Neutral Citation: [2014] IEHC 211

THE HIGH COURT

[2007 No. 6174 P]

BETWEEN

RICHARD O'CALLAGHAN

PLAINTIFF

AND

FRANK DOWLING

DEFENDANT

JUDGMENT of O'Neill J. delivered on the 11th day of April 2014

1. The plaintiff was born in 1986. Early in life, he developed the condition of Kypho-scoliosis. This involved his spine growing abnormally into a bent position both laterally and anteriorally.

2. By 2001, when he was 15, the angle of the curve had reached 60 degrees. He attended Mr. Mullen, an Orthopaedic Surgeon in Cork, who referred him to the defendant, an Orthopaedic Surgeon who specialised in spinal surgery with a special interest in the correction of scoliosis. When the plaintiff saw the defendant in 2001, the scoliosis had progressed to a stage where surgery was appropriate. Because he was going through a growth spurt, the surgery was postponed until his growth was complete.

3. The plaintiff returned to the defendant in April 2005 when he was 19. By this time, his growth was finalised but the angle of the curvature of his spine had progressed to 90 degrees. There is no doubt that at that stage surgery to correct the curvature was necessary and timely.

4. At this time, the plaintiff had completed his secondary education having done his Leaving Certificate in 2004 and had embarked on a third level course in IT at Cork Institute of Technology. His plan then was to get the surgery done, having completed his first year in that course, and he was resigned to sacrificing a year out of college for the surgery and the recovery period.

5. In April 2005, a lengthy consultation took place with the defendant involving the plaintiff and both his parents. I am satisfied that at this consultation all aspects of the surgery, including risks were raised and discussed. In the course of this discussion, the defendant by way of reassurance to the plaintiff and his parents told them about an electronic form of spinal cord monitoring which was available in Crumlin Children's Hospital where he proposed carrying out the surgery. This form of monitoring (SEP) monitored the sensory responses in the spinal cord during the surgery and would enable the surgeon to be alert to injury to the spinal cord during the procedure and if that occurred to take the necessary action to alleviate the injury.

6. The plaintiff and his parents were greatly reassured by the fact that this facility was available as they had been apprehensive about the risk of paralysis resulting from injury to the spinal cord, which is a recognised although rare complication of this type of surgical procedure.

7. Soon after this consultation, the plaintiff was put on the waiting list for the surgery in Crumlin. It was anticipated that the wait might be up to a year. A meeting was arranged between Ms. Marie Noonan and the plaintiff and his family on 31st May 2005. Ms. Noonan was a liaison nurse for the defendant who obviously had considerable experience with this type of surgery. She again conducted a very detailed discussion with the plaintiff and his parents and went through all the relevant aspects of the surgery including the risks associated with it. An MRI of the plaintiff's spine was carried out on the same day.

8. Soon after this discussion, the evidence of the plaintiff's mother was that she received a phone call from Ms. Noonan to say that because of the plaintiff's age he could not have the operation in Crumlin as he was over the age limit, but that the defendant would do it in Blackrock Clinic.

9. A further consultation was arranged between the plaintiff and his parents and the defendant for 13th July 2005. At this consultation, the defendant explained that SEP was not available in the Blackrock Clinic but he was happy to proceed with the surgery using the "*wake-up test*", instead. The plaintiff and his parents were reassured on the adequacy of the wake up test, and so it was arranged for the plaintiff to come into Blackrock Clinic early in September to have the procedure carried out.

10. In the course of his evidence, the defendant said that the plaintiff's age was not a barrier to having the surgery done in Crumlin, that he regularly obtained permission for this type of surgery there, on persons of the plaintiff's age and older, and he was adamant that the plaintiff could have had the surgery in Crumlin. Although he did not have a specific recollection of it, he said his impression was that the plaintiff wanted the surgery done sooner rather than later and was unwilling to wait for up to a year to have it in Crumlin.

11. All of this evidence came as a considerable surprise to the plaintiff and his parents, as I am satisfied that they, at all times until the defendant gave evidence, believed, on the basis of the information given to them at the time in question, that the plaintiff's age ruled out Crumlin as the venue for the surgery.

12. I have no doubt that the plaintiff and his parents and the defendant were telling the truth to the best of their ability and recollection. It is highly probable, however, that the plaintiff and his parents have a much better recollection of these events and discussions than the defendant who candidly accepted the inadequacies of his recollections and accepted readily the integrity of the plaintiff and his parents.

13. I have no doubt that the plaintiff and his parents were told that Crumlin, for whatever reason, was unavailable, and therefore the surgery had to be done elsewhere. This prompted them to check their VHI cover, whereupon they learned that the plaintiff could have the operation in Blackrock Clinic but with a top-up payment from them of €1,500. With all of that settled, the decision was

taken to go ahead with the surgery in Blackrock Clinic.

14. Whatever may have been the reason for not having the surgery in Crumlin, it is essentially immaterial to one of the issues I have to decide, namely, was the defendant in breach of his duty to he plaintiff in proceeding with the surgery without SEP? If SEP should have been used, the defendant should only have done the surgery in a hospital which had it. His own evidence establishes that it was available in Crumlin, and so regardless of any inconvenience, if SEP was necessary, the surgery should have been done there and not in Blackrock Clinic.

15. The surgery was to be carried out in two separate operations. In the first operation which took place on 7th September 2005, the objective was to anteriorally release the plaintiff's spine in order to create some mobility in the spine. Because of the curvature, the spine was extremely stiff and for the purpose of correcting the curvature some mobility had to be introduced into the spine. To achieve this, the defendant removed four discs around the apex of the curve and also removed approximately one half of a vertebra right back to the Dura. He also detached and partially removed three ribs, again to create mobility and also harvested bone which would later, in the second operation, be applied to posterior aspects of the spine to promote a fusion of the spine in that area.

16. This first procedure went well and the plaintiff recovered uneventfully from it. Within a matter of days he was able to mobilise and walk without any untoward difficulty although he had, as was to be expected, the normal post operative pain and discomfort.

17. The second operation took place on 14th September 2005. In this operation, the objective initially was to do a posterior release of the spine by removing bone, i.e. osteotomies, from the structures and joints at the back of the spine again to generate additional mobility in the spine so that it could be straightened to the greatest extent possible.

18. I am satisfied on the evidence of the defendant that he removed bone at seven to eight levels but did not wholly remove the facet joints at these levels. He merely shortened the laminae on the convex side of the curvature where, because of the deformity in the spine, these had grown to an abnormal length. The shortening of these and the removal of some additional bone in these areas did not eliminate the overlap of bone in these facet joints. He also removed the transverse processes which were attached to the three ribs which he had already removed in the first procedure and he removed the spinous processes at these levels. The purpose of the removal of transverse processes and spinous processes was to reduce the rib hump created by the scoliosis.

19. Having completed the release of the posterior aspect of the spine in this way, the next stage in the procedure was to fix into the bony structure of the posterior aspect of the spine, hooks and screws to receive the titanium rods which would hold the spine in its corrected position. Having done this, the next stage was to insert a rod into the hooks at the upper end of the spine and using this, to cantilever the spine into the corrected position.

20. In the plaintiff's case, the evidence of the defendant was that because of the severity of the deformity, the best outcome to be hoped for was approximately a 50% correction of the curvature.

21. When the correction of the curvature was done, the rods were then secured to screws at the lower end with crossbars connecting the two rods for additional strength and support. The harvested bone from the first operation was then laid along the back of the spine to create and/or assist fusion in the corrected position.

22. The process of levering the spine from its deformed position into the corrected position and securing it with the rods takes between 20 and 30 minutes. This is the stage of the procedure when there is a significant risk of injury to the spinal cord, caused by the alteration in the habitat enjoyed by the cord probably for many years. The straightening of the spine may involve a stretching of the cord and/or the blood vessels supplying the cord, or compression on the cord.

23. Because of this risk of injury to the cord at this stage, the wake-up test was performed by the defendant as soon as this stage was complete. This test involved the anaesthetist changing the anaesthetic drugs to allow the plaintiff to partially emerge from anaesthesia, to the point where he could respond to verbal commands. When the plaintiff got to that stage, he was given a verbal command to move his feet and/or legs. As the plaintiff could do this, it signified that his motor function was intact, with no injury to the spinal cord. With that confirmed, the operation wound was closed and the procedure concluded and the plaintiff resuscitated in the normal way.

24. When the wake-up test was done, the plaintiff was able to move his lower extremities. However, the defendant, notwithstanding this result in the wake-up test, had a sixth sense that all was not well. The delay in the plaintiff's response and the lack of vigour in the movement made by the plaintiff was the source of his apprehension. Because of this, he accompanied the plaintiff to ITU and requested that he be woken up again, ahead of the normal process of revival.

25. When woken, it was quickly apparent that the defendant's apprehension was well-founded, because the plaintiff was afflicted with total paralysis of his lower limbs and total loss of sensation in these.

26. The defendant reacted immediately by bringing the plaintiff back to theatre, had him re-anaesthetised, whereupon he removed all of the metal work placed in the plaintiff's spine. This allowed the spine to revert to its former deformed position and in the process relieving the stress on the cord which caused the injury which resulted in the paralysis.

27. To the immense relief of all, when this was done, the plaintiff quickly recovered neurological function, both motor and sensory. Notwithstanding that the original objective, namely a correction of the deformity had to be abandoned, the recovery of neurological function was indeed perceived as a wonderful outcome in these altered circumstances, as there is a significant incidence of non-recovery from these intra-operative spinal cord injuries. This recovery was sustained, and by 7.00am the following morning, when the defendant examined the plaintiff, he had almost normal neurology.

28. Before moving on to consider the plaintiff's subsequent recovery and reversal of same, it is appropriate to consider at this stage the only allegation of negligence made against the defendant relating to the conduct of the surgical procedure, namely, that he carried out the second operation without using SEP and as a consequence of that, did not detect the injury to the plaintiff's spinal cord in time so that the correction to the spine could have been reversed in a calibrated way, so as to retain a degree of correction which was not injurious to the cord.

29. SEP is an electronic system which measures sensory response in the spinal cord and it generates a signal which can be interpreted by a neurophysiologist to indicate injury to the cord during surgery of this kind. The part of the cord which deals with sensation is on the posterior aspect of the cord and consists of one-third of the volume of the cord. It gets its blood supply through two arterial vessels supplied in turn by the segmental vessels entering the cord at each level from both sides.

30. The other two-thirds of the cord on the anterior side deals with motor function and it derives its blood supply through a single arterial vessel also supplied in turn from the segmental vessels at each level on both sides. SEP only monitors sensory function and not motor function. The unchallenged evidence of Mr. Grevitt, an expert witness called for the defendant, is that SEP has a high rate of false positives, in the sense that a drop in signal below 50% followed by a wake-up test has revealed no injury in nine out of ten cases. Studies demonstrated no reduction in the incidence of cord injury, with the use of SEP.

31. Before proceeding further, I should consider the plaintiff's submission that the evidence of Mr. Grevitt should be rejected in its entirety because of what was said to be an absence of candour on his part or a failure by him to discharge his duty to the court to give his evidence, as an expert, in an impartial and independent way.

32. The challenge to the credibility of Mr. Grevitt's evidence was on a number of grounds. The first of these arose from his involvement as an expert witness in the case of *Laura May v. Lancashire Teaching Hospitals NHS Foundation Trust* [2009] EWHC 3175 (Q.B). In that case. Mr. Grevitt had, as in this case, furnished expert reports in advance. The defendant surgeon in that case was a Mr. Roger Smith and one of the allegations of negligence made in that case was that he had proceeded with the surgery without using SEP. Mr. Smith's response to this was that he had done the surgery without SEP but that he had wanted SEP but it was not made available to him and he proceeded with the surgery doing the wake-up test.

33. This all arose out of questions asked in cross-examination of Mr. Grevitt about the number of surgeons in the United Kingdom doing this type of surgery in 2005 without SEP. Mr. Grevitt answered by saying, only one out of approximately 60 UK surgeons did this type of surgery without SEP. The one in question turned out to be Mr. Roger Smith, but in his answers in cross-examination, Mr. Grevitt did not volunteer the further information that Mr. Smith had not used SEP simply because it was not made available to him and, if it had been, he would have used it.

34. Whilst I think it would have been more satisfactory if Mr. Grevitt had volunteered that information when the topic arose in cross-examination in relation to the specific issue of the number of surgeons in the UK using or not using SEP in 2005, did he answer the query accurately and probably did not appreciate at the time the desirability of further elaboration. In the meantime, the cross-examination moved on to other topics. I would not be inclined to conclude that his credibility was lost on the basis of this omission.

35. Next, Mr. Grevitt was criticised because of the omission from his report in this case of a sentence included in his report in the *Laura May* case. In the Laura May case at para .2.1, the following is said under the heading 'Distraction of the Spine':

> *"2.1 One of the various forms of spinal instrumentation (metalwork) used for correction of deformity was the Harrington Rod. By the application of hooks in the spine and connection to a rod, a distractive force was applied to the spine (i.e. separating the hooks). This produced elongation of the vertebral column and in so doing (when applied in the concavity of the Scoliosis) produced correction of the spinal deformity. Unfortunately, in certain instances, this produced associated stretching of the spinal cord and resultant neurological deficit and paraplegia. Most modern instrumentation currently being marketed since the 1990s does not depend on such a principle of distraction to correct spinal deformity. Therefore, in all but the most extreme instances of gross Scoliosis or correction of Kyphosis (forwards angulation of the spine) there is no significant stretching of the spinal cord. Kyphosis correction is in all probability the one instance where spinal cord monitoring is of proven benefit."*

36. In his report dated 1st March 2010, furnished to the defendant in these proceedings, at para. 2.2 thereof the following is stated under the heading 'Distraction of the Spine':

> *"2.1 One of the earliest forms of spinal instrumentation (metalwork) used for correction of deformity was the Harrington Rod. By the application of hooks in the spine and connection to a rod, a distractive force was applied to the spine (i.e. separating the hooks). This produced elongation of the vertebral column and in so doing (when applied in the concavity of the Scoliosis) produced correction of the spinal deformity. This produced associated rapid stretching of the spinal cord and in certain unfortunate instances resultant neurological deficit and paraplegia.*
>
> *2.2 Most modern instrumentation currently being marketed since the 1990s does not depend on such a principle of distraction to correct spinal deformity. Therefore, in all but the most extreme instances of gross Scoliosis or correction of Kyphosis (forward angulation of the spine) there is no gross and sudden stretching of the spinal cord."*

37. As is apparent, these extracts from the two reports are in almost identical terms, the only real difference, in what appears to have been a cutting and pasting exercise, being the exclusion of the last sentence as contained in the report in the *Laura May* case which is dated 1st June 2009, from the report dated 1st March 2010 in this case.

38. In explaining the deletion of the sentence in question, Mr. Grevitt referred to the conclusion to the *Laura May* report at p. 23, para. 9, where he says as follows:

> *"In summary, the use of spinal cord monitoring (both SSEPs and MEPs) does not provide absolute reassurance that no adverse neurological events can occur during the conduct of an operation to correct spinal deformity. Despite twenty years of its use, neurophysiological monitoring of the spinal cord still can produce uncertainty and has not impacted on the instance of paraplegia."*

39. It was said that the reference in the deleted sentence to "*spinal cord monitoring*" referred to both SSEPs and MEPs. The initials MEP stands for Motor Evoked Potentials and is a process of neurophysiological monitoring of motor function as compared to SEPs which measure Sensory Evoked Potentials. The evidence was that MEPs have now taken over as the standard form of spinal cord monitoring, but that was not available in 2005 and did not apply to the plaintiff's case here.

40. I accept this explanation and am satisfied that Mr. Grevitt did not delete the sentence that was in the *Laura May* report, in his report in this case, with a view to misleading the court. In fact, this could have occurred if the sentence had been left in, in the sense that it could have conveyed that spinal cord monitoring was effective with Kyphosis, when, insofar as it might have been effective in this regard, the phrase "*spinal cord monitoring*" encompassed MEPs, a system not involved in this case.

41. Next, the plaintiff challenged the credibility of Mr. Grevitt's evidence on the basis of a chart which he prepared for the purposes of demonstrating the plaintiff's neurological profile from the occurrence of the second operation until his discharge to the National Rehabilitation Centre in Dun Laoghaire. He entered on this chart the results of the various neurological assessments that were carried out over that period and he was specifically challenged on figures that were put in by him on occasions when figures were not noted in the relevant charts. His explanation for doing this was that as the records disclosed no change from prior assessment he put in the

figures from the previous assessment.

42. In my view, it simply cannot be said that this exercise had any misleading effect at all and I reject the challenge on this ground.

43. The next challenge to the credibility of Mr. Grevitt's evidence was on the basis that he gave evidence that, radiologically, the CT scan done of the plaintiff's spine in April 2013 demonstrated that a fusion at the apex of the curve had not occurred and that there was still mobility there. In this respect, Mr. Wilson McDonald, the plaintiff's expert, likewise thought that this scan demonstrated an absence of fusion at the apex of the curve. Professor Lavy, the plaintiff's other expert, opined that there was an absence of fusion, not at the apex of the curve, but adjacent to it and that this was the cause of the plaintiff's ongoing pain.

44. The evidence of the radiologists called by the plaintiff and defendant who are in agreement in their evidence was to the effect that there had been fusion at the apex of the curve, thus undoubtedly contradicting the evidence of Mr. Grevitt and Mr. Wilson McDonald. As the radiologists are the experts in this area, I am happy to accept their opinion with regard to this matter, namely, that fusion had occurred at the apex of the curve. I do not think the fact that the evidence of the two radiologists is to be preferred on this topic to the evidence of Mr. Grevitt or Mr. Wilson McDonald was any ground upon which it could be said that Mr. Grevitt's evidence in general lacks credibility.

45. The final challenge to the credibility of Mr. Grevitt's evidence was on the basis of evidence which he gave to the effect that an increase of the Kyphosis angle would not cause further injury or stress to the spinal cord. This opinion was vehemently contradicted by Professor Lavy and Mr. Wilson McDonald when they were recalled to give evidence after Mr. Grevitt had given his evidence. Mr. Grevitt's opinion in this regard was elicited in cross-examination, and when probed further on it, he explained that insofar as this plaintiff was concerned, if there had been an increase in the angle of the Kyphosis, not only had it not caused further injury, but it had the opposite result insofar as the plaintiff made a full recovery. The two almost identical passages quoted above from the reports in this case and the "Laura May" case, unequivocally acknowledge that Kyphosis correction can involve stretching of the spinal cord, from which I would readily accept that when Mr. Grevitt, in cross-examination, said that an increase in Kyphotic angle did not cause injury, he intended what he said in this regard to be confined to the plaintiff's particular experience, if there had been an increase in his Kyphotic angle after the surgery.

46. In this context, it appeared to me that what developed on this topic was more in the nature of a war of words in which the general was pitted against a specific particular *i.e.* what happened in the plaintiff's case. It is certainly not a basis upon which I could or would want to reject Mr. Grevitt's evidence in general as lacking credibility.

47. After Mr. Grevitt gave his evidence, Mr. Wilson McDonald and Professor Lavy were recalled. Apart from the specific topics mentioned above and the general themes *i.e.* should SEP have been used; was the spine unstable after the surgery and did mobilisation cause the neurological deterioration, there was little contradiction of the detailed evidence which had been given by Mr. Grevitt. In dealing with the extremely difficult issues in this case, I have found Mr. Grevitt's evidence helpful and reliable and the same can be said for the evidence of the experts called on behalf of the plaintiff. The problem in this case is not the credibility or expertise of lack of expertise of these witnesses, it is the fact, as was alluded to by all of these witnesses, that the plaintiff's condition as it developed from 14th September onwards, has challenged, perhaps because of its uniqueness, as mentioned in the evidence, the expert understanding of all of these eminent surgical practitioners.

48. Mr. Wilson McDonald, an expert orthopaedic surgeon called for the plaintiff, was of opinion that had SEP been used, in light of what he described as the equivocal outcome of the wake-up test, it was likely that SEP would have alerted to the presence of cord injury before the wake-up test was done. It is impossible to say whether he is right in this or not. One factor seems to militate against that opinion. That is, that in light of the positive result in the wake-up test, even if injury was then in the process of occurring, it would appear to have been at an early or incipient stage so that its manifestation was, insofar as it was detectable at all, subtle or equivocal and not florid or obvious. Thus, it would seem likely, having regard to the normal delay in getting a result from SEP, that in this case, any change of signal, alerting to cord injury would be at the longer end of normal delay experienced with SEP, and in all probability, in my view, would not have happened before the wake-up test.

49. Even if SEP (had it been used) did indicate cord injury before the wake-up test, and if it did, it could only have been very slightly before, the certain outcome would have been that the wake-up test would have been done, as it was, in the event.

50. On the other hand, the wake-up test, unequivocally and reliably demonstrates the integrity of spinal cord motor functions, or damage thereto.

51. The evidence of Mr. Grevitt was that he had never encountered the occurrence of injury to the sensory aspect of the cord in the absence of demonstrable injury to the motor function, whereas the occurrence of demonstrable injury to the motor function without any injury to the sensory aspect was more the norm. Thus, the detection of injury to motor function, invariably alerted also to injury to the sensory function, but screening for sensory injury alone would not provide an alert to injury to motor function.

52. Hence, the wake-up test as a reliable indicator of injury to motor function was considered to the "*gold standard test*" of injury to the spinal cord.

53. The evidence of the defendant was that when he did use SEP in Crumlin, he always did the wake-up test as well.

54. I am satisfied, on the evidence, that even if the defendant had used SEP in this case, it was highly unlikely that it would have alerted the defendant to spinal cord injury in light of the fact that the wake-up test produced a positive result, namely that the plaintiff was able to move his lower limbs. The evidence of Prof. Lavy, an expert witness called for the plaintiff, indicated that once there was a positive result to a wake up test, most surgeons would discontinue SEP monitoring. The evidence of Mr. Grevitt was to the effect that once the anaesthetic is lightened to enable a wake-up test to be done, SEP becomes very unreliable and could not have reliably indicated the development of injury in the post wake-up test phase, until the patient was re-anaesthetised.

55. The evidence of Mr. Wilson McDonald was to the effect that he would leave the SEP *in situ* until the operation was concluded, which, presumably after the plaintiff was re-anaesthetised, once the wake-up test was done, would have created the opportunity by the use of SEP to have detected the cord injury in the post-wake-up test phase of the procedure. He may be right in this, but two questions arise from his opinion in this regard. The first is whether a change of SEP signal at that stage of the procedure would have materially altered the outcome for the plaintiff. Had that occurred, as Mr. Wilson McDonald said, the plaintiff would have been left in theatre, no doubt a further wake-up test done to confirm the result from the SEP and if the cord injury was confirmed, the instrumentation would then be removed to release the spine to revert to its former position. The only difference in that scenario to that which actually occurred, is the relatively short additional period of time involved in taking the plaintiff to the ITU, having him

woken up early and then returning him to theatre for the removal of the instrumentation. All the experts agreed that this short loss of time had no material effect on the outcome for the plaintiff.

56. In any event, because of the sixth sense apprehension of the defendant, he had already set in train the process of the removal of the metal work and no significant time was lost doing that, and as matters turned out the plaintiff did recovery neurologically after the removal of the metal work.

57. In light of the best outcome expected for the surgery in the first place, and the severity of the spinal injury suffered in the surgery, namely, complete paralysis and complete loss of sensation, I am quite satisfied on the evidence that it was highly improbable that any significant body of spinal surgeons carrying out this surgery would, faced with this severe complication, have done anything other than a complete removal of the metal work and I do not think that a significant body of surgeons doing this procedure would, in these circumstances, have taken on the risk of attempting to maintain some degree of correction, faced with a significant risk of paralysis, in a patient who prior to surgery had no disability and for whom the surgery was intended mainly for cosmesis. The evidence of Mr. Wilson McDonald on this topic persuades me strongly to this conclusion.

58. This brings me to a consideration of the relevant legal test for determining whether or not the defendant was negligent in not using SEP. The well-known test is that set out in the judgment of the Supreme Court in *Dunne v. The National Maternity Hospital* [1989] 1 I.R. 91, at 109, where Finlay C.J. said:

> *". . . The principles thus laid down related to the issues raised in this case can in this manner be summarised.*
>
> *1. The true test for establishing negligence in diagnosis or treatment on the part of a medical practitioner is whether he has been proved to be guilty of such failure as no medical practitioner of equal specialist or general status and skill would be guilty of if acting with ordinary care.*
>
> *2. If the allegation of negligence against a medical practitioner is based on proof that he deviated from a general and approved practice, that will not establish negligence unless it is also proved that the course he did take was one which no medical practitioner of like specialisation and skill would have followed had he been taking the ordinary care required from a person of his qualifications.*
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> *3. If a medical practitioner charged with negligence defends his conduct by establishing that he followed a practice which was general, and which was approved of by his colleagues of similar specialisation and skill, he cannot escape liability if in reply the plaintiff establishes that such practice has inherent defects which ought to be obvious to any person giving the matter due consideration.*
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> *4. An honest difference of opinion between doctors as to which is the better of two ways of treating a patient does not provide any ground for leaving a question to the jury as to whether a person who has followed one course rather than the other has been negligent.*
>
> *5. It is not for a jury (or for a judge) to decide which of two alternative courses of treatment is in their (or his) opinion preferable, but their (or his) function is merely to decide whether the course of treatment followed, on the evidence, complied with the careful conduct of a medical practitioner of like specialisation and skill to that professed by the defendant.*
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> *6. If there is an issue of fact, the determination of which is necessary for the decision as to whether a particular medical practice is or is not general and approved within the meaning of these principles, that issue must in a trial held with a jury be left to the determination of the jury."*

On this aspect of the case, the applicable principle is that set out in para. 2 above. For the plaintiff, it was submitted that the evidence established that all of the spinal surgeons carrying out this type of surgery in the United Kingdom in 2005 were using SEP, except Mr. Smith, who would have used it if he had it. The defendant himself habitually used SEP which was available in Crumlin Hopsital.

59. The defendant relied upon the 2003 Edition of the Guidelines published by the British Scoliosis Society, of which the defendant was President in the years 2006 to 2007, the first ever non-UK President. The relevant guideline here reads as follows:

> *"All spinal deformity operations are accompanied by a risk of neurological injury, including Paraplegia. Electrophysiological spinal cord monitoring or the 'wake-up test' may reduce this risk and should be available at the discretion of the surgeon."*

60. The defendant's case was that this guideline gave the surgeon a discretion whether to use the wake-up test or SEP. In his evidence in cross-examination, the defendant accepted that the guideline was in the nature of an administrative provision rather than a specific guideline for the conduct of surgery, the guideline being aimed at health service providers, rather than, specifically, surgeons carrying out this surgery. The evidence of Mr. Wilson McDonald was to the effect that, notwithstanding this guideline in 2005, the universal practice of surgeons carrying out this type of surgery in the United Kingdom was to use SEP.

61. The first problem to be resolved in this regard is to determine what pool of surgeons is the defendant's conduct in this regard to be assessed against in order to determine what was the general and approved practice and whether or not the defendant deviated from it.

62. I infer from the evidence that this type of surgery to correct a spinal deformity resulting from Scoliosis and Kyphosis is highly specialised, and in 2005, very few surgeons in Ireland did it. On the other hand, in the United Kingdom there were approximately sixty surgeons engaged in this type of surgery in 2005; again, a relatively small number having regard to the size of population of the United Kingdom.

63. It would appear to me to be unrealistic, to the point of artificial, to attempt to establish a standard of practice for this type of surgery based solely on a the conduct of this surgery in this jurisdiction, particularly when the defendant himself clearly drew his reference point in this regard from practice in the United Kingdom, he being obviously a very active member of the British Scoliosis Society, and, indeed, its President at one stage. It was the defendant who introduced the guideline of the British Scoliosis Society into the case as a justification for the choice he made in this case not to use SEP. All this leads me to conclude that in establishing a standard of practice applicable, one must look to the general and approved practice in the United Kingdom in order to establish the

standard against which the conduct of the defendant is to be assessed.

64. I am quite satisfied from the evidence of all the expert witnesses in this case, and also the evidence of the defendant, that in 2005, regardless of what may have been said in the guidelines of the British Scoliosis Society, the use of SEP in Scoliosis deformity correction surgery was a general and approved practice, and hence, the defendant, in not using SEP in the operation on the plaintiff, deviated from that general and approved practice.

65. The next question which inevitably arises is whether or not, in so deviating, the defendant did something *i.e.* did not use SEP, which no practitioner of like specialisation and skill would have done had he been taking the ordinary care required for a person of his qualifications.

66. I am satisfied from the evidence that SEP had significant limitations. Firstly, it only measures sensory responses and gave no alert to injury to motor function. Secondly, there could be a significant time lapse between the occurrence of an injury to the spinal cord and a change of signal alerting to injury. Thirdly, there was a significantly high level of inaccurate results, both positive and negative. Finally, the use of SEP had not been demonstrated to reduce the incidence of a spinal cord injury in surgery of this kind.

67. The evidence of the defendant was that even when he used SEP, he always did the wake-up test as well. The wake-up test was universally recognised as the "*gold standard*" test to determine unequivocally injury to the spinal cord. Even where SEP was generally in use where a positive result was given, this would normally be confirmed or not by doing the wake-up test. In light of all of the foregoing, in my opinion, it simply cannot be said that in not using SEP, and at the same time using the "*wake-up test*", the defendant was engaging in a practice which no medical practitioner of like specialisation and skill would have followed had they been taking the ordinary care required from a person of their qualifications. I have come to the conclusion that the defendant was not negligent in failing to use SEP for the second operation on the plaintiff.

68. I am also satisfied, for the reasons set out above, that the failure to use SEP did not at all cause the neurological injury which afflicted the plaintiff subsequently. The risk of injury to the spinal cord is a rare but well-known complication of the surgery undertaken by the defendant in this case. In doing the second wake-up test on the plaintiff, the defendant detected this injury and quickly took the appropriate remedial action by removing the instrumentation that he had placed in the plaintiff's spine which resulted in an immediate neurological recovery. As mentioned already, in my view, it was unlikely that SEP would have disclosed this injury prior to the first wake-up test, and as SEP would, in normal course, have either been turned off at that point or taken some time to become effective again, depending on re-anaesthetisation, it is unlikely that the plaintiff's injury could have been detected before the second wake-up test. Any loss of time involved in taking the plaintiff to ITU and doing the second wake-up test was agreed by all the experts to have had no adverse consequences so far as the outcome of the plaintiff's injury was concerned.

69. I am quite satisfied that there was no negligence on the defendant's part in carrying out the second operation without SEP relying solely on the wake-up test. I am also satisfied that the non-use of SEP, did not lead to any exacerbation of the spinal injury which the plaintiff undoubtedly suffered in the second operation, in the sense of permitting a delay in the detection of that injury, nor did the absence of SEP result in any loss of opportunity to have retained some degree of correction of the plaintiff's spinal deformity.

70. As mentioned, when seen by the defendant at 7.00am on the morning of 15th September 2005, the plaintiff had achieved a near full neurological recovery. The plaintiff remained in bed and the defendant ordered mobilisation for him *"as able"*. On 17th September, the defendant left to travel to Barcelona to attend a conference and for a short holiday. He designated Mr. Sankar, a locum orthopaedic consultant to deputise for him while he was away. He returned on 24th September and visited the plaintiff that evening.

71. While the plaintiff was on bed rest between 15th and 19th September, a variety of physiotherapy exercises were carried out on him by the physiotherapists largely aimed at preserving the mobility of his joints and in his lower limbs.

72. On 19th September, when for the first time the plaintiff got out of bed, his evidence was that on sitting up at the edge of the bed, he experienced excruciating unbearable pain in his spine such that it took his breath away. His evidence was that he never experienced a pain like it before. He hyperventilated and the nurse and physiotherapist attending to him queried whether he was having a panic attack and it would appear so reported to the defendant by phone. After a short period, the plaintiff was returned to bed. Over the next week, the plaintiff got up and out of bed for short periods *i.e.* no more than 15 to 20 minutes during which he sat in a chair and on a couple of occasions he walked a few steps, once completing twenty steps with the aid of a rollator and assisted by nurses and a physiotherapist. Whilst out of bed he continued to experience excruciating pain which made him hyperventilate, although the notes seem to record a better tolerance, from the point of view of pain, as the week progressed. I am satisfied he presented, at times, in a very distressed way during these episodes, in particular, when sitting either on the side of the bed or in a chair, he was obliged to use his arms and/or elbows to support the weight of his upper body to alleviate his pain.

73. Towards the latter end of the period of 19th to 25th September, it is apparent from the notes, in particular the physiotherapy notes, that there was a growing concern amongst the physiotherapists and nurses that the plaintiff was not doing well and that mobilisation was not enhancing his progress. This culminated in a clear expression of disquiet with continuing mobilisation pending further assessments and in particular an MRI.

74. Neurological assessments done by the physiotherapists on 21st September demonstrated a clear deterioration in neurological functioning.

75. On his return, the defendant whilst initially satisfied with his progress, by the following day, namely 25th September, it had become clear to him that there had been a significant neurological deterioration with demonstrable loss of power, function and sensation in the lower limbs. To deal with this, the defendant ordered an MRI and requested a consultation with Dr. Brian Murray, a Consultant Neurologist and Professor Ciaran Bolger, a Consultant Neurosurgeon. The MRI was done on 27th September and the plaintiff was given a detailed neurological examination and assessment by these two eminent doctors on 28th September.

76. The MRI, surprisingly, given the clearly established neurological deficits clinically, did not disclose any abnormality in the spinal cord. The detailed neurological assessment carried out by Dr. Murray confirmed a very significant neurological deterioration in the plaintiff's lower limbs consistent with findings of the physiotherapists on 21st September.

77. From 25th September onwards, the plaintiff had been kept on bed rest. This continued until his discharge to the National Rehabilitation Centre in Dun Laoghaire on 14th October, 2005. During that time, he continued to be assessed by Dr. Murray and the defendant and his condition stabilised and perhaps improved very slightly. He continued to have some physiotherapy as before to maintain the mobility of his lower limbs, but without any mobilisation.

78. On 11th or 12th October, a monkey pole was introduced to enable the plaintiff to pull himself up in the bed, however, the defendant, whilst he did not order this, his evidence was that if asked at the time he would have approved it. Also at that time, he was fitted with a brace, the purpose of which was primarily to ease pain by immobilising the spine and it was hoped that this might also assist with correcting the curvature of the spine. The monkey pole was used only once by the plaintiff to support himself while the brace was being applied. Mr. Wilson McDonald found no fault with the use of the monkey pole, in this very limited way.

79. When the plaintiff was admitted to the National Rehabilitation Hospital in Dun Laoghaire, a detailed neurological assessment was done, known as the ASIA assessment. This measured or assessed the neurological condition of the plaintiff's lower limbs and was comparable to the assessments previously carried out by the physiotherapists and by Dr. Murray in the Blackrock Clinic.

80. It is apparent that the results recorded on 14th October 2005, show a very significant deterioration in neurological function between 6th October, when the plaintiff was previously assessed, and 14th October.

81. Although Dr. Costigan, a Consultant Neurologist called as an expert witness by the defendant, rejected the validity of the results of the assessment of 14th October, in the absence of a corresponding clinical description of such deterioration over the period before 14th, it is clear that the continuing assessment of the plaintiff during his long stay in the Rehabilitation Hospital, bore out that deterioration to the point that the plaintiff became effectively paraplegic and wheelchair bound.

82. The prognosis for the plaintiff at that time, to which Dr. Murray and the defendant subscribed, was that the plaintiff would not recover and would remain a wheelchair-bound paraplegic for life and his therapy in the Rehabilitation Centre was focused on training him for life as a wheelchair-dependent paraplegic.

83. As so it continued, and the plaintiff, with the benefit of the intensive therapy and training in the National Rehabilitation Centre, adapted to his life as a paraplegic. On his visits home to Cork, he resumed his social life in a remarkably positive way and with the help of his family and friends adapted successfully and quickly to his disability.

84. Thus, he progressed until nearing the end of his therapy in Dun Laoghaire in August 2006, when one day at home in Cork, he noticed he could move a big toe voluntarily. Soon, he was able to move the other big toe. These events led to a complete re-evaluation of his condition and a reversal of his therapy and it was realised, that a neurological recovery, all hope of which had long since been abandoned, was occurring.

85. His therapy now focused on establishing and developing that recovery and it progressed beyond all expectations to the point of almost total recovery, in a relativity short period of time.

86. Now, seven years later, there are some relatively minor sensory deficits but motor function is normal. All of the expert doctors in the case agree that this recovery is extraordinary.

87. Insofar as the plaintiff's deterioration, neurologically, between 19th September and 14th October, the plaintiff, through his expert witnesses, namely Professor Lavy, Mr. Wilson McDonald and Mr. Brian Gardiner, attributed that deterioration to the inappropriate mobilisation of the plaintiff from 19th to 25th September at a time when these three experts say the plaintiff's spine was in a pathologically unstable condition as a result of the surgery performed on it, rendering it prone, on mobilisation, to further unstable movement which was likely to cause further injury to the spinal cord which had already sustained a serious injury and recovered, but remained sensitised to any further insult.

88. The instability which these experts describe is not instability which permitted pathologically abnormal movement of the spine in rotation, extension or transitional, namely, vertebra on vertebra movement, but rather, hyperflexion in the same plane as the existing Kypho-scoliosis. As proof of this hyperflexion movement, evidence was given by Professor Lavy of taking a measurement from an X-ray done post-operatively which, he said, showed that the angle of the deformity had increased from 90 degrees as of the date of the surgery to 120 plus degrees when the X-ray was taken. Similarly, Mr. Wilson McDonald on examining a recent CT scan done in April 2013, identified the angle of the deformity as being well in excess of 90 degrees.

89. Against this, Mr. Grevitt's evidence was that the angle of the deformity as shown in that CT scan was not materially changed since the surgery in 2005.

90. Professor Lavy and Mr. Gardiner were of the view that mobilisation post operatively was permissible but only with extreme caution and should have been discontinued immediately on encountering the painful reaction experienced by the plaintiff at the outset. This painful reaction was described by these experts as classical of bone on bone movement in an unstable spine.

91. Mr. Wilson McDonald was of opinion that there should have been no mobilisation until it was clear the spine was stabilised. The stability of the plaintiff's spine could only have been assured, he said, either by further surgery to insert metal work to hold his spine in its restored but deformed position, or bed rest until bony fusion of the spine was achieved, a period of up to three months. Although, with a clear lack of enthusiasm, he seemed to be prepared to countenance the wearing of a brace as a possible but unreliable provider of stability.

92. Critical to the issue of whether mobilisation was appropriate or not in the post-operative period is whether the plaintiff's spine was pathologically unstable as a result of the surgery performed by the defendant.

93. The defendant himself was adamant it was not. Indeed, he went so far as to say that it never occurred to him that the plaintiff's spine was unstable. He described in considerable detail what he did in both operations, namely the anterior release and the posterior release. After the former, his evidence was that the removal of the four discs and the half vertebra only gave minimal additional flexibility and mobility in what was a very stiff spine. He tested this mobility by inserting an expanding instrument between the vertebrae and established that very little separating movement between these could be achieved. In the second operation, the removal of the spinous processes, done to reduce bony prominence, had no effect at all on stability. Likewise, the removal of the three transverse processes to which the ribs removed in the first operation were attached did not impact at all on stability. These were also removed, he said, because they exacerbated the rib hump.

94. His evidence was that the osteotomies carried out at the seven to eight levels left intact, the facets joints, and merely removed abnormal length from the laminae on the convex side of the curvature. He said these osteotomies would not have permitted any abnormal movement in rotation or extension, nor would they have permitted transitional movement between the vertebrae. The defendant did accept that the removal of the four discs and the half vertebra anteriorally would have permitted some flexion movement but that this was minimal.

95. The defendant described the surgery as an effort to get sufficient mobility into a very stiff spine to enable it to be manoeuvred or manipulated so as to straighten it to the extent of removing about 50% of the deformity in it. His evidence was that at all times, the plaintiff's spine remained relatively stiff and even with the releases that were done, it never approximated to the flexibility of a normal spine. He was adamant that it never came near the kind of floppiness or pathological instability described by the plaintiff's expert witnesses and as already said, it never occurred to him that it was unstable.

96. It is difficult to reconcile or synthesise the diametrically opposed opinions of these eminent doctors on this issue, namely was the plaintiff's spine unstable after the surgery. Of greatest note is the fact that the defendant, a spinal surgeon, with vast experience in 2005 of this particular surgical procedure, did not even consider that the plaintiff's spine might be unstable after what he had done in the surgery.

97. On the other hand, Professor Lavy, Mr. Wilson McDonald and Mr. Gardiner were adamantly of the view that after this surgery, the plaintiff's spine could not be otherwise than pathologically unstable.

98. Whilst all three of the plaintiff's experts were of the view that the spine was unstable, Professor Lavy and Mr. Wilson McDonald arrived at that opinion by way of a different route to Mr. Gardiner. Professor Lavy and Mr. McDonald's expertise is in the field of spinal surgery, whereas Mr. Gardiner is an expert in the rehabilitation of spinal injury.

99. Professor Lavy and Mr. Wilson McDonald arrived at the conclusion of instability on the basis of the amount bone taken out by the defendant, particularly in the osteotomies on the posterior aspect of the spine. Both of these experts, certainly when giving their evidence in chief, seem to think that these osteotomies were much more radical than appears to have been the case. Both gave their evidence on the basis that the entire facet joints were removed, as *'Smyth and Peters Osteotomy'* resulting, as they saw it, in that there was very little apart from soft tissue holding the spine together at the levels of these osteotomies. They also appear to have been impressed by the cumulative effect of the anterior and posterior releases, in particular, Professor Lavy.

100. I accept the evidence of the defendant as an accurate description of exactly what was done and how much bone was removed.

101. Unfortunately, Professor Lavy and Mr. Wilson McDonald were, until the defendant gave evidence, entirely dependent on the operation notes in respect of the two procedures for their information on what was done in the surgery. Whilst these operation notes are not in any way clinically deficient, and in the experience of this court of medical negligence cases, they could be said to be relatively fulsome, nevertheless, they go nowhere near the detailed description of precisely what was done and how much bone was removed, as was given by the defendant in his evidence.

102. Had that detailed description been available to the plaintiff's experts before they wrote their reports and before they gave evidence, I think it likely that there would have been a much greater convergence between the views expressed by Professor Lavy and Mr. Wilson McDonald, and the evidence of the defendant on the stability of the plaintiff's spine after the surgery.

103. As I mentioned above, Mr. Gardiner reached his conclusion on instability, not by reference to the detail of the surgery, but rather by way of a conclusion or inference from the circumstances in which the neurological deterioration emerged after mobilisation between 19th and 25th September, 2005. His evidence was that the pattern of the development of this deterioration in these days, allied to the extreme pain experienced by the plaintiff, was capable of only one explanation, namely, an unstable spine subjected inappropriately to the stresses of weight-bearing mobilisation, resulting in further pathological movement of the spine, which in turn caused a further insult to a sensitive cord, which was recovering from its previous injury.

104. The defendant's evidence as to the stability of the plaintiff's spine after the surgery was fully supported by the expert evidence of Mr. Grevitt.

105. Both Professor Lavy and Mr. Wilson McDonald conceded in cross- examination that the best judge of stability or instability of a spine after surgery of this kind is the surgeon who performed the surgery. He or she knows exactly what they have done and can best judge the result in terms of stability of the spine or otherwise.

106. Having carefully considered all the evidence, I have come to the conclusion that the amount of bone and the type of osteotomies done by the plaintiff were unlikely to have destabilised the plaintiff's spine pathologically.

107. Notwithstanding this, one must query whether there was hyperflexion of this deformed spine after the completion of the surgery so that the angle of the deformity increased from 90 degrees to 120 degrees approximately and did that happen at the time of the mobilisation and did that cause a second insult to the cord resulting in the paraplegia which ensued.

108. Alternatively, was the cause of the neurological deterioration an ischemic perfusion/reperfusion injury to the cord, as suggested by Mr. Grevitt?

109. All the experts agreed that the final common pathway of injury to the cord was vascular.

110. The timescale of the onset of the neurological deterioration is within the known timescale for reperfusion injury as described in the literature.

111. Additionally, there has to be considered, as was advanced in the evidence of Dr. Costigan, that there may have been a perfusion injury caused by instability in the blood supplied to the cord. The initial neurological recovery evidenced an adequate perfusion but there may have been a continuing instability in perfusion with perhaps hyperfusion which can cause neurological damage as occurred.

112. Arising from all of this, the question that must be decided is whether the defendant was negligent in instructing that the plaintiff be mobilised "*as able*". A further question is whether the defendant was negligent in failing to adequately supervise, or arrange for suitable and adequate supervision, while he was abroad.

113. On the question of instability of the spine, this instability was described as being a tendency to excessive or pathological flexion, resulting from the loosening of the spine in the surgery with the result that when the spine, after the removal of the metalwork, reverted to its original deformed position, that during the time before fusion, the deformity worsened in the same plane, to the extent that the angle of deformity increased or worsened from about 90 degrees to in excess of 120 degrees or perhaps a much as 134 degrees.

114. The evidence of the defendant was to the effect that the deformity had, by 2005, significantly disimproved and he described it

as a 90 degree Kypho-scoliosis. His evidence was not explicit on what the 90 degree figure was based on *i.e*. whether it was radiological imaging or clinical assessment or a combination of both. At the time of the surgery in 2005, the defendant had available to him an MRI scan done on 31st May 2005, and earlier X-rays.

115. After the surgery in 2005, an MRI was done on 27th September 2005. Further MRIs were done, but of these only an MRI done in 2011, featured much in the evidence. Finally, a CT scan was carried out in April 2013.

116. Insofar as there was any divergence between the experts, namely, Professor Lavy and Mr. Wilson McDonald and Dr. Wilson for the plaintiff and Mr. Grevitt and Dr. Molyneux for the defendant, I prefer the evidence of the two radiologists, namely, Dr. Wilson and Dr. Molyneux on what is to be gleaned from the various radiological examinations.

117. The CT examination of April 2013, with the aid of computer technology, gives a 3D representation of the plaintiff's spine. This facility, I am satisfied, was not available to the defendant in 2005. Both radiologists agreed that the pre-operative radiological examinations and also the MRI of 27th September 2005, being available in film form only, could not be managed or manipulated so as to yield a 2D image of the plaintiff's spine. From these earlier films, there could be seen only a coronal or anterior view or a sagittal or lateral view of the spine. From the anterior or coronal view, the scoliosis could be visualised and a *"Cobb"* angle taken to measure the angle of the scoliosis curvature. Both Dr. Molyneux and Dr. Wilson agreed that the pictures taken from this view, both before the operation in September 2005, and the various radiological pictures taken in the later ones, consistently show the angle of scoliosis to be 90 degrees approximately, allowing for a small built-in margin of error.

118. The sagittal views taken from the CT scan in 2013, and the post-operative MRI taken on 27th September 2005, also, these radiologists agreed, demonstrated a Kyphotic angle of 90 degrees approximately (which also seems to be consistent with the pre-operation radiological examination). The MRI scan of 2011 and the CT scan of 2013, because they yielded 3D imagery and because the software enabled the image to be rotated so as to give an all-round view of the spine as distinct from the 2D pictures taken laterally and anteriorally, it was possible to rotate the spine through these images to find the maximum deformity of the spine and to measure the angle of it. In doing this, it transpired that the maximum angle of deformity was found to be exactly midway between the coronal view and the sagittal view *i.e.* at 45 degrees towards the left, which corresponds exactly with the route of the plaintiff's Kypho- scoliotic deformity.

119. Both radiologists agreed that this maximum angle of deformity was 129 degrees approximately, and allowing for the permitted margin of error, could vary plus or minus 5 degrees, namely, down to 124 degrees or up to 134 degrees.

120. This 3D measurement was not available prior to the plaintiff's operation and therefore there was no radiological data to which this angle of maximum deformity could be compared in the pre-operative radiological imaging.

121. I accept that the maximum angle of the plaintiff's deformity, measured in the MRI of 2011 and the CT scan of 2013, has for some time, namely, since the plaintiff's spine fused, been in the region of 130 degrees. The question that arises is whether that was the state of the plaintiff's deformity before his surgery and was not ascertained radiologically then, when the best that could be achieved radiologically was 2D sagittal and coronal views which appear to have shown a 90 degree deformity in both of these planes.

122. There is no doubt the defendant, having reviewed the radiology available to him at the time and having clinically assessed the plaintiff was of the view that the plaintiff had a 90 degree Kypho-scoliosis.

123. It was agreed by both Dr. Wilson and Dr. Molyneux that on the sagittal and coronal views taken from all the radiology since the operation, the angles revealed are all close to 90 degrees, apparently demonstrating no significant change in the deformity following this surgery.

124. If, from two fixed points *i.e*. lateral/sagittal and coronal/anterior, you have no apparent change, is it likely or is it even possible that at the third point, namely, 45 degrees or halfway between the sagittal and coronal views, there could be any significant change, bearing in mind that the angles are always constant and the variations recorded resulted simply from changing the viewing point so as to visualise the angle of maximum deformity.

125. It would seem to me to be very unlikely that with two fixed points remaining constant that there was significant change at the third point i.e. 45 degrees or halfway between the two fixed points.

126. All of that suggests that insofar as the radiology is concerned it is likely that had 3D imaging been available to the defendant in 2005, he would have found that the maximum angle of deformity was as shown in 2011 and 2013, in the 120 degree plus range.

127. With all of this is the clinical picture. The defendant, having seen the plaintiff, was of the view that the Kypho-scoliosis was 90 degrees. Could he be out by 30 degrees or more on clinical examination? The radiology was undoubtedly telling him it was 90 degrees. I think it was probable he relied on that radiology to determine the extent of the deformity. After all, until he had operated on the plaintiff he could not visualise the actual deformity. When recalled, the defendant said that in the first surgery, he thought that the deformity was more severe than appeared on AP X-rays. He also said that by rotating the patient for X-ray purposes, you could get a worse angle, but he had not done that.

128. Then there is the evidence of the plaintiff and his parents to the effect that the plaintiff's hump has become sharper or more pronounced and also the plaintiff's evidence of having lost height of about one and a half inches since the surgery.

129. The evidence of Professor Lavy, and especially Mr. Wilson McDonald, was to the effect that these features could only be explained by a significant increase in the Kyphotic deformity. Mr. Wilson McDonald did accept that a few millimetres of the height loss could be attributed to the removal of the four discs and the half vertebrae and the posterior osteotomies, but no more.

130. All the experts agreed that the plaintiff's spine became fused not later than about six months after the surgery. Notwithstanding the opinions of some of the orthopaedic specialists to the contrary, the evidence of the two radiologists on both sides of the case was firmly in agreement that there had been fusion at the apex of the plaintiff's curvature. Insofar as the plaintiff complains of a loss of height, his evidence was that this occurred in the eighteen months prior to the trial. This would have been long after his spine fused into the position which, I am satisfied it has been in since March 2006. I would readily accept that there has been some relatively minor loss of height as a result of the surgery carried out in the first operation involving the removal of four discs and half a vertebra.

131. I am satisfied that on the balance of probabilities, that the plaintiff's spine has fused in a position which is substantially the

position it was in prior to the surgery. Whilst I accept that the angle of maximum deformity can now be measured at approximately 130 degrees, because the angles of Scoliosis and Kyphosis as demonstrated in lateral/sagital views and coronal/anterior views have remained consistently in the radiology at approximately 90 degrees, it would seem to me highly unlikely that the plaintiff's deformity has changed significantly since surgery. What is new is the fact that the angle of maximum deformity can now be visualised using 3D technology and measured. This could not be done before the surgery and was not done at any point prior to the MRI scan of 2011.

132. This conclusion, which is a finding that when the plaintiff's spine fused, it did so with an angle of deformity which was similar to that which was there prior to the surgery, does not determine the question of whether, in the period between the surgery and the fusion of the spine, there may have been a degree of hyperflexion in the spine which, combined with the mobilisation of the plaintiff between 19th and 25th September, may have interfered with the spinal cord to the extent of causing the paraparesis which rendered the plaintiff a wheelchair-bound paraplegic until his extraordinary recovery from August 2006 onwards.

133. Apart from the short periods of mobilisation between 19th and 25th September, the plaintiff was, until fusion would have occurred, lying in bed and nursed so as to avoid any possibility of injury to the cord. In that context, it is hardly surprising, in my view, that his spine ultimately did fuse in the same position as it was in prior to surgery, given that lying in bed would have definitely avoided any flexion of his spine.

134. The injury to the plaintiff's spinal cord that occurred in the second operation happened when his spine was being straightened. The movement involved here would have been the direct opposite of flexion, namely, a forced extension of the spine, sideways to correct the Scoliosis and backwards to correct the Kyphosis.

135. After the surgery, insofar as there was any instability in the spine, it was only in the flexion plane. It is to be noted that when the metalwork was removed and the spine allowed to revert to its original deformed position, there was an immediate neurological recovery. It would seem surprising, then, if further injury to the cord could occur on such flexion of the spine as was involved in the mobilisation of the plaintiff between 19th and 25th September 2005.

136. As said earlier, I do not think that the plaintiff's spine was pathologically unstable in the manner described by Mr. Wilson MacDonald, Professor Levy and Mr. Gardiner. I do accept, as was conceded by the defendant, that the removal of the four discs and half vertebra in the first operation did permit of some additional flexion of the spine as compared to that which could have occurred before that surgery. The question which arises here is did such additional flexion occur when the plaintiff was mobilised and could that relatively minor degree of additional flexion have injured the cord.

137. When the plaintiff was mobilised, he was initially sat on the side of the bed. This would have involved some flexing of the spine. Similarly, flexion would have occurred whilst the plaintiff was walking the few steps that he took. However, because of the limited amount of movement carried out by the plaintiff in these manoeuvres, one would have to conclude that very little additional flexion would have occurred, although I do accept that the spine, in its post-operative condition, would have permitted a little more additional flexion than would have been the case prior to the surgery.

138. All of the experts agreed that following the initial injury to the spinal cord in the second operation, the spinal cord would have remained sensitive or sensitised to further insult.

139. The close contemporary relationship between the onset of neurological deterioration and the mobilisation that occurred between 19th and 25th September seems to point to a causative connection between the mobilisation and the triggering of neurological deterioration in a spinal cord that was probably, as a result of the insult suffered in the second operation, highly sensitised to any further provocation. Professor Lavy forcefully advanced the Occam's Razor principle in this regard.

140. Against this, it is contended on behalf of the defendant that the neurological deterioration which occurred was the result of what was described as a reperfusion injury. This theory was advanced in the expert evidence of Mr. Grevitt and supported by some literature. Reperfusion injuries to the spinal cord had been noted to occur after surgery which involved the interruption of the blood supply to the spinal cord, when that supply is restored. The defendant's case is that this occurred following on from the ischaemic event that undoubtedly occurred in the second operation resulting in the paralysis experienced by the plaintiff immediately after the second operation. The removal of the metalwork, permitting the spine to revert to its former deformed position, would have released whatever stress there was on blood vessels which led to the insult to the plaintiff's cord, thereby restoring its normal blood supply. It was contended for the defendant that the occurrence of the neurological deterioration between 19th and 25th September was within the recognised time periods in which reperfusion injury can emerge.

141. I am not satisfied that the reperfusion theory convincingly explains the plaintiff's neurological deterioration between 19th and 25th September. In the literature, the occurrence of reperfusion injury was considered to have happened as a result of cardio thoracic/thoracabdominal aneurysm repair [Floviczki 'Cardiovascular Surgery', Vol. 10, No. 4, p.p. 434-441, 2002] and following cervical decompression surgery [Hasegawa, 'Spine', Vol. 32, No. 6, p.p. E197-E 202]. . The literature does not mention at all any incident of reperfusion occurring in Scoliosis correction surgery of the kind that the defendant was performing on the plaintiff in this case. When one considers that in all Scoliosis correction surgery, there is a forced straightening of what may be a very bent spine and a necessary alteration of the habitat of the cord and the blood vessels supplying it with a consequent and obvious risk of ischemic injury to the cord, it is surprising that the literature concerning this type of surgery does not record the occurrence of reperfusion injury to the cord.

142. Whilst the reperfusion theory was advanced by Mr. Grevitt in his evidence, Dr. Costigan, a neurologist who gave evidence on behalf of the defendant, seemed to advance a somewhat different description of the ischemic event that may have been the final pathway to neurological damage. He describes something in the nature of a perfusion instability in the period immediately following the surgery.

143. Having regard to the absence of a clear authoritative basis in the literature for this theory, attributable to Scoliosis correction surgery, and mindful of the disparity of view in the defence case, I have come to the conclusion that it is improbable that the neurological deterioration suffered by the plaintiff can be explained as a reperfusion injury. I am also not satisfied that the separate, perfusion instability theory, advanced by Dr. Costigan convincingly explains the neurological deterioration.

144. The neurological deterioration of the plaintiff resulted in the mobilisation of the plaintiff being discontinued. Between 25th September and 12th October, he stabilised and it was noted that there was a slight improvement. However, as noted earlier, on 14th October, the ASIA assessment carried out on the plaintiff in the National Rehabilitation Centre in Dun Laoghaire demonstrated a significant further deterioration which had occurred between that date and about 6th October. The plaintiff, and in particular, through the evidence of Mr. Gardiner, sought to explain this deterioration by the use of a monkey pole which, it was claimed, encouraged

wholly inappropriate mobilisation by the plaintiff. However, it became apparent after the plaintiff was recalled to give evidence that the monkey pole was used on one occasion only to assist the plaintiff in supporting himself while a cast was being applied. Mr. Wilson MacDonald, when apprised of this situation, had no criticism of it and was of the view that the use of the monkey pole solely for this purpose was entirely appropriate. The consequence of this sequence of evidence is that there is no explanation at all for the further neurological deterioration noted on 14th October. At this stage, the plaintiff was well outside any accepted period for the development of a reperfusion injury and this deterioration cannot be attributed to any mobilisation of the plaintiff, inappropriate or otherwise, because nothing of that kind occurred after 25th September.

145. The question which necessarily arises from this is whether the lack of any explanation for this later deterioration casts doubt on, or to go further, robs the inappropriate mobilisation explanation of the earlier deterioration of any real credibility.

146. Whilst the plaintiff, immediately after the instrumentation was removed from his back in the third operation, did recover neurologically, he did not achieve a complete neurological recovery. The Patient Treatment Notes for 16th September 2005, contain, inter alia, the following note:

> *"Noticeable MS power weakness L. limbs R. and L esp quads/hip flexors and abductors GD -3(R) 3+ (L). Will need to review muscle power assessment . . ."*

147. When the defendant examined the plaintiff at 7.00am on 15th September 2005, i.e. the morning after the surgery, he noted:

> *"Normal sensation both legs, right quads a bit weak (GD 4+)."*

148. The defendant examined the plaintiff again at 6.15pm on the same day and noted:

> *"Power in right quads improved since AM, mobilise as able."*

149. On 17th September 2005, the defendant, having examined the plaintiff, noted:

> *"All muscle groups lower limbs moving - weak L4 +5. Good S1. Continue intensive physio - over weekend . . . "*

150. When assessed by the physiotherapist on 21st September 2005, there is no doubt that a broad range of neurological deficit was noted in the plaintiff's lower limbs. A pattern similar to that revealed on 21st September 2005, continued thereafter whilst the plaintiff remained in the Blackrock Clinic. From 19th to 25th September 2005, the plaintiff had varying degrees of mobilisation, involving standing, taking a few steps and sitting in an armchair for a couple of periods up to twenty minutes and then being returned to bed. On one occasion, the plaintiff, with the assistance of a rollator and two physiotherapists took twenty steps. Throughout the process of mobilisation, in particular at the outset of it, the plaintiff suffered excruciating pain although this would appear to have eased off at times during the process. The principal difficulty which it would appear the plaintiff encountered was in controlling his lower limbs and it is apparent that problem, very naturally, inhibited him in responding to the undoubted encouragement he was receiving to progress further in standing and walking. The pain which he experienced in his back no doubt also kept short the periods when he was sitting out of bed in a chair, and when doing this, he would use his elbows to support his upper body to alleviate the pain he was experiencing in his back.

151. As the efforts at mobilisation progressed over these days, it is apparent that the physiotherapists became concerned at the neurological deficits that they noted and eventually, on 25th September 2005, they declined further out of bed mobilisation until a neurological review was conducted. The detailed neurological assessment of the plaintiff's lower limbs noted in the physiotherapy notes on 21st September 2005, disclosed at that stage, a pattern of weakness in the plaintiff's lower limbs, which undoubtedly compromised the plaintiff's ability to stand and walk. This was evident in the attempts at mobilisation in this regard, and as said earlier, this pattern persisted until the plaintiff was transferred to the National Rehabilitation Hospital in Dun Laoghaire, at which stage a very significant further deterioration was noted.

152. The defendant, as of 25th September, likewise noted significant neurological deterioration and requested a review of the plaintiff by Dr. Brian Murray, a consultant neurologist, and Professor Kieran Bolger, a consultant neurosurgeon.

153. On 27th September 2005, an MRI scan was done and, as noted earlier, to the surprise of all the medical experts, this scan revealed nothing untoward in the plaintiff's spinal cord, nor did it demonstrate any material change in the deformity of the plaintiff's spine as compared to earlier scans. On 28th September 2005, the plaintiff was seen by Dr. Murray and Professor Bolger. Dr. Murray carried out the first of a number of detailed assessments of the plaintiff's neurological condition. Professor Bolger, at the conclusion of his examination, concluded that there was no indication for any surgery and he did not see the plaintiff again. Dr. Murray continued to review and assess the plaintiff until he was discharged to the National Rehabilitation Centre and he saw him once thereafter whilst he was in the National Rehabilitation Centre.

154. In his letters to the defendant and in his evidence in this case, Dr. Murray described the insult or injury to the plaintiff's spinal cord as being vascular in nature, either a perfusion problem or a drainage problem, possibly caused by a mechanical event during the second operation. He was unable to be definitive as to the precise nature of what was going on in the plaintiff's spinal cord. He did think that there was oedema involved and that this explained the fact that there was, ultimately, recovery. He was, however, adamant that what was going on in the plaintiff's spinal cord was not related to the mobilisation of the plaintiff from 19th September onwards, but was caused by the original injury or insult in the second operation.

155. As noted earlier, significant muscle weakness was noted on 16th September and a detailed assessment on 21st September disclosed the full pattern of neurological deficit. This assessment on 21st September would appear to have been the first full neurological assessment of the kind frequently carried out thereafter.

156. There can be little doubt but that a process of neurological decline was in progress well in advance of the commencement of the mobilisation of the plaintiff on 19th September 2005. The amount of mobilisation attempted between 19th and 21st September, as disclosed in the relevant notes, appears to have been relatively minimal, and extracting from that mobilisation those parts of it which would have involved any flexion of the plaintiff's spine, suggests that this mobilisation would have placed minimal flexion stresses on the plaintiff's spine during the period 19th to 21st September 2005.

157. Although the experts in the case did not pay much attention to it, I was struck by the fact that, for an early point in his rehabilitation and before out of bed mobilisation began, the plaintiff was commenced on an exercise regime, whilst in bed, involving the use of tetra bands, namely, strong elastic bands which were attached to his feet and held in his hands which he would use to

raise his legs off the bed and then would exercise his legs by pushing against the resistance of the tetra band. Inevitably, the stress generated by such exercises was channelled through his arms, into his shoulders, and to some extent, at least into his spine. One would have thought that a spine that was as kyphotic as the plaintiff's would be more prone to or susceptible to absorbing these stresses than a normal spine, and if that spine was pathologically unstable, as opined by the plaintiff's experts, one would have thought that these experts would be concerned about these exercises as a risk factor for spinal cord injury in a pathologically unstable spine, as they saw it. It would seem to me that any flexion stresses on the plaintiff's spine, resulting from these exercises, were at least as significant as the flexion stresses generated by the mobilisation of the plaintiff between 19th and 25th September 2005.

158. It is difficult to comprehend that such minimal flexion, as was involved in the mobilisation, in what was essentially a stable, and still a stiff spine, could have the drastic neurological consequences suggested by the plaintiff's experts, particularly bearing in mind that the undoubted cause of the injury in the second operation was precisely the reverse movement, namely, the forced extension of the spine. Given that the plaintiff's spine fused in substantially the same position as it was in prior to the surgery, and allowing for the fact that prior to fusion there may have been some capacity within the spine for a small amount of additional flexion, before the spine became fused, I cannot accept that even if any such additional flexion did occur during the mobilisation of the plaintiff, that it could have caused the neurological deterioration, particularly so when it is quite clear that that process of neurological deterioration was well underway a few days before mobilisation began, and from the outset of the mobilisation, the plaintiff was experiencing difficulties in controlling and managing his lower limbs, all consistent with the existence at that time of significant neurological deficits. The absence of medical literature describing injuries of this kind caused by inappropriate mobilisation additionally militates against mobilisation as a probable cause of the plaintiff's neurological deterioration.

159. In light of all the foregoing, I have come to the conclusion that the mobilisation of the plaintiff between 19th and 25th September 2005 did not cause the neurological deficits in the plaintiff's lower limbs which ultimately went on to render him paraplegic. It is to be observed that there was a further significant neurological deterioration noted in the ASIA assessment done on 14th October 2005, which had nothing at all to do with mobilisation. Furthermore, the wholly unexpected and inexplicable recovery of the plaintiff from August 2006 onwards tends to persuade me that the precise nature of the neurological deterioration suffered by the plaintiff in September 2005, in spite of the best efforts of eminent experts on all sides of the case has eluded convincing explanation. Were I compelled to reach a conclusion as to a true explanation, I would prefer the evidence of Dr. Murray who had the advantage of seeing the plaintiff on several occasions during the relevant time and of conducting detailed assessments on him at that time.

160. Taking all the evidence into account, the plaintiff has failed to satisfy me on the balance of probabilities that the mobilisation of the plaintiff between 19th and 25th September 2005 caused the plaintiff's neurological decline.

161. The final matter for consideration is whether or not the defendant was negligent in leaving an instruction on 17th September 2005 that the plaintiff was to be mobilised "*as able*", and secondly, was the defendant negligent in failing to have arranged for the plaintiff to be cared for by a consultant of equivalent or appropriate speciality while the defendant was away from 17th to 24th September 2005.

162. The appropriateness or otherwise of mobilisation of the plaintiff depended to a large extent on whether the plaintiff's spine after the surgery was stable or, as contended for by the plaintiff's experts, pathologically unstable. I have accepted the evidence of the defendant as to what he did in the surgery and as to the stability of the plaintiff's spine after the surgery. As the defendant saw it, he was dealing with what was a stiff spine and even after the surgery it did not have the mobility of a normal spine and there was no question in the defendant's mind that it was pathologically unstable. It necessarily follows from this that the defendant had no reason to think that the minimal level of mobilisation that could be achieved while he was away would pose any risk of injury to the plaintiff's spinal cord because of instability in the spine.

163. Thus, it would seem to me to have been entirely reasonable for the defendant to have made provision for the commencement of mobilisation of the plaintiff, as in fact he did. It cannot, in my view, be said that in his instruction as to the mobilisation of the plaintiff in the circumstances pertaining on 16th and 17th September 2005, that the defendant was "*guilty of such failure as no medical practitioner of equal status or general status and skill would be guilty of if acting with ordinary care*". I am quite satisfied that the defendant, in this regard, was not in breach of his duty of care to the plaintiff, as described by Finlay C.J. in *Dunne v. The National Maternity Hospital* [1989] 1 I.R. 91 at 109 as quoted above.

164. Whilst Professor Lavy and Mr. Gardner were of the view that mobilisation could be commenced but on a very cautious basis, they were of opinion that it should have been stopped once adverse symptoms were encountered. In this context, they mentioned the severe pain suffered by the plaintiff at the commencement of mobilisation and subsequently the emergence of clear neurological deficits comprehensively afflicting the plaintiff's lower limbs.

165. I am persuaded that the pain complained of was of equivocal origin, but more likely, the natural result of the initial experience of weight bearing through a spine that had a considerable amount of surgery performed on it in the previous two weeks rather than pain resulting from bone-on-bone contact in an unstable spine. One would have thought that without any instability at all, there would be a lot of pain, particularly in the posterior aspect of the plaintiff's spine where seven to eight osteotomies were done, together with the excision of three spinous processes and three transverse processes, resulting in a lot of severed bone, and in the case of the osteotomies, leaving severed laminae. In the anterior releases carried out in the first operation, four discs were entirely removed together with half a vertebra. All of this surgery, apart from the severing of bone, involved also a lot of surgery on the soft tissues in and near the affected areas, which, on initial mobilisation, would be very painful.

166. All of the foregoing persuades me that the plaintiff's complaints of pain initially on mobilisation could not reasonably have been interpreted as requiring an immediate cessation of mobilisation. The fact, as evidenced in the relevant notes that the plaintiff's pain situation seemed to significantly improve from the first day i.e. 19th September, would inevitably have reinforced the decision to continue mobilising.

167. I cannot accept that the pain complained of by the plaintiff should have been perceived as a decisive factor against any further mobilisation.

168. On 21st September 2005, the physiotherapists recorded a detailed neurological assessment which clearly revealed extensive neurological deficits in the plaintiff's lower limbs. By this time also, it was apparent that the plaintiff was having difficulty managing and controlling his lower limbs for the purposes of standing and walking. Although he did take a number of steps on a few occasions, what he achieved was probably not walking in the normal sense, but rather, as observed by Dr. Murray, was "*rather abnormal and likely represented the activity of retained functions of the aforementioned muscle groups because of the partial nature of the spinal cord lesion*".

169. When the physiotherapists recorded significant neurological deficits on 21st and 23rd September, they took the unusual step of recording their concern in the Clinical Notes, reciting there the results of their assessment. The note which they made in the Clinical Notes suggests that they did not envisage cessation of mobilisation as an appropriate step. On the contrary, under the side heading 'Plan', the note says as follows:

> *"To increase sensory awareness, build up and maximally stimulate MS groups - assisted active exs and wt/bearing - gait re-education - posture awareness in sitting/lying - will continue to see management and follow up report at later date."*

170. Of significance here is the plan to continue with weight bearing and gait re-education. This note, by the physiotherapist in the clinical note does not request or suggest a neurological review, notwithstanding the detailed description of the plaintiff's neurological status set out in the note. In the physiotherapy notes of the same date at the conclusion of the description of the plaintiff's neurological status it is noted "*will need review neurologist and will note in medical notes".* Plainly, that intention was not carried through into the clinical notes of same day, although there was a phone call to the defendant in which the neurological deterioration was described.

171. On the following day, 24th September 2005, the physiotherapy notes record, *inter alia*, that the plaintiff was mobilised in the evening and with the assistant of two, went around the room and was returned to bed.

172. On the following day, 25th September 2005, the physiotherapists again assessed the plaintiff's neurology, and having done that, noted the following:

> *"Unhappy to move pt out of bed due to deterioration in neurological status and request neurological co (illegible). Phoned Mr. Dowling re same and agreed (eventual neuro consult) (illegible) to leave patient bed rest until MRI results - ? brace pending MRI result . . ."*

173. Thus, for the first time, notwithstanding previously expressed concern about the plaintiff's neurological status, on 25th September 2005, the physiotherapists express a disinclination to continue with mobilising the plaintiff out of bed.

174. The Multidisciplinary Patient Care Record discloses that on 19th September 2005 at 14.00 hours, the defendant was contacted by phone, the note reading as follows:

> *"Phoned Mr. Dowling re: ? check X-ray - same not necessary, informed of pts increased shortness of breath when sat up, not concerned re same, feels that this may be panic related, ensure that enough analgesia is given. Brace not required at present. H6 11.8, Dr. informed of same. Nil else @ present (Mr. Dowling abroad at present)."*

175. On 22nd September 2005, the defendant's substitute, Mr. Sanker, was contacted in Crumlin Hospital in relation to the plaintiff's wound and some suggestion of infection and the continuance of an antibiotic. Mr. Sanker rang back that afternoon and gave directions on the basis of what he was told concerning the plaintiff's wound. It would appear from the note that Mr. Sanker was told nothing at all about the plaintiff's neurological status nor was any advice or direction sought from him in that regard.

176. On 23rd September 2005, the defendant was phoned and informed of the plaintiff's complaint of deterioration in sensation right and left across his buttocks and down to mid-thighs and dullness to touch in the mid-thigh with intermittent pins and needles. The defendant said he would review the plaintiff on the following Monday for a brace. He did not require a neurologist consultation at that time.

177. Mr. Dowling returned on 24th September 2005, and saw the plaintiff that evening, although there is no note of this. He did see the plaintiff the following morning, 25th September, at 10.10am at which stage he noted a variety of neurological problems but concluded "*overall, improving slowly, continue to mobilise - for MRI plus cast*". Later, on the same day, according to the physiotherapy notes, Mr. Dowling was phoned and persuaded to a neurological consultation and to leave the plaintiff on bed rest pending the results of the MRI scan.

178. The question which arises out of all of this is whether or not, out of bed mobilisation of the plaintiff should have been stopped, and if so, when. As mentioned earlier, the evidence of Professor Lavy and Mr. Gardner was that this should have occurred, insofar as Mr. Gardner was concerned, when the plaintiff complained of pain, as he did on first mobilising, and Professor Lavy and Mr. Gardner were of opinion that as soon as the plaintiff's deteriorating neurology was detected, mobilisation should have ceased then.

179. The first time the defendant learned of any change for the worse in the plaintiff's neurological status was when phoned on 23rd September 2005. Mr. Sanker, the defendant's replacement while he was away, was not told anything at all concerning the plaintiff's neurology, although he was consulted on a different matter relating to the plaintiff.

180. The physiotherapists who were directly involved in managing the plaintiff's post-surgery rehabilitation, although concerned about a deterioration in his neurological status after 21st September, as recorded in the clinical notes on 23rd September, did not at that point suggest a cessation of mobilisation out of bed. On the contrary, their recommended plan was for a continuation of that kind of mobilisation including weight bearing and gait re-education. They continued to mobilise the plaintiff in this way on 24th and 25th September and it was not until 25th September that they appear to have reached the conclusion that further mobilisation was ill-advised, at which point it would appear they phoned the defendant and persuaded him to that conclusion. The defendant, in the meantime, having assessed the plaintiff on the morning of 25th September, had been of the view that mobilisation should continue.

181. The evidence of Mr. Gardner and Professor Lavy is difficult to understand except in the context of established instability in the spine. Otherwise, where one is dealing with a spine which the surgeon, in this case, the defendant, was convinced was stable and proceeded accordingly, risk of injury to the spinal cord was not to be apprehended by cautious mobilisation. Even in the context of an unstable spine, it would appear that Professor Lavy and Mr. Gardner were prepared to countenance cautious mobilisation. If, however, there was no reason to apprehend risk of injury to the cord from instability in the spine, I would find it difficult to accept that mobilisation would have to be instantly discontinued on the detection of adverse neurology. In this case, an experienced physiotherapy team, although concerned about the deterioration in the neurology, nonetheless planned to continue with mobilisation and did so for a further two days before concluding that further mobilisation was ill-advised. Thus, it would appear that in the context of a stable spine, the question of whether or not to discontinue mobilisation involves a range of professional discretion, no doubt involving continuous review to see how matters progress. In this case, there was continuous review by the physiotherapists who kept a meticulous and detailed record of the plaintiff's evolving neurological status. The physiotherapists and nursing staff had access both to the defendant and Mr. Sankar and could, if, in their judgment, a point was reached when further mobilisation was contraindicated, have so informed the defendant, as they did on 25th September 2005. It is apparent from the notes that the physiotherapy team

were meticulous in their neurological assessments of the plaintiff and also accurate, as confirmed by the assessments done later by Dr. Murray.

182. Whilst the defendant, as the consultant in charge, directs the rehabilitation of the plaintiff, and did so, he must rely upon those professionals who are skilled in the process of rehabilitation, in this case, the physiotherapists, both to carry out the programme of rehabilitation and also for continuous assessment of the patient. As the defendant in this case was told nothing of any deterioration in the plaintiff's neurological condition until 23rd September 2005, and as Mr. Sanker, his replacement while he was away was told nothing at all about the plaintiff's neurological status, it is difficult to see how the defendant can be faulted for not reacting to the plaintiff's deteriorating condition, until he did do so by instructing bed rest on 25th September 2005. When he was contacted on 23rd September, he was not asked to consider discontinuing mobilisation, nor, in my view, can it be reasonably be suggested that the information he was given, without more, as recorded in the note would have conveyed the necessity of so doing to him, all the time bearing in mind that he was dealing with a spine that was stable and therefore with no material risk of injury to the spinal cord, from cautious mobilisation.

183. In these circumstances, I cannot find in the evidence a reasonable basis for a conclusion that in not directing the cessation of mobilisation earlier than 25th September 2005, that it has been proved that the defendant was guilty of such failure in that regard as no medical practitioner of equal specialist or general status and skill would be guilty of if acting with ordinary care.

184. Finally, there is the question of whether or not the defendant was negligent in leaving the plaintiff without the care and supervision of an appropriate consultant.

185. No criticism is levelled at the defendant in going away for the purposes of attending a conference and having a short holiday. There is no doubt that before he went, the defendant designated Mr. Sanker as his replacement and so it is recorded in the relevant notes. There has been no evidence led before me to suggest that Mr. Sanker did not have the requisite specialist qualifications and experience to discharge such duties as would arise in relation to the plaintiff. In this regard, it has to be borne in mind that very few surgeons in Ireland practised in the narrow speciality of the defendant, unlike in the United Kingdom where there are several units devoted to this kind of specialist surgery. It is likely that the defendant might very well have found it impossible to find a surgeon with the exact speciality, available to act as a locum for him in Ireland. Bearing all of this in mind, I am satisfied that there is no evidence to suggest that his designation of Mr. Sanker as his replacement was in any sense inappropriate or in any way a breach of his duty of care to the plaintiff.

186. In conclusion, therefore, I am satisfied that there was no negligence on the part of the defendant as alleged in these proceedings. I am also satisfied that the plaintiff's neurological deterioration between 19th and 25th September 2005, or in October 2005, was not caused by the mobilisation of the plaintiff, inappropriate or otherwise. I am also satisfied that the cause of that deterioration is not explained by the reperfusion theory put forward on behalf of the defendant. In the result, the cause of the plaintiff's neurological deterioration leading to paraplegia and his subsequent recovery has not been explained or established by any of the expert evidence in the case and remains shrouded in mystery. That being so, I have no option but to adopt the course as set out in the case of *Quinn v. Midwestern Health Board* [2005] 4 I.R. 1, in which Kearns J. held as follows:

> *"56 At an earlier point of his judgment in Best v. Wellcome Foundation Ltd. [1993] 3 I.R. 421, Finlay C.J. had stressed that it is not possible either for a judge of trial or for an appellate court to take upon itself the role of a determining scientific authority resolving disputes between distinguished scientists in any particular line of technical expertise. In the ordinary course, however, a trial judge will, and must, use his best endeavours to resolve conflicts of fact by deciding those issues in accordance with the legal requirement that he do so on the balance of probabilities. Exceptional cases, however, can and do arise, and this is clearly one such case, where it may not be possible to do so.*
>
> *57 Having regard to the complete stand-off between the respective medical experts on both sides of this case, both as to causation and the timing of the plaintiff's injury, I do not believe it was necessary for the trial judge ultimately to decide in favour of one proposition or the other. It was open to him to decide the case by holding, as he did, that the plaintiff had not discharged the burden of proof to establish, on the balance of probabilities, that the plaintiff's injury had occurred in a manner or at a time contended for by the plaintiff's experts. .*

187. There is no doubt that this case is, as all the experts agreed, unique. As stated above, I have been unable to accept the explanation of the cause of the plaintiff's neurological deterioration put forward by either the plaintiff's experts (the mobilisation theory) or the defendant's expert (the reperfusion theory).

188. In these circumstances, I must hold that the plaintiff has failed to discharge the onus on him of proving on the balance of probabilities that his explanation of causation is correct. As I have also held that in any event, there was no negligence on the part of the defendant, the plaintiff's action must be dismissed.