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2014 No: 125895

IN THE HIGH COURT OF JUSTICE IN NORTHERN IRELAND

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QUEEN'S BENCH DIVISION

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Between:

EMS (A MINOR) BY HER MOTHER AND NEXT FRIEND

Plaintiff

and

ES

First-named Defendant

DARREN THOMAS McCORD

Second-named Defendant

W D IRWIN & SONS LIMITED

Third-named Defendant

and

HS

Third Party

_____

MAGUIRE J

Introduction

[1] The plaintiff in this case was born on 1 August 2012. On 21 August 2014 at or around 08:10 hours, while a back seat passenger in a car driven by the first-named defendant, the plaintiff, then aged 2, sustained serious injuries as a result of a road traffic accident.

[2] In these proceedings she, through her mother and next friend, has sued three defendants.

[3] The first-named defendant is the plaintiff's aunt. She was the driver of the Volvo car in which the plaintiff had been a back seat passenger at the time of the accident. The plaintiff was secured in the back of the car by a Graco booster seat. There was no-one else in the car save for the driver.

[4] The second-named defendant was the driver of a van. This was the other vehicle in the accident. He was alone in the van. The van was travelling in the opposite direction to the Volvo car.

[5] The third-named defendant is sued as the owner of the vehicle the second-named defendant was driving. There will be no need in this judgment to refer to it further.

[6] While at an earlier stage of these proceedings there was a third party also involved, as explained in Stephens J judgment already given in this case, that party was dismissed from the proceedings by the judge and, in these circumstances, this court need not refer further to him.

[7] A hearing was conducted by Stephens J in respect of liability issues. This resulted in a substantial written judgment which was delivered on 14 June 2017.

[8] That judgment dealt with the principal issues relating to liability. The judge provided a written judgment (STE10325) and, *inter alia*, held as follows:

(i) As was clear from the outset, the plaintiff was bound to succeed in the proceedings as, on any view, her injuries were sustained as a result of the negligence of one or other of the defendants.

(ii) In fact, the second-named defendant – the van driver - was the party responsible for the accident giving rise to the plaintiff's injuries.

(iii) In particular, the judge held that the first-named defendant at all material times was driving on her own side of road. What had happened was that the second-named defendant had moved from his own side of the road into the first-named defendant's side of the road so causing a head-on collision.

(iv) The collision, therefore, occurred on the first-named defendant's side of the road.

(v) The combined impact speed was held by the judge to be 80 mph. The judge found as a fact that the Volvo had been travelling at 52 mph and the van at 28 mph at the point of impact.

(vi) Neither defendant, the judge held, braked at the time of the accident.

(vii) As a result of the accident the Volvo car was pushed back a little as a result of the collision.

(viii) The Graco booster seat, in which the plaintiff was sitting at the time of the accident, was the responsibility of the first-named defendant who had placed the plaintiff on it. It was not a suitable seat for the plaintiff to travel in as it was inappropriate for a child of the plaintiff's age and weight. Moreover, the plaintiff had not been properly secured in the seat as the seat belt used had been positioned below the plaintiff's left arm rather than above it, over her shoulder. At the time of the accident the judge found as a fact that the seat belt had been improperly positioned as indicated.

[9] An issue left open at the original hearing before Stephens J was that of whether the inappropriate restraint used in this case had caused or contributed to the plaintiff's injuries. This matter was left open because of the particular circumstances described at [21] of the judge's judgment (see below).

[10] As Stephens J was not available to deal with the issue that had been left open on the date when this issue was scheduled to be heard, the parties agreed to the course that this court would deal with that issue. Before this court, Mr Dermot Fee QC and Mr Morrissey BL appeared for the plaintiff; Mr Ringland QC and Mr Spence BL appeared for the second and third named defendants; and Mr Simpson QC and Mr MacMahon BL appeared for the first named defendant. The court is grateful to counsel for their helpful oral and written submissions.

The Plaintiff's Injuries

[11] The plaintiff was just over two at the time of the accident. The injuries she received in it were serious. In essence the plaintiff's injuries were found principally at three locations:

(a) To the head.

(b) To the abdomen.

(c) To the spine.

[12] The issue at the hearing before the court related only to the spinal injuries the plaintiff received. It was common case that the injuries relating to plaintiff's abdomen and head did not require any ruling from the court at this time.

The Spinal Injuries

[13] There is little dissent in this case about the general nature of the plaintiff's spinal injuries. A reasonable statement of these would be that she sustained:

(i) A probable unstable fracture at the level C5/6.

(ii) An upper thoracic spinal injury with ligamentous disruption at the level of T3.

(iii) Mild disruption at C6/7.

(iv) Spinal cord damage at T3.

Legal Principles

[14] There is no serious dispute in this case about the relevant legal principles which apply to the issue which is now before the court. The key principles can be stated as follows:

(a) Section 1(1) of the Civil Liability (Contribution) Act 1978 states as follows:

> "Subject to the following provisions of this section, any person liable in respect of any damage suffered by another person may recover contribution from any other person liable in respect of the same damage (whether jointly with him or otherwise)."

(b) Section 2(1) of the 1978 Act goes on:

> "2(1) …in any proceedings where a contribution under section 1 above the amount of the contribution recoverable from any person shall be such as may be found by the court to be just and equitable having regard to the extent of that person's responsibility for the damage in question."

(c) The approach to contributory negligence in seat belt cases is found in Froom v Butcher [1976] 1 QB 286. In that case Lord Denning said at pages 295-296:

> "Whenever there is an accident, the negligent driver must bear by far the greater share of responsibility. It was his negligence which caused the accident. It also was a prime cause of the whole of the damage. But in so far as the damage might have been avoided or lessened by wearing a seat belt, the injured person must bear some share. But how much should this be? Is it proper to inquire whether the driver was grossly negligent or only slightly negligent or whether the failure to wear a seat belt was entirely inexcusable or almost forgivable? If such an inquiry could easily be undertaken, it might be as

well to do it. In Davies v Swan Motor Co. (Swansea) Ltd [1949] 2 KB 291, 326, the court said that consideration should be given not only to the causative potency of a particular factor, but also its blameworthiness. But we live in a practical world. In most of these cases the liability of the driver is admitted, the failure to wear a seat belt is admitted, the only question is: what damages should be payable? This question should not be prolonged by an expensive inquiry into the degree of blameworthiness on either side, which would be hotly disputed. Suffice it to assess a share of responsibility which will be just and equitable in the great majority of cases.

Sometimes the evidence will show that the failure made no difference. The damage would have been the same, even if a seat belt had been worn. In such case the damages should not be reduced at all. At other times the evidence will show that the failure made all the difference. The damage would have been prevented altogether if a seat belt had been worn. In such cases I would suggest that the damages should be reduced by 25 per cent. But often enough the evidence will only show that the failure made a considerable difference. Some injuries to the head, for instance, would have been a good deal less severe if a seat belt had been worn, but there would still have been some injury to the head. In such case I would suggest that the damages attributable to the failure to wear a seat belt should be reduced by 15 per cent."

(d) The Froom approach has been applied in cases involving children and the use of child seats. In the case of Hughes (A child) v Williams [2012] EWHC 1078 (QB) Blair J stated:

> "[74] … I accept Dr Sherriff's evidence that if seated in the child's seat Emma's injuries would largely have been avoided …
>
> [81] I am bound to follow the rules laid down in Froom v Butcher [1976] QB 286 as interpreted in the present kind of circumstances in Jones v Watkins [2001] RTR 19. The importance of doing so was reiterated recently by the Court of Appeal in Stanton v Collinson [2010] RTR 284, to which I have already referred. It had been submitted in that case by the appellant that the trial judge's question

posed in her judgment was wrong. Hughes LJ (with whom Ward and Hallett LJJ agreed) said at 26:

> '… the question posed drew directly upon the language of Lord Denning MR in Froom v Butcher. I do not agree that it was the wrong question. In particular, I do not agree that even if the seat belt would or might have made a lesser difference to the injury, as distinct from 'a considerable difference' or from reducing the injuries to ones 'a good deal less severe', section 1 of the Law Reform (Contributory Negligence) Act 1945 nevertheless requires the court of investigate the extent of the difference with a view to ordering a reduction of less than 15% for contributory negligence. There may, I accept, be unusual cases in which the two brackets of finding contemplated by Froom v Butcher are neither appropriate. But the Act requires that the reduction for contributory negligence shall be such as appears to the court to be just and equitable. It therefore permits an approach such as adopted in Froom v Butcher based upon two broad categories of typical case and the general proposition that, absent something exceptional, there should be no reduction in a case where the injury would not have been reduced "to a considerable extent" by the seat belt. Both parties in this appeal urged upon us, in different contexts, the undesirability of a prolonged or extensive inquiry into these cases. They were right to do so; there is a powerful public interest in there being no such enquiry into defined degrees of contributory negligence, so that the vast majority of cases can be settled according to a well understood formula and those few which entail trial do no mushroom out of control. Froom v Butcher so states, and is binding'."

(e) The approach just stated was approved by the Court of Appeal in England and Wales in the same case: Williams v Williams [2013] EWCA Civ 455.

[15] In Northern Ireland a similar approach has been taken: see Elliot (A Minor) v Laverty and another [2006] NIQB 97; KW (a Minor) v Bolton [2009] NIQB 39.

The Context in More Detail

[16] In order better to understand the context in which the issue the court is considering is set, it is helpful to provide more detail in relation to it.

[17] The basic position is as has been discussed above. However, in the judgment of Stephens J, useful detail is provided.

[18] The following quotations from the judge's judgment bear on the issue now before the court:

(i) "[10] Another … issue relates to the forward facing Graco booster seat with a back support ("the Graco booster seat") on which the plaintiff was sitting. The Graco booster seat uses the vehicle's own seat belt to both secure the seat to the car and to restrain the plaintiff in the seat. One part of the seat belt strap is attached through a belt routing system in the headrest and then is available to go over the plaintiff's left shoulder. The lap part of the seat belt strap is available in the usual way to go across the plaintiff's abdomen performing the dual function of restraining that part of the plaintiff in the seat and securing the seat in the car. The seat belt is secured in the usual way by inserting the plate at the end of the webbing into the buckle which is secured to the car on the plaintiff's right hand side.

[11] At the date of the collision the plaintiff weighed 11.6 kg and the Graco booster seat in the Volvo in which the plaintiff had been placed was only suitable for a child over 15 kg. It is common case that as the plaintiff was not within the weight range for the Graco booster seat that it was not a suitable seat for her. A suitable rear facing child seat, given the age and weight of the plaintiff, could use a harness with three straps. A suitable forward facing child seat, given the age and weight of the plaintiff, would have been one which did not utilise the Volvo's own seat belt to restrain the child but rather one which was secured to the Volvo and then had a harness for the child integral to the seat, with five straps all secured at a central fixing point. There would have been a strap over each shoulder, with two lap straps one from each side and one strap coming up from underneath between the plaintiff's legs. Such a child seat would have secured both of the plaintiffs shoulders, her abdominal area and finally the crotch strap would have prevented the plaintiff in an impact from slipping down in the child seat.

[12] The second and third defendants in their defence and in a Notice of Contribution and Indemnity to the first defendant,

both served on 7 May 2015, alleged that the plaintiff was in a child seat which was not suitable for her and which "may have caused or contributed to her injuries." The first defendant, whilst recognising that as the driver of the Volvo, she had a responsibility to the plaintiff to restrain her appropriately for her age and/or weight, and that the plaintiff was not so restrained, denied that there was any material difference in the injuries sustained by the plaintiff by being placed and restrained in an incorrect child's seat. …

[13] Further issues arise in relation to the restraint of the plaintiff on the booster seat in the Volvo.

(a) Immediately after the collision occurred a Mr Kelly came on the scene. He recounted to the police that he found that the seat belt was not over the plaintiff's left shoulder but rather was under her left arm. The second defendant alleges that if that was so before the collision occurred then the seat belt was not correctly positioned to provide the maximum level of restraint. The second defendant alleges that the seat belt was not correctly positioned, that the first defendant was responsible for positioning the seat belt and for checking that it remained in position and this failure contributed to the injuries that the plaintiff sustained.

(b) The Graco booster seat utilises the Volvo's seat belt but to do so appropriately there is integrated into the headrest of the seat a seat belt guide which ensures that the seat belt is in the correct position. This belt routing system is highlighted in red so that the webbing of the seat belt is threaded through the guide bar and is retained in position. Mr Kelly states that after the collision he was asked by the emergency services to take the Graco booster seat out of the Volvo with the plaintiff sitting in it. In order to do this he released the seatbelt plate from the buckle but he did not have to remove the webbing from the seatbelt guide in the headrest. His evidence is that not only was the seatbelt under the plaintiff's arm but also that the top of the Graco booster seat was not properly secured."

(ii) "[18] The second defendant alleges that the use of an inappropriate child seat for and restraint of, the plaintiff caused or contributed to her injuries. The first defendant whilst acknowledging that the plaintiff ought to have been in a child

seat with a five point harness contended that the plaintiff would have sustained the same injuries even if properly restrained.

[19] It was agreed, and I directed, that this issue should also be heard and determined at this stage.

[20] The first defendant obtained a report from Professor Michael Vloeberghs, Consultant Paediatric Neurosurgeon at Nottingham University Hospital and the second defendant obtained a report from Mr Gavin Quigley, Consultant Neurosurgeon at the Royal Hospitals, Belfast. There was a meeting by telephone conference call between those experts on 8 February 2017. It is apparent from their reports and the minutes of the telephone conference call that their opinions differed.

[21] Among the injuries which the plaintiff sustained was an unstable fracture of C5/6, a disc injury at the level C6/7 and catastrophically a stretching injury to the spinal cord at the level of T3 which has caused tetraplegia. Professor Vloeberghs gave evidence that in young children the weight of the head is much greater in proportion to an adult and that 15%-20% of the plaintiff's body mass would have been around the surface of her head. That a five point harness with a strap over each shoulder would not make any difference to the mobility of the plaintiff's head and this was the cause of the cervical fracture, the disc injury and the stretching of the spinal cord. He concluded that the plaintiff's tetraplegia would have occurred in any event even if she had been restrained within a five point harness. This was an opinion with which Mr Quigley disagreed and his views were being put to Professor Vloeberghs in cross-examination by Mr Ringland. However, it became apparent that the reasoning of Mr Quigley, as articulated in Mr Ringland's cross-examination, had not been included in Mr Quigley's expert report, was based on documents which were not before the court, included references to an MRI scan about which there might be the need to obtain the views of a consultant radiologist and that the reasons had not been discussed in the expert's meeting. The first defendant would have been prejudiced if the cross-examination continued. I gave a number of directions including that Mr Quigley prepare a further medical report and I adjourned the issue as to whether the inappropriate restraint of the plaintiff has caused or contributed to her injuries."

(iii) "[34] The Graco child seat came with a manual and with a notice on the back of it. Both the manual and the notice stated that "To use this Graco booster seat your child MUST meet ALL

of the following requirements." Both the manual and the notice then listed a number of requirements which included your child must be "approximately 3-12 years old" and "weigh between 15-36 kg." The first defendant's son was approximately 3 years old but the first defendant knew or ought or to have known that the plaintiff was just 2 years old."

(iv) "[64] The plaintiff had been placed in the Graco booster seat by the first defendant …

[65] I accept the evidence of Mr Kelly that the seat belt was under the plaintiff's left arm rather than over her left shoulder. I find as a fact that this was the position prior to the collision occurring and that the first defendant had positioned the seat belt in that way when placing the plaintiff in the Volvo.

[66] Mr Kelly gave evidence that the Graco booster seat was not properly secured in the vehicle in that the seat belt was not through the guide bar on the headrest. This was not mentioned to the police during the course of the initial investigation and the evidence emerged just prior to trial. On the balance of probabilities I am not persuaded that it is correct."

(v) "[71] A copy of this judgment should be sent to the medical witnesses dealing with the issues as to whether inadequate restraint of the plaintiff in the Graco booster seat caused or contributed to the plaintiff's injuries so that their opinions are based on these factual conclusions in so far as they are relevant to that issue."

The hearing before this Court

[19] At the hearing before this court both Professor Vloeberghs and Mr Quigley gave evidence and were cross-examined. By the date of the hearing, each had provided two written reports to the court. Before considering their oral evidence it will be of value to provide a brief summary of these reports, together with a summary of the evidence of Dr Flynn, a Neuroradiologist who did not give evidence but who had provided a report to the court dated 31 August 2017. The court will begin with the report which is first in time, which is Mr Quigley's first report.

[20] As already has been noted, Mr Quigley was an expert witness retained on behalf of the second defendant. As already noted, he is a Consultant Neurosurgeon. His first report was dated 20 November 2016. In it, having referred to the plaintiff's spinal injuries and having described them, he offered the following view:

> "This type of injury is caused by the sudden forward flexion of the rapid deceleration during the accident. Children have larger heads in proportion to their body than adults and so cervical injuries are more common in road traffic collisions. Overall the incidence of spinal cord injury in children is extremely low and most are seen as a result of road traffic collisions.
>
> I think an integral safety harness would have reduced the amount of forward flexion [the plaintiff] was subjected to, as the harness would spread the load and restrain the shoulders. Her upper thoracic injury is unusual and is likely due to excessive forward flexion. There is marked cord disruption at this level and it is unlikely to recover. In my opinion it is still likely that she would have sustained a cervical injury because of the high energy nature of the collision. I think it is reasonable to suppose that her injuries may have been reduced in severity by the presence of a safety harness in a suitable car seat … I do feel however that an integral harness securing both shoulders would have reduced the severe nature of [the plaintiff's] thoracic injury …".

[21] Additionally, in his report Mr Quigley expressed the view that the positioning of the seatbelt under the plaintiff's left arm rather than over her left shoulder permitted a much greater degree of forward flexion at impact than one might have expected, if at least one shoulder had been properly restrained. Consequently, he went on, that it was likely that the plaintiff would not have suffered such a severe thoracic injury had her shoulders been restrained.

[22] His overall conclusion was that:

> "On the balance of probabilities a suitable child restraint seat would have avoided the T3 cord injury and subsequent paralysis."

[23] The next report, chronologically, is that of Professor Vloeberghs, which is dated 25 January 2017.

[24] As has already been stated, Professor Vloeberghs is a Consultant Paediatric Neurosurgeon. In his first report he describes the history and makes reference to the booster seat that the plaintiff had been in. His report included a description of the fixation device. In his view, the position of the child as demonstrated in a photograph with which he had been provided was "secure". He put the matter as follows:

> "If [the plaintiff] was in the car seat [as in the picture he had been provided with], she would have been in a stable three point fixation position".

[25] The witness's main conclusions were as follows:

> "In case of a full frontal impact, in whichever type of seat, the child is propelled forcefully forward. The body is restrained; the child's head represents a significant weight and is connected to the body by a relatively frail structure e.g. the cervical spine, composed of vertebrae with discs, ligaments and muscles and this structure is mobile in all directions … The muscles around the cervical spine are designed to move the head and spine and to maintain an upright position of the head and, even in ducts, will not protect the cervical spine during this type of injury, hence the number of whiplash injuries. [The plaintiff's] injury to the spine and spinal cord is a result of the forceful forward projection of the head which ruptured the posterior ligaments, which in turn destabilised the vertebrae leading to disc pro laps and instability from … C4-T3, causing spinal cord injury …
>
> … I have come to the conclusion that in view of the violence of the impact, the type of car seat would not have influenced the head injury and a three-point [or] four-point fixation did not influence the mechanics of the injury".

[26] The hearing before Stephens J took place in or around June 2017. The directions of the judge in respect of the issue now before this court have been briefly referred to above. One of these related to the need for a report from a Consultant Radiologist. This direction gave rise to a report being filed by Dr Flynn. He is a Consultant Neuroradiologist and works in the Department of Neuroradiology at the Royal Victoria Hospital in Belfast. His report is dated 31 August 2017. It is not proposed to do more than to refer to particular aspects of his report which are relevant to the issue now before the court.

[27] Dr Flynn referred to a CT of the plaintiff's cervical spine which was carried out at the Ulster Hospital on 21 August 2014. The focus of this scan was related to the area from the skull base to mid T3. In respect of this area, he notes the presence of an unstable injury with significant widening of the C5/6 intervertebral disc space and the interspinous space. He further noted that there was a left-sided unilateral facetal subluxation with perching. A further finding of the scan was that there was an evulsion fracture involving the anteroinferior aspect of the C5 vertebral body.

[28] Dr Flynn also referred to an MRI scan of the same date. The findings of this concluded that there was abnormal T2 hyperintensity within the inferior aspect of the C5 vertebral body corresponding to the site of a known avulsion fracture. Moreover, it is noted that there was a defect in the posterior longitudinal ligament at C5/6 and an associated small acute disc protrusion. A further finding was that the cervical cord at the level of C6 was "mildly expanded".

[29] Commenting on the above findings Dr Flynn stated:

> "The initial CT cervical spine revealed an unstable injury at C5/6. The injury included disruption of the C5/6 disc with a small acute posterior disc protrusion, an avulsion fracture from the anteroinferior aspect of the C5 vertebral body, disruption of the posterior longitudinal ligament and ligamentum flavum, soft tissue injury to the interspinous spaces posteriorly and a unilateral facetal subluxation resulting in perched facets on the left".

[30] Mr Quigley's second report came after he had seen and studied further documentation in the case. This documentation included the first report of Professor Vloeberghs and the report of Dr Flynn which has just been summarised.

[31] Mr Quigley's second report is dated 4 September 2017 and is described as a "Supplementary Report". Its conclusions affirmed those contained in his first report. In the second report he remarked on the rarity of spinal cord injury in children under 8. It is clear that Mr Quigley carried out a search of medical literature (what he described as "numerous studies") and in fact he appended a substantial volume of such literature to his report. On the basis of his research, he noted that where such spinal cord injuries where sustained in young children, they were most common at the junction between the head and upper cervical spine. It was not until children get older, he observed, that the level of injury tended to progress further down the spine.

[32] Referring to the injury at the level of C5/6, involved in the plaintiff's case, he said:

> "C5/6 is a level of injury typically associated in adult cervical spinal injuries and not young children".

[33] Mr Quigley went on to note that, according to Dr Flynn's report, the posterior dura in the plaintiff's case had been disrupted i.e. torn by the injury. In Mr Quigley's estimation, such was an extremely unusual finding in a spinal cord injury and even a rarer finding in paediatric spinal cord injury. On this he commented:

> "This suggests that the degree of flexion during the accident was extreme as would be the case if [the

> plaintiff] had been restrained only with a lap belt and is difficult to explain in any other way".

Relying on the literature he had appended to his report he went on:

> "Cervical spine injuries in this age group … tend to occur in the upper portion of the cervical spine and not near the junctional level between the cervical spine and thoracic spine as in [the plaintiff's] case".

[34] Overall, Mr Quigley repeated his belief that on the balance of probabilities the plaintiff's spinal cord injury at T3 would not have occurred had she been restrained in a suitable restraint.

[35] Professor Vloeberghs provided a second report to the court which is dated 22 October 2017. By this date it is clear that he will have had the experience of giving evidence, though uncompleted, at the original trial before Stephens J. He will also have received Dr Flynn's report and the second report of Mr Quigley.

[36] The second report of Professor Vloeberghs is constructed largely as a supplement to his first report. In essence, he repeats the contents of his first report. Following that, he comments upon the further materials he had received.

[37] In respect of Mr Quigley's second report Professor Vloeberghs stated that:

> "This type of injury at [the plaintiff's] age may be rare but has happened in this case".

He then went on:

> "In my view the injury went as follows:
>
> An unstable fracture dislocation at the level C5/6 occurred with fracture of the left facet joint at that level, causing instability and allowing for further than normal movement, which is sufficient to explain the further flexion and distraction [the plaintiff's] spinal cord had, in particular in this high energy impact.
>
> At trial questions were raised regarding the rarity of this type of injury and in my opinion the reason is that these are generally high energy impacts in which there are significant associated injuries, which combined with spinal cord lesion have a high fatality rate and may be under-reported …

> I remain of the opinion no type of restraint, bar from an airbag or head restraint, would have avoided the C5/C6 fracture dislocation at that level of energy transfer".

[38] The witness also discussed the imaging report of Dr Flynn. In response to its contents, he notes that the main lesion to the plaintiff's spinal cord is at the C6 level which correlates with the clinical presentation and was the result of the C5/C6 fracture dislocation. In this regard he states:

> "Taking into account the violence of the event, the fracture dislocation allowed further, above the norm, stretching of the spine and spinal cord causing the lower down injuries".

[39] Professor Vloeberghs made no direct comment on Stephen J's judgment which had been provided to him.

[40] In his summary and opinion, the Professor indicated that the supplementary information "confirmed my initial opinion". The spinal cord was damaged from the C6 level downwards "likely by a combination of exaggerated stretch and vascular damage related to stretching of the blood vessels in and around the cord … No type of harness or restraining device avoids the C5/C6 injuries and ensuing disability [the plaintiff] suffered".

The Appended Literature

[41] As already noted, Mr Quigley provided with his second report a range of medical literature which took the form of eight different articles concerning, *inter alia*, spinal injuries in children. The court has considered these references. It is not proposed to attempt a summary of them. The court will confine itself to indicating that the following broad themes, which were not in significant dispute at the hearing as between the experts, emerged:

- Injuries to the spine in very young children are comparatively rare.

- Such injuries are mostly seen in the upper cervical spine.

- Anatomical and biomechanical differences between the developing child and the adolescent or adult accounts for the different pattern of injury occurring in different age groups.

- The ligaments, discs, and soft tissue structures, it would appear, are more elastic and the musculature is less well developed in children than in adults. It may be this feature which explains the relative resilience of the paediatric spine to injury.

- The size and weight of the head in relation to the weight of the body is greater in the case of babies and younger children but it gradually decreases with age. This factor causes the fulcrum of spinal flexion to be located at C2-C3 in very young children shifting to C5-C6 by late childhood.

- In at least one of the articles the most common level of involvement was C2.

- Children under the age of 3 have been identified specifically in some of the articles. In one article this group is described as "a distinct subpopulation of those paediatric spinal cord injuries".

- The issue may be one of bone maturation. Most of this occurs, according to one of the articles, between the ages of 3 and 8.

- Overall in younger children spinal injuries tended to be predominantly in the upper cervical segments. Where a child is 8 or over the pattern and aetiology of injury becomes similar to injury in adults.

[42] Some of the material provided by Mr Quigley makes reference to the issue of preventability in respect of cervical spinal cord injury in relation to paediatric cervical spine injuries. In one publication, based on a study of paediatric patients admitted to a children's hospital in the United States, there is reference to this issue. The authors state that many injuries would seem to be preventable, or at least could be ameliorated by common sense measures such as use of seatbelts, realistic use of vehicles and home safety education.

[43] In the same article[1] the following is stated:

> "The utilisation of available restraint systems in automobiles, such as infant seats and ordinary seat belts with shoulder harness can markedly reduce the incidence in spinal cord injury".

Expert Meetings

[44] The two experts at the centre of this case held two expert meetings, one before the hearing in front of Stephens J and one afterwards. This court will only refer to that which took place after the hearing before Stephens J. This meeting occurred on 13 November 2017 and related to the specific issue before this court.

[45] The minutes of this meeting demonstrated no meeting of minds as between the experts on the key issues which the court is now considering. On the one hand, Mr Quigley viewed the injury to the spine in a child of this age to be rare. In his view this was suggestive that "restraint devices play a large part in the very small

[1] Hill et al, Paediatric neck injuries, J Neurosurg 60 at 700-706

numbers of such injuries seen worldwide." He reiterated his view that flexion occurs over a much larger range of motion in such cases and more than would have been possible had the shoulders been restrained. In his view a correctly fitted and appropriate sized restraint device probably would have prevented spinal injury.

[46] On the other hand, Professor Vloeberghs remained of the view that the plaintiff's disability was caused by the C5/C6 unstable fracture and the downward spinal cord lesions which were the result of stretching of the spinal cord, vascular disruption within the cord and physiological changes relating to past trauma swelling. In short, the unstable fracture allowed the spinal cord to stretch beyond its tolerance. In his view no form of restraining device would in these circumstances have protected the plaintiff from the cervical spinal injury because of the violence of the impact.

The oral hearing

[47] The position of the expert witnesses – Professor Vloeberghs and Mr Quigley – did not alter significantly from their written reports at the hearing, notwithstanding the vigorous cross-examinations to which they were made subject.

[48] As regards the former, under cross-examination, while maintaining his general position, Professor Vloeberghs did acknowledge some of the points put to him by Mr Ringland.

[49] The court will provide some examples:

(a) He appeared to accept that the purpose of child restraint in a seat of a certain specification was, while not making the child invulnerable, safety. However he did not view the child seat concept as being protection from cervical spinal injuries, in particular, in the context of high velocity impacts. He accepted that "potentially, to some degree" the seat may protect in less than high velocity impacts, by which he meant impacts under 40 mph. When challenged about this, the Professor was questioned as to why his written reports had cited no evidence or literature to support what he was saying on this point. To this he accepted that this had occurred by omission on his part, notwithstanding that the situation had arisen before when he first gave evidence before Stephens J in this case. Mr Ringland put to him that at the previous hearing he was reminded about the need to support by evidence an assertion such as that which he had made both at the earlier hearing and now at the later one. The witness at this stage was asked to identify any paper or papers which supported his view. To this he replied he could not as a matter of memory. He then said there was a study though he had not cited it in his reports. This aspect of the cross-examination ended with him accepting that he was unaware of anything published by the manufacturers or retailers of car seats which

was in the nature of a caveat to the effect that there existed research or studies which indicated that child seats would not protect against cervical injuries to a child where the speed of impact was above 40 mph.

(b) In the context of questioning about where in the spine injuries to small children occur, Professor Vloeberghs accepted that Mr Quigley was correct in saying that it tended to occur at the upper end viz C1 or C2 level. He also, therefore, accepted that an injury to a child of the plaintiff's age, lower down the spine at C5 or C6 level, would be a rarity. The witness was asked as to whether he had ever encountered such an injury, lower down, in his clinical practice? This question was asked against the context that there was no reference to the witness having come across this sort of injury in his clinical practice in any of his reports. To this Professor Vloeberghs replied that he had encountered injuries at the level of C5-C6 in clinical practice in the relevant age group. The witness was then asked:

> "Why haven't you referred to [this] anywhere?"

To which he replied:

> "It was not really necessary to mention."

In further questioning the witness said he had come across lower cervical spinal injuries in this age group in respect of a child in the plaintiff's age group "perhaps twice". Unsurprisingly, he was asked why he did not refer to this aspect of his clinical experience when discussing the case with Mr Quigley. His answer was that he had not mentioned it out of a sense of humility. The Professor was then asked when he last had come across a lower cervical injury of the sort involved in the plaintiff's case in a young child in a road traffic accident. To this he replied he could provide no date, or name but it must have been a few years before. Nor could he recall the speed involved in the case which he had in mind. Mr Ringland put the following summary to him as a fair summary:

> "1. You left out any mention of your previous experience for reasons of humility ….
>
> 2. You can't recall whether it was 1 or 2 …
>
> 3. You can't recall when it last was.
>
> 4. You can't recall any details at all in respect of velocity, child seat or anything else?"

To this the witness replied "that is correct".

(c) In a later exchange between Mr Ringland and the witness an extensive discussion occurred in respect of the proposition that a tear to the posterior dura protecting the spine was an extremely unusual injury in a case of this nature involving a child of the plaintiff's age. When this proposition was put to the witness he said he disagreed in part. This was because such a tear, the witness thought, was something which may not be routinely sought after by radiologists and that, by reason of this, such an injury was under reported. In answer to further questioning, the witness accepted that he was not basing himself on any experience or conversation with radiologists.

(d) In the context of being questioned about the difference between Professor Vloeberghs' position and Mr Quigley's, the following exchange occurred:

> "A. It is rare injury.
>
> Q. I take it you do agree that worldwide there must be very very many accidents involving high velocity speeds and children properly fastened into the appropriate child seat?
>
> A. Potentially, yes.
>
> Q. Despite the fact that in your opinion appropriate … child restraint doesn't make any difference in … high velocity impacts, these injuries are not being seen, so far as you are aware except [on] very rare occasions?
>
> A. This is correct, yes."

[50] As regards Mr Quigley's cross-examination, he also maintained his general position. He acknowledged some of the points put to him by Mr Simpson.

[51] Again, the court will provide some examples:

(a) The witness accepted that there were significant forces involved in the accident in which the plaintiff was injured, based on the judge's findings, and that there would be bound to be some degree of forward

movement of the child's whole body in these circumstances, at least until a form of restraint was engaged. In particular, he accepted that seatbelt type restraints were not designed to restrain the head, which would be thrown violently forward in an accident involving acute deceleration forces as here. The head would go forward until stopped by the chest, Mr Quigley stated.

(b) When pressed about the extent of the disruption found at the level of C5/C6, as being indicative of excess forward flexion, Mr Quigley remained of the view that this was not the sort of injury he would expect to see in a child of this age. It was, he thought, the sort of injury you would expect to see in an adult if involved in an accident of this sort. The excessive flexion was as a result of the absence of suitable restraint. However, he accepted that Professor Vloeberghs' explanation was possible though he disagreed with it.

(c) The witness also accepted that one of the papers[2] he had appended to his second report had put the incidence of spinal injuries in children between 2.7% and 9% of which in relation to all children 40%-60% occurred in the cervical spine with roughly one third occurring in the upper end and two thirds in the lower cervical spine.

(d) The point of stop in the movement caused by deceleration remained contentious and Mr Quigley was questioned about this. The following exchange occurred:

> "Q. The tolerance of the neck to withstand forward flexion will be the same essentially, no matter where it stops?
>
> A. I would disagree with that because … if you are stopped because … your shoulders are restrained, you are spreading some of the energy. That is the point of these restraint harnesses. You are able to spread the energy across the upper torso as well so there is less movement."

The court's assessment

[52] The court has carefully considered the evidence before it and has reminded itself that the onus of proof is on the second named defendant to establish the proposition that the first named defendant should be liable to contribute to the

[2] Basu, Spinal Injuries in Children, Front Neurol (July 2012)

plaintiff's damages in accordance with the provisions of the 1978 Act set out earlier and the authorities which have been summarised herein above.

[53] More specifically, the issue before the court can be distilled to that of whether the plaintiff's spinal injuries in this case have been materially contributed to by reason of the first named defendant's failure to use or to use properly a suitable seat for the plaintiff to travel in.

[54] On this issue the court has observed the two experts who have given their evidence before it and has watched closely as they have been examined and cross-examined by counsel. It has taken into account each expert's written reports and has charted the development of these over time. While the court acknowledges the expertise both of Professor Vloeberghs and Mr Quigley, it must at the same time apply its own judgment to the issue it must determine.

[55] On the critical decision the court is obliged to make, it has concluded that the second named defendant has established on the balance of probabilities that the spinal injuries to the plaintiff have been materially contributed to by reason of the actions and/or omissions of the first defendant in respect of the Graco booster seat in which she was seated at the time of the accident.

[56] The court's reasons for so deciding are as follows:

(a) Reduced to its basics, the plaintiff was being restrained in a seat which was both inappropriate for her, in terms of her age and weight, and in terms of the way in which it had be operating at the time of the accident. The reality of the situation was that at the time of the accident the restraining effect of the seat on the plaintiff was, in the court's judgment, highly likely to have been far less than it should have been. It is not unfair to characterise the situation as being one in which the effective restraint in relation to the plaintiff, in the circumstances described in Stephens J's earlier judgment, was little more than that which would be available from a lap belt. This meant that the upper part of her body, including her shoulders, were unrestrained. While the court accepts that even if a proper form of restraint had been applied, the plaintiff's head would have been subject to the deceleration forces which arose from the nature of the accident, it seems to court that firm upper body restraint would, more likely than not, have caused the plaintiff's movement to have been of a lesser dimension and so less likely to result in injuries as extensive as those which she, in fact, received.

(b) It seems to the court that the above conclusion is consistent with the approach taken by Mr Quigley in his evidence to the court as well as being consistent with what the court considers would be the more obvious of the scenarios placed before it. In particular, the court

believes that the violence of movement to which the plaintiff's upper body and head will have been subjected to will have been accentuated and increased by the relative absence of secure restraint when compared with the position as it would have been if proper restraint had been in place.

(c) The court accepts Mr Quigley's analysis that the age group to which the plaintiff belonged is a relevant factor. Given her age, the court is satisfied that had she been properly restrained, it is far more likely that her injuries would have been sustained in the area of the upper cervical spine, as was Mr Quigley's view. The court has been satisfied in this case that lower cervical spine injuries in under three year olds is a reflection of the factors to which Mr Quigley drew attention i.e. its resilience in view of the less developed musculature, the elasticity of the ligaments and discs and soft tissue structures and the anatomical and biomechanical differences between the developing child and adolescents and adults. In the court's opinion, the broad sweep of the literature cited by Mr Quigley supports his contention.

(d) The court was not impressed with Professor Vloeberghs' alternative analysis, based as it was on the proposition that while this type of injury at the plaintiff's age may be rare, it happened in this case. While the court does not exclude the possibility that Professor Vloeberghs' approach could be correct and that there could be under reporting of injuries of the type received in this case in respect of under threes, it considers that his approach and explanation falls well short of satisfying the balance of probability standard. In particular, the court found the exchanges between Professor Vloeberghs and Mr Ringland, described above at paragraph [49] concerning in respect of his omissions to provide concrete evidence in his reports (and later his evidence) for points on which he appeared to place considerable reliance.

Should the court follow the Froom approach?

[57] It appears to the court that any apportionment of liability between joint tortfeasors must keep in mind the statutory test and must reflect what the court considers to be just and equitable "having regard to the extent of [the joint tortfeasor's] responsibility for the damage in question".

[58] The above, however, is not to say that regard should not also be had to the guidelines suggested by Lord Denning in Froom.

[59] In the present case, no party has argued that the court should do other than apply the Froom guidance in the event that it reaches the conclusion that the first defendant ought to be liable to make a contribution.

[60] In these circumstances, the court is content to apply the statutory test while at the same time viewing the case as one suitable for the application of the Froom guidance.

[61] While the court accepts that it is the negligent driver who must by far bear the greater share of responsibility, it is of the view that the logic of its overall conclusion in this case, points firmly in the direction that, had it not been for the negligence of the first named defendant, the injuries to the plaintiff would have been substantially lessened. In particular, if the plaintiff had been placed in an appropriate form of restraint, on the balance of probabilities, she would not have sustained the spinal cord injury at T3 and would not now be faced with the drastic consequences of this. Her injuries would, on the balance of probability, have been sustained to the upper cervical spine and would not have been of the same level of seriousness. In these circumstances the court regards this case as a 25% rather than a 15% case, using the guidance provided in Froom.

Conclusion

[62] On the net issue the court has been charged to determine, the court holds that the first named defendant should make a 25% contribution to the damages in respect of the plaintiff's cervical spinal injuries.