware of fatigue. Memory was impaired. The cognitive and emotional sequelae to the accident had undermined his usual ways of coping. He had a sense of less control over how to handle the uncertainty he is facing. There is a recommendation for 15 sessions of

psychological/emotional therapy.

Ms M Bauer

99. Ms Bauer, speech and language therapist, first assessed the Claimant on 31 July 2022. Mr Nurse reported problems with his vocabulary. The therapist noted some difficulties with turn taking and initiation of conversation. On assessment there was evidence of poor performance in relation to attention, information processing and derivation of meaning. On most assessments his responses indicated impairment of attention, executive functioning, and information processing. There is also reference to issues managing anger and aggression. There is recommendation for neuropsychology but there is also recommendation for future SLT to assist with social communication.

Ms L Adam (04.03.22)

100. Ms Adam, occupational therapist, notes that he was independently mobile, exercising regularly and able to run. She identified mildly reduced coordination in both upper limbs. She administered the ACE – III in which he scored 70/100; identifying difficulties with memory, fluency, language and attention. He was reported to have difficulties with memory and social situations. In communication, he avoided eye contact. He spoke in full and complete sentences but with occasional word finding difficulties. He was noted to be independent with personal care. He remained motivated. Ms Adam identified nystagmus.

101. She concluded that he was coping well at home but that his plan to attend university would be a significant adjustment. There is recommendation for weekly OT as well as a specialist SLT assessment. Ms Adam also questioned the need for referral to a neuro-orthoptist.

Mr M Bell (22.03.22)

102. Mr Bell, educational and occupational consultant, conducted a face-to-face assessment on 24 February 2022 and an online assessment on 7 March 2022. He notes premorbid difficulties at school. Mr nurse's wish was to attend university to study computer programming. Post-accident, he reported being much more motivated to succeed. He notes that Mr Nurse was struggling with day-to-day organisation and focus. He notes that Mr Nurse's outcome-focused preferences were much stronger than his people-focused qualities.

103. On assessment he did not score highly in conscientiousness, which was considered key in studying computer programming, and in which he would require qualities such as being reliable and structured. There was concern about his ability to deal with stress. Although he scored within the average range for attention and executive functioning, he performed within the impaired range for processing speed as well as recent memory and new learning. Mr Nurse exhibited lack of awareness of his difficulties. Concern was expressed that this, coupled with his personality and emotional difficulties, could give rise to stress and have a negative impact on his emotional wellbeing unless significant supports were in place. Difficulties in processing speed, short-term memory and new learning were likely to cause significant difficulties in the workplace.

104. Mr Bell concludes that it was unclear what level of support he would require at university. The conclusion was that there would need to be a significant amount of support from a multidisciplinary team over the next few years for him to navigate the transition through university into employment. A variety of recommendations are made, including one-to-one tutoring in computer programming and one-to-one education coaching. There is recommendation for the creation of a multidisciplinary team (MDT) to assess potential universities. Further provision would be required to design a personalised degree for him to learn at his own pace via multimodalities supported by an MDT. There is support for the recommendation of psychological

input, OT and SLT.

OPINION

105. Without expert engineering opinion I can provide only an outline view on causation.

106. The Claimant's premorbid psychological history, and the difficulties that his would have given rise to in relation to education and social interaction, is not a matter of neurosurgical opinion. In any event, my instructions are to consider matters of causation and not his condition and prognosis.

107. On 29 June 2021, at the age of 18, Mr Nurse was a passenger in a small hatchback which was involved in a single vehicle RTC. As a result of the traumatic brain injury (TBI), Mr Nurse has a prolonged period of retrograde and post-traumatic amnesia, with no recollection of the index accident. This is entirely consistent with the fact that he was GCS 4 at the scene, and the severity of injury evident on CT. There is no engineering evidence in relation to seat belt usage, or any physical evidence that might inform opinion on where he was positioned within the vehicle.

108. Both the police collision report and the witness evidence of Mr Hewson report that there were three occupants in the vehicle, although there are also the names of two females who are listed but who appear to have arrived post-accident. The Letter of Instruction states that it is the Claimant's evidence that he was the front seat passenger, and was restrained. That is also the evidence of another vehicle occupant, Mr Brindley. Mr Hewson, who was driving past the scene also suggests that one of the occupants was out of the vehicle and that two remained trapped within it. He states that both occupants who remained within the vehicle were positioned in the front.

109. However, this is contradicted by the evidence of the first responder paramedic. He states that there were three occupants of the vehicle and suggests that Mr Nurse was

in the rear and trapped by his arm. Noting that the vehicle came to rest on its offside, this suggests that he was seated behind the driver if he was restrained but, if unrestrained, he may have moved from the nearside to the offside when the vehicle barrell-rolled clockwise. The HEMS record documents that Mr Nurse was unrestrained in the rear, but whether that was how they found him or whether they obtained this information at handover from the land ambulance crew is unknown. The collision report documents that Mr Nurse was in the rear, as was Benjamin Brindley, with the only other occupant recorded as Dillon Falconbridge, who was allegedly the driver.

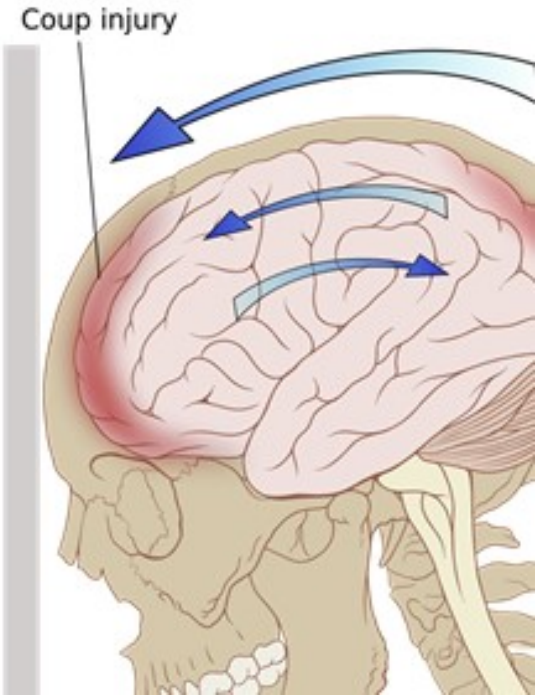
110. The paramedic's note reports also that Mr Nurse was inverted within the vehicle and had "noisy breathing" until the nasopharyngeal airway was inserted. Unfortunately, the column which records oxygen saturations is blank because the paramedic states that there was insufficient access for him to apply monitoring. It is therefore unknown whether Mr Nurse had a period of hypoxia prior to the arrival of the emergency services. The Claimant required freeing by the fire service before he could be extricated from the vehicle via the boot. How long he was trapped for is currently unknown, but he was receiving high flow oxygen and the obstructed breathing resolved following insertion of a nasopharyngeal airway. Glasgow Coma Score was 4/15 when attended by the paramedic.

111. The admission CT shows a right frontotemporal subgaleal haematoma, indicative of a head strike to this region. The imaging showed no evidence of a skull fracture or fracture of the facial bones but haemorrhagic contusions were identified on subsequent imaging in both frontal lobes and the left parietal region, in addition to a shallow right acute subdural haematoma. At that stage, grey/white matter differentiation was preserved but there was effacement of the sulci at the vertex, indicative of raised intracranial pressure.

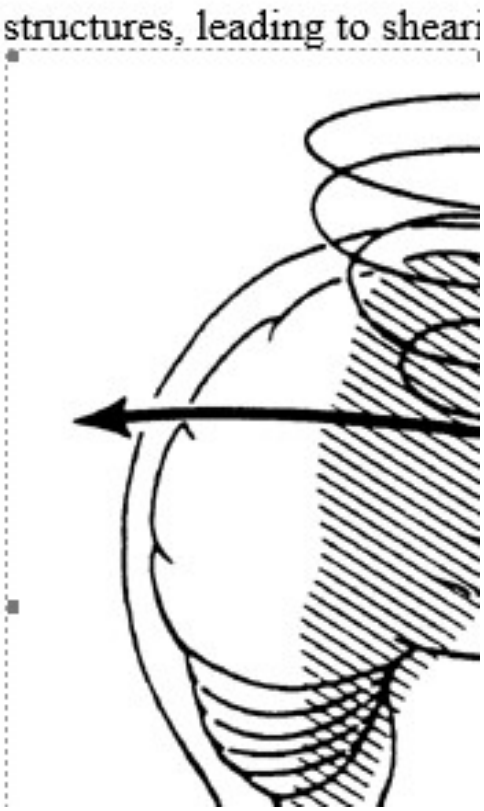
112. Mr Nurse's other injuries included a right-sided pneumothorax, bilateral lung

contusions and a liver laceration as well as a pancreatic contusion. All were managed conservatively. An ICP monitor was inserted and, over subsequent days, Mr Nurse required maximal medical management for raised intracranial pressure. He also required a prolonged period of ventilation on account of severe bilateral traumatic lung injury. At one time he was even considered a possible candidate for ECMO (extra-corporeal membrane oxygenation). Subsequent CT head scans reported to show some blossoming of previous contusions.

113. The cranial imaging is consistent with diffuse axonal injury, but with an element of contrecoup injury. By way of explanation there are two typical types of brain injury that follow trauma to the head, although they are not mutually exclusive. The first is a coup contrecoup injury. This is the result of linear forces being applied to the head / brain. If the head strikes an object and the skull decelerates rapidly, the brain moves relative to the skull, causing injury both at the site of impact and the diametrically opposite pole of the brain. This is analogous to Newton's cradle, where three touching metal balls are suspended by threads from a beam. When one ball is pulled back and released (analogous to the striking force) the centre ball (analogous to the skull) stays still and the third ball (analogous to the brain) moves away in the opposite direction before swinging back again.



114. The other classical pattern of brain injury is diffuse axonal injury. This occurs because the brain is relatively mobile within the cranial cavity. If the head is struck a tangential blow then the brain will rotate relative to the skull. The brainstem and deep basal nuclei are relatively fixed both because they are in the central axis of the rotation and because of the attachment of the cranial nerves. In contrast, the hemispheres of the brain and cerebellum are relatively mobile relative to these fixed structures, leading to shearing at the sites between the two.



115. Whilst diffuse axonal injury can rarely result from a non-contact injury, such as when motorcyclists are “high-sided,” almost invariably DAI in the context of motor vehicle accidents is the product of a head strike. For example, ice-skaters can rotate at up to 4-6 revolutions/s without suffering any ill-effects. Although the vehicle appears to have undergone multiple rotational forces DAI, on the balance of probabilities, TBI was the result of a severe head strike / strikes. Indeed, the subgaleal soft tissue swelling indicates a severe frontotemporal impact.

116. On the admission scan, in addition to the extensive right frontotemporal subgaleal soft tissue swelling there are haemorrhagic contusions to the frontal lobes and the left parietal lobe, consistent with a coup / contrecoup injury in a right frontal - left parietal line of force. On later imaging there is evidence of subdural blood beneath the tentorium as well as evidence of deep-seated injury to the region of the basal ganglia and corpus callosum, typical of diffuse axonal injury, although the latter is seen much more readily on MRI.

117. What is less certain is whether Mr Nurse suffered a period of hypoxia prior to extraction from the vehicle. It is unfortunate that it was not possible to record oxygen saturations whilst he was in situ, although I have not seen the medical records from the land ambulance or HEMS that attended him after the paramedic. It would appear that his airway was partially obstructed by his position within the vehicle but that this was corrected by the insertion of a nasopharyngeal airway. The admission CT did not show loss of grey/white mater differentiation; a radiological sign which can be indicative of hypoxic / ischaemic brain injury. I cannot exclude a period of hypoxia although had there been such, I would have expected it to have been handed over to the emergency team post-admission and for there to be evidence for this on imaging. The evidence available does not suggest that his resting position within the vehicle prior to extraction compounded the primary brain injury due to airway obstruction. The significance is that airway obstruction is less likely to occur in a restrained than unrestrained occupant.

118. Post-admission, intracranial pressures were difficult to control and it is probable that this was a consequence of both swelling of the brain within the confines of a rigid skull due to the primary brain injury, but exacerbated by the severe bilateral pulmonary contusions which, for a time, made him difficult to ventilate [Note: ventilation of contused/infected lungs may require increased ventilatory pressures in order to maintain the patency of small airways / oxygen saturations. Because there are no valves in the veins in the neck, if intrathoracic pressure is elevated in order to improve oxygenation then this increases cerebral venous pressure/blood volume and hence elevates intracranial pressure].

119. Nevertheless, it was possible to manage raised ICP medically and without the need for decompressive craniectomy or institution of external ventricular drainage and, in my opinion, even if it is found that Mr Nurse was not wearing a seat belt and, had he done so, his risk of chest injury would have been lessened, I do not think that this

would have had any significant bearing on outcome of the TBI.

120. Based on GCS and duration of post-traumatic amnesia, Mr Nurse suffered a severe TBI. Whilst the Mayo Classification has found favour in medicolegal practise, it is in fact extraordinarily lacking in its discrimination of TBI severity. Any brain contusion, whether it has no clinical sequelae or results in devastating neurodisability is characterised as moderate – severe (definite) on the Mayo system.

121. I have not had the opportunity to examine the Claimant in person but note that an OT thought that there was evidence of nystagmus and some dysdiadochokinesia. The latter was not evident at the time that I conducted this test virtually but it was not possible to assess him for nystagmus. My provisional opinion is that Mr Nurse has made a good physical recovery but I cannot exclude high level balance dysfunction secondary to diffuse axonal injury. His current difficulties are consistent with ongoing cognitive/executive difficulties secondary to frontotemporal brain injury/diffuse axonal injury secondary to a severe head strike, compounding pre-existing personality traits.

Causation

122. Without sight of detailed accident reconstruction evidence, I am unable to provide an opinion on seat belt causation, but make the following observations. I have been asked to consider causation in respect of Mr Nurse being either in the front or in the rear of the vehicle. However, given the forces that would have been exerted during the impact and state of the vehicle, it is in my non-expert opinion difficult to envisage a circumstance whereby Mr Nurse could have been seated in the front at the time of the collision and yet have been found in the rear of the vehicle post-accident. He would have been unconscious from the outset As noted above, the evidence in relation to his final resting position is contradictory.

123. As far as Mr Nurse being seated in the front of the vehicle is concerned, there is

severe intrusion of the roof when the vehicle barrel rolled and it struck a mature tree. Not only is the roof crushed, particularly on the offside, but the A pillar on the passenger side is displaced both backwards and inwards. Whilst I will defer to expert engineering opinion, I suspect the only reason the driver survived, if it was him who was outside, is because he was unrestrained and, when the Polo struck the Armco barrier and started to barrel roll, he was ejected through the windscreen and was therefore not within the vehicle when it impacted with the tree. However, I can see no evidence of ejection on the CCTV. My provisional opinion is that, if Mr Nurse was in the front seat of the vehicle and was restrained, he would have suffered a very severe head strike to the vertex when the vehicle struck the tree, or he would have struck the left side of his head on the A pillar. To strike the right side of his head whilst seated in the front would suggest that he suffered head contact with the driver.

124. The second scenario to consider is if he was in the rear of the vehicle, and unrestrained. No evidence has been provided as to whether he would have been seated behind the passenger or the driver although, if it is correct that the other rear seat passenger was on top of Mr Nurse and the latter's right arm was trapped outside the vehicle then this would suggest that he was seated behind the driver. Once again, whilst rightly a matter for expert engineering opinion, my understanding of the mechanism of this accident is that when the vehicle struck the Armco barrier, if Mr Nurse was unrestrained, he would have been pitched forwards and to the offside towards the "B" pillar. That is consistent with the position of the right frontotemporal impact site.

125. When the vehicle struck the tree, he would have been projected violently upwards. In my non-expert opinion the vehicle probably then barrel rolled 360 degrees in the opposite direction, providing multiple opportunities for further cranial impact, although the CT suggests only a single severe head strike. Were he restrained in the rear passenger seat then it will be a matter for expert engineering opinion to advise

whether Mr Nurse would have rotated out of the diagonal strap of the seatbelt, and whether he would have been vulnerable either to a clash of heads with another rear seat occupant or whether his head could still have made contact with the offside of the vehicle.

126. Whilst there are no photographs of the interior of the vehicle, the photographs reproduced at paragraph 96 suggest that the offside "B" pillar has been forced both inwards and rearwards. It is noteworthy that this was a small hatchback, with limited space in the rear. The roof over the rear passenger compartment has been forced upwards on the offside. It will rightly be a matter for expert engineering opinion to advise whether, even had Mr Nurse been restrained, his head would still have been projected into the "B" pillar or indeed whether his head would have made contact with the base of the tree/ground via the broken passenger window. When the vehicle barrel-rolled, the forces would have been laterally and a seat belt would not have protected Mr Nurse when the vehicle rotated onto its right side shortly before it struck the tree.

127. In summary, there is insufficient evidence currently on where he was seated and the movements he would have made during the various phases of this accident to form an opinion as to whether Mr Nurse's cranial injury would have been mitigated by the wearing of a seat belt. However, based on current evidence he would still have been vulnerable to suffering a severe head strike either with the B pillar or with his head against the side window / base of the tree, even had he been restrained. His risk of airway obstruction would have been lessened were he restrained but, currently, there is no evidence to suggest in fact that he suffered a secondary hypoxic ischaemic injury.

EXPERT'S DECLARATION

I, Robert Macfarlane, declare that:

1. I understand that my duty in providing written reports and giving evidence is to help the Court, and that this duty overrides any obligation to the party by whom I am engaged or the person who has paid or is liable to pay me. I confirm that I have complied and will continue to comply with my duty.

2. I confirm that I have not entered into any arrangement where the amount or payment of my fees is in any way dependent on the outcome of the case.

3. I know of no conflict of interest of any kind, other than any which I have disclosed in my report.

4. I do not consider that any interest which I have disclosed affects my suitability as an expert witness on any issues on which I have given evidence.

5. I will advise the party by whom I am instructed if, between the date of my report and the trial, there is any change in circumstances which affect my answers to points 3 and 4 above.

6. I have shown the sources of all information I have used.

7. I have exercised reasonable care and skill in order to be accurate and complete in preparing this report.

8. I have endeavored to include in my report those matters, of which I have knowledge or of which I have been made aware, that might adversely affect the validity of my opinion. I have clearly stated any qualifications to my opinion.

9. I have not, without forming an independent view, included or excluded anything which has been suggested to me by others, including my instructing lawyers.

10. I will notify those instructing me immediately and confirm in writing if, for any reason, my existing report requires any correction or qualification.

11. I understand that:

    11.1. my report will form the evidence to be given under oath or affirmation;

    11.2. questions may be put to me in writing for the purposes of clarifying my report and that my answers shall be treated as part of my report and covered by my statement of truth;

    11.3. the court may at any stage direct a discussion to take place between experts for the purpose of identifying and discussing the expert issues in the proceedings, where possible reaching an agreed opinion on those issues and identifying what action, if any, may be taken to resolve any of the outstanding issues between the parties;

    11.4. the court may direct that following a discussion between the experts that a statement should be prepared showing those issues which are agreed, and those issues which are not agreed, together with a summary of the reasons for disagreeing;

    11.5. I may be required to attend court to be cross-examined on my report by a cross-examiner assisted by an expert;

11.6. I am likely to be the subject of public adverse criticism by the judge if the Court concludes that I have not taken reasonable care in trying to meet the standards set out above.

12. I have read Part 35 of the Civil Procedure Rules and the accompanying practice direction including the "Protocol for Instruction of Experts to give Evidence in Civil Claims" and I have complied with their requirements.

13. I am aware of the practice direction on pre-action conduct. I have acted in accordance with the Code of Practice for Experts.

Statement of Truth

I confirm that I have made clear which facts and matters referred to in this report are within my own knowledge and which are not. Those that are within my own knowledge I confirm to be true. The opinions I have expressed represent my true and complete professional opinions on the matters to which they refer. I understand that proceedings for contempt of court may be brought against anyone who makes, or causes to be made, a false statement in a document verified by a statement of truth without an honest belief in its truth.

Robert Macfarlane MA, BChir, MD, FRCS

ROBERT MACFARLANE: SUMMARY OF CURRICULUM VITAE

I received my undergraduate training at the University of Cambridge, where I was a scholar at Selwyn College. I obtained First Class Honours in Medical Sciences in 1979. My clinical training was also in Cambridge. I qualified as a medical practitioner in 1981, and was awarded the Lewin Prize in Surgery.

I completed basic post-graduate training in various surgical disciplines, including general surgery, orthopaedics, urology and cardiothoracic surgery, obtaining my Diploma of Fellowship of the Royal College of Surgeons in England in 1986. My higher surgical training in neurosurgery was at Addenbrooke's Hospital in Cambridge and at the Massachusetts General Hospital in Boston, USA. I obtained a Doctorate of Medicine from the University of Cambridge in 1992, for which I was awarded the Sir Lionel Whitby Medal and Ralph Noble prize.

Having obtained my certificate of completion of higher surgical training in cranial and spinal neurosurgery in 1992 I was appointed as a consultant neurosurgeon to the Royal London Hospital later the same year. In 1994 I was appointed as a consultant neurosurgeon at Addenbrooke's Hospital in Cambridge. My sub-speciality interest was in surgery of the skull base. I retired from the NHS in January 2022.

I have written more than 60 papers on various aspects of surgery, including both cranial and spinal neurosurgery. I have also written a number of chapters in textbooks. I am the co-author of a book on the Outcome of Cranial and Spinal Trauma.