Neutral Citation Number: [2024] EWHC 3318 (KB)

Case No: QB-2021-000329

IN THE HIGH COURT OF JUSTICE
KING'S BENCH DIVISION
CLINICAL NEGLIGENCE

Royal Courts of Justice
Strand, London, WC2A 2LL

Date: 20/12/2024

Before :

HIS HON JUDGE DIGHT CBE

- -

Between :

JESSICA TUFFIN	**Claimant**
- and -	
UNIVERSITY HOSPITALS COVENTRY AND WARWICKSHIRE NHS TRUST	**Defendant**

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- -

Ms Lizanne Gumbel KC (instructed by **Shoosmiths PLC**) for the **Claimant**
Mr Matthew Barnes (instructed by **Bevan Brittan**) for the **Defendant**

Hearing dates: 21, 22, 23, 24 May 2024

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Approved Judgment

This judgment was handed down remotely at 10.30am on 20/12/24 by circulation to the parties or their representatives by e-mail and by release to the National Archives.

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HIS HON JUDGE DIGHT CBE

His Hon Judge Dight CBE:

1. This judgment follows trial of the issue of causation in a clinical negligence claim arising out of personal injuries sustained by the claimant after she underwent elective surgery to her spine on 7 July 2015 for prosthetic replacement of lumbar intervertebral discs at University Hospital Coventry & Warwickshire in Walsgrave ("the Hospital") which is run by the defendant. The claimant was not given appropriate chemical thromboprophylaxis (specifically an anticoagulant called Clexane) after the operation as a result of which it is agreed that she suffered a deep vein thrombosis ("DVT") and subsequently post thrombotic syndrome.

2. In September 2018 the claimant underwent an amputation of her left leg, above the knee.

3. The issue before me is whether the decision to amputate was caused or materially contributed to by the negligent failure of the defendant to administer Clexane after the operation in 2015.

4. By its defence the defendant admitted that:

   i) "…the failure to administer Clexane starting 24 hours after surgery on 7 July 2015 represented a breach of duty." (para 3)

   ii) "…as a consequence of the breach admitted above the Claimant developed a DVT on 17 July 2015 which she would otherwise have avoided." (para 12(a)), and

   iii) "…as a result of the admitted breach of duty, the Claimant developed a mild to moderate post thrombotic syndrome as a result of the deep vein thrombosis" (para 12 (b)).

5. Prior to the surgery the claimant had been disabled by back and leg pain and had previously undergone surgery which had been unsuccessful. She also, in the course of previous treatment for this condition, had a spinal cord stimulator fitted which had limited effect on her symptoms.

6. The claimant's primary case is that complications from the negligent treatment by the defendant immediately after the surgery led to her requiring the amputation in September 2018 leaving her much more seriously disabled than she had previously been. She says that as a result of the negligence she developed excruciating pain, vascular ulcers and infections which were together so disabling that ultimately she was left with no choice but to undergo the amputation. The claimant explained her decision making process early in her witness statement as follows:

> *"6. After the surgery on 7 July 2015…I developed a proximal DVT…*
>
> *7. I went on to suffer post-thrombotic syndrome (PTS) which caused me excruciating pain, so much so that I could not cope with many activities of my daily life, or look after my two young children. I was reliant on a wheelchair both in and*

> *outside the home as I was unable to bear weight on my affected leg…*
>
> *8. As a consequence of poor circulation in my left leg, I also developed vascular ulcers which would not heal. These ulcers were a source of ongoing infections. Due to the unbearable pain, repeated infections and the risk of sepsis, my consultant proposed an above knee amputation of my left leg as a potential form of alternative resolution of my symptoms. After much deliberation I finally made my decision to undergo the amputation, because I felt I could no longer live with the unbearable pain which was not resolving or responding to any form of medication or treatment. This was not a decision that I took lightly. I literally felt there was no other option.*
>
> *9. I underwent an above knee amputation of my left leg on 19 September 2018 at University College Hospitals Coventry and Warwickshire NHS Trust. This has been a very traumatic period in my life."*

The two key causes of the decision to undergo amputation referred to in that passage, "excruciating pain" (later suggested to be allodynic pain triggered by no more than a light to the skin) and ulcers, were considered at greater length in the written and oral evidence of the claimant as she explained her symptoms and thought processes and in the evidence of the experts as they examined the causes of those symptoms. A third cause of the claimant's decision also featured in the later material before me, namely the apparently permanently twisted position of her left knee and foot which developed after some time. It was submitted on behalf of the claimant that this latter symptom was caused by her use of a wheelchair because she was unable to bear weight as a result of the swelling of her left leg due to the DVT.

7. The defendant's case is that the need for amputation and the symptoms which led the claimant to decide to undergo that surgery were the result of her developing complex regional pain syndrome ("CRPS") and not as a result of their admitted negligence or the DVT.

8. The claimant submits that the contemporaneous medical evidence is "somewhat difficult to disentangle" ie as to whether the cause of the amputation is the DVT or CRPS, and therefore her alternative case is that the DVT and post-thrombotic syndrome, which she says that she also suffered as a result of the defendant's negligence, at least made a material contribution to the need for an amputation in due course and that therefore she is entitled to a finding against the defendant on the issue of causation on either of these two bases. Ms Gumbel KC submitted in closing that if the court cannot disentangle the two pathologies then it should reach the conclusion that the defendant's negligence which led to the DVT made a material contribution, without the need to apportion the causes or make findings as to the percentage of their respective contributions.

9. While the defendant admits that it was in breach of the duty that it owed the claimant in that she was not prescribed Clexane within 24 hours of her spinal surgery on 7 July 2015 and that the claimant therefore developed an avoidable DVT which, it is agreed,

in turn led to the claimant developing a post thrombotic syndrome, it denies that there is any causative link between the admitted breach of duty and the claimant's above knee amputation. The defendant's submission in closing was that there was a fundamental flaw in the claimant's case which failed sufficiently to analyse the symptoms which led to amputation and to identify the cause of those symptoms. As that submission was developed it was suggested that the claimant's two experts did not refer to or consider all three of the symptoms which are said to have led to the amputation. As a result it is argued that I should treat the claimant's case generally and the written expert evidence which supports it with a considerable degree of caution. The defendant alleges that the CPRS, which it says was the cause of amputation, was most likely triggered by the spinal surgery or was pre-existing or arose spontaneously and that the claimant would have undergone an amputation of her left leg whether or not she had developed a DVT.

10. The claimant's submission is that on the balance of probabilities if the claimant had not developed a DVT and post thrombotic syndrome she would not have developed CRPS, if it is found that she did.

The issue

11. By his order dated 16 June 2022 Senior Master Cook directed that:

> "A preliminary issue shall be tried between the Claimant and the defendant as to the extent of the injury and loss caused by the DVT on 17 July 2015 and in particular whether the Defendant is liable to the Claimant for the development of complex regional pain syndrome and/or for the Claimant's left leg above knee amputation on 18 September 2018."

Although there were subsidiary factual and legal issues the focus at trial was on the medical cause of the need for the amputation as I have already indicated.

The general test

12. The burden is on the claimant to prove causation, on the balance of probabilities.

13. It seems to me that, in reality, there is little between the parties on the law.

14. Ms Gumbel KC submits that, in essence, the issues for the Court are:

a) Did the DVT and post thrombotic syndrome cause the claimant to undergo the amputation of her left leg, adding that, if the post thrombotic syndrome was the reason why the claimant was in so much pain that she requested and was reasonably treated by the amputation then the causation is straightforward;

b) Alternatively, did the DVT and post thrombotic syndrome materially contribute to the claimant undergoing the amputation of her left leg, ie was the amputation required for a combination of reasons including the DVT and post thrombotic syndrome;

c) Or, was the amputation of the claimant's left leg unrelated to the development of the DVT and post thrombotic syndrome and solely as a

result of unrelated CRPS so that it would have been required in the absence of the DVT and post thrombotic syndrome.

15. As Mr Barnes submits, the test for causation is as explained by the Court of Appeal in Bailey v Ministry of Defence [2008] EWCA Civ 883, a case at the heart of which was the issue of whether the claimant could succeed where there were said to be mixed causes of the major injury, the subject matter of the claim. In the course of which the court addressed the principles relating to material contribution. The Court of Appeal reviewed the existing caselaw leading to the following pithy statement of principle by Waller LJ, at [46]:

> "46. …*If the evidence demonstrates that 'but for' the contribution of the tortious cause the injury would probably not have occurred, the claimant will (obviously) have discharged the burden. In a case where medical science cannot establish the probability that 'but for' an act of negligence the injury would not have happened but can establish that the contribution of the negligent cause was more than negligible, the 'but for' test is modified, and the claimant will succeed.*"

16. Ms Gumbel KC submitted in closing that at the end of the evidence she could not pursue the "but for" test in the sense referred to by Waller LJ because it was not really open to me to conclude that (1) CRPS did not play any part in the decision to amputate and (2) that the decision was made solely as a result of the DVT.

17. It still seems to me helpful to consider the question of causation in the way explained by Waller LJ, namely whether the claimant has proved, on the balance of probabilities, that the amputation of her left leg would not have occurred but for the negligence of the defendant and then, if the medical science relied on by the claimant cannot establish that but for the negligence she would not have undergone amputation, to move on to consider whether the claimant has proved on the balance of probabilities that the negligence nevertheless made a material contribution, described by Waller LJ as more than a negligible contribution (in a causative way), to the injury. The answer to those tests are questions of fact; the burden is on the claimant to prove causation, in the "but for" sense, or as a more than a negligible contribution to the injury. In either scenario it seems to me that one has to focus on whether the causative or contributory effect of the factor(s) relied on can be proved.

18. With that in mind I turn to look at the evidence, both factual and expert opinion.

The evidence

19. At the trial I was taken in some detail through the contemporaneous documentation recording the claimant's medical history. The claimant herself gave evidence and was cross-examined. I was also assisted by experts on both sides in the fields of vascular surgery and in pain and pain management. The experts agreed on a significant number of matters, recorded in their respective joint statements, but were ultimately not agreed as to the cause of the need for amputation or whether the claimant underwent the amputation as a result or partly as a result of the negligent care by the defendant. I also had the benefit of a daily transcript of all the evidence and submissions in this case, which I re-read when preparing this judgment.

The factual context

20. When called to give evidence the claimant confirmed the contents of her witness statement dated 17 August 2022 and was cross-examined on it. The claimant was an honest and careful witness who gave clear answers to all the questions which she was asked in cross-examination. I accept her evidence about how she felt, about the pain that she was suffering and the steps in her thinking which led her ultimately to have the further surgery in September 2018 in which her left leg was amputated except insofar as her recollection differs from the contemporaneous records, which, except where indicated, I prefer. I bear in mind the views expressed by the claimant as to the medical or clinical consequences of her condition as it developed and particular as to the issue of causation in this case but, again, where her opinion differs from that of the treating physicians or the experts, I prefer their views.

21. The claimant summarised her case in the early paragraphs of her witness statement where she explained that after the surgery in 2015, and what she described as a post-thrombotic syndrome, she suffered *"excruciating pain, so much so that I could not cope with many activities of my daily life, or look after my two young children."*. In paragraphs 8 and 9 of her witness statement (set out in paragraph 6 above) she described her condition leading up to the decision to undergo an amputation and the effect on her of the operation itself.

22. The relevant chronological events are as follows.

23. The claimant was born on 23 September 1984. In 2007 she fell down some stairs as a result of which she says that she suffered considerable back pain *"from this point onwards"* and developed sciatic pain in her left leg. As a consequence in 2008 she underwent an MRI scan which identified that she had two slipped discs in her spine and accordingly in 2010 she underwent a lumbar discectomy at lumbar disc L.5. My attention was also drawn to a letter from the claimant to the Department of Work and Pensions dated 2 May 2011 in which she told them:

> *"As per my last letter I still have great difficulty lifting and carrying items on a daily basis, I really struggle to lift and carry heavy pots and pans when cooking on my own. I still struggle greatly and find it extremely difficult to walk short distances of 20 metres without feeling severe pain and discomfort in my leg and back. I still cannot lift and carry my baby daughter even on short distances without feeling severe pain and discomfort in my leg and back…"*

24. In March 2012 the claimant had a spinal cord stimulator fitted at St Thomas Hospital in London to help her manage her ongoing pain, which I mention above. The claimant's evidence is that it did not really work and was never 100% effective.

25. In March 2015 Mr Sutcliffe, a specialist at a London hospital, recommended disc replacement at L.4 and complete fusion of her lumbrosacral joint (L.5/S.1) between the lumbar spine and sacral spine in her lower back. The claimant was then seen by Professor Amjad Shad, a consultant neurosurgeon at the Hospital, in June 2015 who having given her advice about the various options open to her booked her in for surgery to carry out Mr Sutcliffe's recommendation.

26. The claimant was admitted to the Hospital on 6 July 2015 and was assessed by a Senior House Officer who, in their manuscript notes, recorded that the claimant had a background history of left lower limb pain for several years adding *"? CRPS. Pain associated with weakness which limits her to using her walkers, or scooters".* The claimant told me from the witness box that although the rest of the comment recorded in that note was reasonable the possibility of CRPS had not been discussed with her at the time. This is the first reference to CRPS and, as a potential diagnosis, is not further analysed in the notes and I place little weight on it of itself.

27. On 7 July 2015 the claimant underwent an elective procedure at the Hospital for l.4-5 anterior fusion and prosthetic replacement of lumbar intervertebral l.5-S.1 discs at the Hospital which was carried out under the care of Professor Shad. The post-operative plan specified that the claimant was to be given Clexane, a chemical thromboprophylaxis, after 24 hours. The procedure was described in the operation note as *"L5/S1 ALIF (eurospine cage size 9, 4 degrees lordosis). L4/L5 Aesculp L active L disc (Medium 10mm core and degrees cranial)."*

28. On 8 July 2015 the claimant was examined by a Registrar.

29. The claimant was discharged home on 16 July. After her surgery the claimant had not been given Clexane in breach of the post-operative plan. The discharge notes suggest that all her limbs seemed to have normal power, although there was mild weakness in her left leg, and that the claimant was able to mobilise herself with a walking frame or in her wheelchair. She was being treated with regular doses of oramorph and her pain score was low.

30. The claimant says that during the night of 16 and 17 July she *"suddenly experienced a very severe pain in my left leg. It was discoloured and felt like my skin was stretching and itching. My leg got bigger and redder, my thigh became grotesque"* as a result of which, in the afternoon of 17 July, the claimant returned to the Accident and Emergency Department of the Hospital where she was readmitted as an in-patient. On examination the claimant's left leg was swollen, measured on 17 July at 3cm larger than her right leg, a condition which continued for much of the time that she remained in hospital prior to her discharge. Shortly after arrival the claimant was referred to the neurosurgical team who provisionally diagnosed a deep vein thrombosis and prescribed and administered Clexane for the first time. On 28 July 2015 the claimant was also prescribed Warfarin as an anticoagulant and by the time that she was discharged on 5 August 2015 her hospital notes recorded that her back pain had gone and the swelling of her leg was better: the claimant did not accept that description in cross-examination. It seems to me that the note is more likely to be accurate than the claimant's recollection at this distance in time but I have no doubt that the incident was painful and distressing and that the claimant was frightened by the sudden development of this condition particularly given that having been reassured that the surgery had gone well she had been discharged home the day before.

31. The vascular experts agreed that the symptoms and signs reported on the claimant's re-admission to the Hospital were likely to be due to a DVT suffered by her and for which the defendant was responsible. Professor Stansby further accepted that this would have been "an unexpected and somewhat alarming change in her condition after spinal surgery, to suddenly have a severely swollen and painful left leg". Professor Stansby

went on to comment on what would usually happen to a patient in the claimant's position:

> "…what would usually happen to someone who had an iliac vein DVT, which would be they would have a swollen and somewhat painful leg that would start to, in the majority of cases, improve over the period of the first few days, and then first few weeks with a gradual improvement, and in those very first few days in most patients, they would usually have a limitation of weight bearing and moving and standing because of the swelling and pain in the leg." (Day 2, page 22)

32. The claimant says (paragraphs 42 and 43 of her witness statement) that:

> *"42. By the end of August 2015 my left leg didn't seem to be improving so my GP visited me at home. My GP then referred me to Professor Imray and the vascular team for review…. I was boosting the anticoagulation, as in addition to the warfarin, I was injecting Clexane.*
>
> *43. My leg felt like it was burning and was on fire, but it was cold to the touch. I was unable to sleep easily and would wake up if the quilt touched my leg, as this would feel like a rock had been chucked onto me. I was unable to be touched…"*

The anticoagulants were plainly not relieving the claimant's symptoms.

33. The claimant was then visited at home on 19 August 2015 by her General Practitioner who noted in her records:

> *"…Worried leg not going down, painful, struggling to mobilise and colour not returning to normal yet. Also 24 hours of feeling sweaty and unwell, chills, staying under covers…Legs – left leg slight discolouration, warm, CRT 2 secs, tender, no breaks in skin/evidence of cellulitis…"*

The same General Practitioner, Dr Geissler, visited the claimant again at home on 3 September and noted that the claimant's foot was a normal colour and of equal temperature to the right leg but there was mild swelling in the left calf. In cross-examination the claimant accepted that it was reasonable to suggest that her left leg had initially became worse but then improved while she was in hospital after her recent emergency admission.

34. In a faxed referral sheet dated 17 September 2015 Dr Athey-Pollard, from the claimant's GP practice described her condition as follows:

> *"…[she] was diagnosed with a DVT in her left internal and external iliac venous system post spinal surgery on the 17/07/15.*

> *Unfortunately she has not done well since this. She is on warfarin, yet despite this her foot remains swollen. She is unable to weight-bear on that foot since the clot was diagnosed. It's now causing burning and redness in her leg despite two months of treatment. She is unable to tolerate cotton trousers touching her leg, so she's been unable to wear any support stocking.*
>
> *She is obviously worried about post thrombosis [sic] syndrome and in view of the fact that she is still not weight-bearing 6 weeks post diagnosis of the clot, I would be very grateful if you could see her on a semi-urgent basis and determine whether anything needs to be done."*

The claimant was plainly in considerable pain at this point, which her GP attributed to the DVT.

35. On 24 September 2015 Professor Imray, a consultant vascular and general surgeon, examined the claimant, following an urgent referral from her GP, and was very firmly of the view that her symptoms were due to CRPS and not to the post thrombotic syndrome. In writing to Professor Shad, who had overseen the claimant's surgery, Professor Imray noted as follows:

> *"I was asked to see this lady with a degree of urgency in my clinic. I note that she has an extensive history of back pain, has had multiple procedures, has had a nerve stimulator inserted and most recently underwent an anterior approach for 2 level disc surgery. According to the notes there was ALIF at the L5/S1 and a disc at L4/5 level. Immediately post procedure she had left leg pain and the leg became swollen. There was significant weakness immediately post procedure. A couple of days later there was no evidence of a leg DVT on ultrasound but there was evidence of a CT proven left external and left internal iliac vein thrombosis consistent with post surgery trauma. She was seen and assessed by Mr Higman [consultant vascular surgeon] who felt there was no vascular compromise, she did have swelling in the leg. She has been fully Warfarinised and cam[e] to clinic this morning in a wheelchair, <u>unable to stand with exquisite pain, shiny oedematous skin, fairly brisk capillary refill and severe allodynia</u> [my underlining]. This is much more typical of a complex regional pain syndrome and I think the iliac DVT's probably a red herring. These have been adequately treated and at this point in time I would expect to see significant resolution of the symptoms. I have requested a further CT to investigate this further but I think the neurosurgeons need to see this woman urgently to decide how the complex regional pain syndrome is best managed."*

The claimant submits that Professor Imray's reference to the DVT being a red herring was wrong because he was under the misapprehension that it had resolved by then. It was also submitted that he had failed to set out the analytical process which led to his diagnosis of CRPS and that, in any event, I should note that he is not a pain expert but

a vascular surgeon. I do not think that the criticism of his analysis is fair given the symptoms and signs which the letter identifies and the consequent diagnosis which it leads to. Undoubtedly Professor Imray was wrong to assume resolution of the DVT but it seems to me that at the heart of this letter is his analysis of the symptoms which I have underlined which led him to say were more consistent with CRPS than DVT.

36. The vascular experts agreed in their joint report, in relation to the symptoms recorded in this note, that some of the features described by Professor Imray were not consistent with severe untreated DVT and post-thrombotic syndrome and I therefore take this as the first significant and reasoned diagnosis of CRPS, notwithstanding the criticisms of it. The vascular experts were also of the view that it was too early at that point in time to diagnose post-thrombotic syndrome but that the reported swelling was consistent with a recent DVT. Thus it seems to me that there was evidence of both DVT and CRPS at this point.

37. The claimant accepted that her allodynia, the painful reaction to a light touch to the skin, which was noted by Professor Imray on 24 September in the note quoted from above, never improved prior to the amputation in 2018.

38. On 27 September Professor Shad saw the claimant and noted that her *"back pain has fully resolved after 15 years"*. He reviewed a CT venogram from 25 July and noted *"evidence of left common iliac and external iliac veins, no collection was seen on the CT scan."* I assume that the reference to "collection" was of blood or fluid. There seems to be no doubt that the operation had been successful in relieving the claimant of the pain in her back. The issue thereafter was, as I understand the evidence, solely in relation to her left leg.

39. By 29 September signs of ulceration on the claimant's left leg were noted for the first time in her General Practitioner's notes of that date.

40. A "CT" scan was carried out and the results were then recorded by Professor Imray in his letter of 28 November 2015 to the claimant's General Practitioner noting that the scan

> *"suggests complete resolution of her pelvic DVT" but "[i]t doesn't appear that her leg has improved significantly and as far as I can see no one has asked anyone to look into this potential complex regional pain syndrome. I still think there is a degree of urgency here and I will ask Dr Krishnamoorthy if he could kindly see her urgently…"*

Dr Krishnamoorthy was a consultant in anaesthesia and pain management. The vascular experts who gave evidence at trial agreed with each other that as at 28 November 2015 the DVT had <u>not</u> in fact resolved but:

> *"the progression of symptoms was not consistent with the usual course of severe untreated DVT and post-thrombotic syndrome in that she did not develop classic skin changes consistent with venous hypertension. Swelling was a persistent complaint however and this would be consistent with both PTS and CRPS."*
> (para 10(d) of their joint statement)

They were of the view that Professor Imray, himself a vascular surgeon, had been misled by the images available to him at that time into believing that the DVT was no longer an issue. It seems to me that the mistake in forming the view that there had been complete resolution of the DVT by 28 November 2015 was likely to have been a material influence at this point in time in diagnosing the claimant as suffering from CRPS rather than the consequences of a DVT or post thrombotic syndrome. Ms Gumbel KC submits that the comparison between the notes of the treating doctors at this point and the views of the experts demonstrates how difficult it is to disentangle the symptoms and signs and the cause of them but they contain, in my judgment, clear evidence of those symptoms and signs although the cause of those symptoms and signs remained a matter of debate.

41. On 7 December 2015 Dr Krishnamoorthy saw the claimant and agreed with Professor Imray's suggestion that the claimant was suffering from CRPS noting *"marked paraestheisa, there was swelling and colour changes to her left leg. I do think that she has complex regional pain syndrome affecting her left leg".* He recommended a different type of drug regime.

42. Ms Gumbel KC relies on a very short note dated 18 December 2015 in which Dr Krishnamoorthy wrote to the claimant's GP that:

> *"Mrs Jessica Tuffin attended the Day Unit at UHCW and she had Lignocaine infusion.*
>
> *She has complex regional pain syndrome affecting the left leg following pelvic DVT. I will review her in about a month's time."*

It was submitted that this should be read as the expression of the doctor's view that there was a sequential connection between the DVT and the CRPS, but it seems to me that such an interpretation stretches the wording used by the doctor. In my view the purpose of this note and the intention of the doctor who wrote it was to provide a purely factual update to the claimant's GP as to the treatment she was receiving to manage her pain. I do not view it as a diagnosis of her condition, much less the expression of a medical opinion that the CRPS was caused by the DVT.

43. The claimant was seen again in the Department of Neurosurgery at the Hospital on Sunday 3 January 2016 by Mr Ahmed who noted that:

> *"Her left lower limb in no longer swollen although it is still discoloured and no sign of ischaemia but the swelling has gone. Also, she has no difference between the temperature of both lower limbs, but still she is left with pain in the lower limb although this looks like regional pain syndrome in her left lower limb. The pain is triggered by touch.*
>
> *Her back pain is absolutely resolved…"*

The claimant said that she did not remember her leg not being swollen at this point but, again, I am afraid that I prefer the evidence recorded in the note over the claimant's recollection after this passage of time. This further mention of resolution of the claimant's back pain confirms that the surgery was, to that extent, successful.

44. By 14 January 2016 however the claimant was so concerned about the condition of her leg and the pain that she was suffering that after a home visit by a different doctor from her local practice, who noted that her entire leg was mottled and that her big toe was blue, she was taken to hospital by ambulance where she was admitted for a further 4 days. The discharge summary for that short stay in hospital recorded the twin diagnoses as post thrombotic pain syndrome with complex regional pain syndrome and noted that although her back pain had resolved she had continuing and worsening pain in her left leg. The summary noted that she was seen by both the neurosurgical specialists and the pain specialists and stated:

> *"…she was reviewed…by the vascular team who also believed that her pain is post thrombotic in origin. She was reviewed by the pain team who are getting on top of her complex pain history."*

Further appointments were made for the claimant to be seen again by Professor Imray.

45. On 25 February 2016 Professor Imray saw the claimant again, noting his view that *"her problem remains primarily of post regional pain syndrome and I think the evidence of post phlebitic [or post thrombotic] issues is weak."* He advised a further CT scan or venogram to see whether there was evidence of the possibility that the claimant was still suffering from a post thrombotic syndrome.

46. On 5 May 2016 the claimant was seen by Ms Mushkar, a consultant haematologist in the Department of Thrombosis at the Hospital, who recorded that *"…in spite of being on Warfarin her leg swelling has not improved. In fact she remains in considerable pain and is mostly wheelchair-bound with a dusky oedematous left leg".*

47. On 12 May 2016 on a further review by Professor Imray he accepted, contrary to his earlier view, that a repeated venogram suggested that the claimant was still suffering from or had suffered from a DVT and he referred the claimant to Professor Bradbury, a professor of vascular surgery and consultant vascular and endovascular surgeon at Heartlands Hospital in Birmingham. In his referral letter Professor Imray said:

> *"She was seen by one of my vascular colleagues on the ward about a possible DVT, imaging at that time was not clear because of the metal work and initially our thoughts were there probably wasn't a DVT. However, we have now performed a formal venogram which shows a complete occlusion in the left common femoral and significant crossover through the pelvic region."*

48. When she came to give evidence about Professor Imray's diagnosis of CRPS in September 2015, at a point in time when he mistakenly thought that the DVT had resolved itself, Dr Simpson (for the defendant) said that nevertheless:

> *"A…separate to the vascular problems that were ongoing, there was ample evidence of CRPS and, although I would have expected him to refer on to a pain clinician, that would be for a confirmation diagnosis and treatment. So, although there may have been ongoing vascular issues,*

> *the presentation to a treating vascular surgeon was of CRPS.*
>
> *Q. But the ongoing vascular issues would be relevant, for example, to the Budapest criteria as to whether you have excluded other diagnoses, would they not?*
>
> *A. Well, I don't think they would, my Lord, because an ongoing vascular issue would not lead to that kind of allodynia or the other physical signs. So to fulfil the Budapest criteria [for diagnosis of CRPS] there only has to be, um, physical signs in two categories. And they would have been there irrespective of any ongoing vascular issue. So no other diagnosis would better explain the allodynia."*

49. Dr Simpson was further challenged on this but gave further compelling reasons why she believed that she was correct in her view:

> *"Q. Well, how, having not examined the claimant and not had an accurate assessment of the vascular problems, can you say that when, as the Budapest criteria, which are at the bottom of the page, include the criteria of no other diagnosis can better explain the signs and symptoms?*
>
> *A. Because a vascular ... a venous occlusion would not explain the signs and symptoms better than CRPS. Because a vascular occlusion, even if it was ongoing, would not lead to severe allodynia. And the trophic changes that we have seen that were not in keeping with a vascular issue.*
>
> *Q. But they would explain the pain in the early stages.*
>
> *A. Not the ... the most severe pain. Just to divide pain up, there are two types of pain. There is pain in a normally functioning nervous system, nociceptive pain. So a clot in a vein will cause the normal pain that we all experience when our nervous system is working correctly. The other kind of pain is neuropathic pain due to an intrinsic abnormality in the nervous system, and that causes allodynia. So the fact that there was such severe allodynia means that a vascular problem would not better explain that finding. Which is why an experienced vascular surgeon said that this looks more like CRPS." (Day 3, pages 16 to 18)*

50. The claimant then instructed Professor Bradbury on a private basis for a second opinion. He met her on 13 October 2016. He was aware of the two diagnoses of post thrombotic syndrome and of CRPS. He examined the claimant and reported the following:

> *"…the features in her left leg were entirely in keeping with CRPS (reflex sympathetic dystrophy, RSD). Although the leg was somewhat swollen, there were no skin changes of chronic venous insufficiency. Absent the signs and symptoms of CRPS, my impression is that her PTS would in fact be only mild to moderate in severity. There was no evidence of any arterial disease and Mrs Tuffin has no risk factors for peripheral arterial disease,"*

He examined the claimant undertaking an ultrasound scan and found no abnormality in her veins on either leg concluding that *"there is excellent collateral circulation decompressing the left leg. That being the case, one would expect her symptoms and signs of PTS to be fairly limited."* He then went on to consider the central question and commented:

> *"However, as noted above, the situation for Mrs Tuffin is complicated by the fact that she has on-going spinal problems and has developed CRPS in her left leg. While CRPS after iliofemeral DVT complicated by PTS has been reported and I have seen a couple of cases where this appears to have occurred, it is extremely rare. My overall impression is that her on-going pain and CRPS symptoms and signs are much more likely to be due to her spinal pathology/nerve injury than due to her DVT and PTS although accurately disentangling the two pathologies, and attributing her symptoms and signs to each in percentage terms, is obviously difficult."*

In the remainder of that report he expressed the view that he was not supportive of the possibility of the claimant undergoing stenting in an attempt to relieve her condition.

51. On 19 October 2016 the claimant was seen by a Dr Costanzi, a clinical research fellow in pain medicine, together with Dr AL-Kaisy in the Pain Management & Neuromodulation Centre at St Thomas' Hospital in London, who noted that as a result of CRPS of her left leg she was in constant severe pain (described as *"10/10"*). On examination the doctor *"found signs of CRPS (allodynia, reduction of activity, colour changes and asymmetry in hair…)…"*

52. On 6 February 2017 the claimant was noted by a Registrar at University College Hospital, London as having a *"massively swollen left lower limb"* and had *"ulceration down her left leg and foot"*.

53. On 11 April 2017 Professor Toby Richards, a consultant vascular surgeon, also at University College Hospital, saw the claimant and noted that she had:

> *"…considerable overlap between a complex regional pain syndrome through depending of (sic) being in a wheelchair due to being unable to walk and also post-thrombotic limb syndrome. It is difficult to see where the symptoms of one stop and the other start but there is no denying the fact that she has got an occluded common iliac vein on that side."*

He advised that there was a 90% chance that a stent would successfully unblock her vein but queried whether that would make her symptoms better. He explained his thinking as follows:

> "*Currently she is in a wheelchair and she has got a very engorged, swollen and tender left leg. There are many factors to (sic) play here including hypersensitivity of the skin, as well as dysmobility et cetera. It is difficult to know whether or not the intervention of the stent per se will directly impact on the symptoms but the way to view this is that we have defined intervention point and, whether or not there is direct or indirect sequelae to the benefit of that, that is what we need to focus on and therefore, in the interim, she needs to work out (as it is her pain) what things make her legs better and what things make them worse…"*

54. By the summer of 2017 the claimant's left foot had become twisted and inverted and was pointing inwards, as recorded in her General Practitioner's answers in a DVLA questionnaire about her fitness to drive. Dr Bains described the claimant as suffering from CRPS and said that it was assumed that she was not fit to drive because of her medical history.

55. The claimant saw Professor Shad at the defendant's Department of Neurology on 24 September 2017 who noted in report to the claimant's GP that she had:

> *"Ongoing left leg pain, swelling, discolouration of the leg and now she is developing some ulcers ?vascular insufficiency ?complex regional pain syndrome."*

While this is not on the face of it a clear diagnosis of either DVT/post thrombotic syndrome or CRPS it adds to the factual picture of the development of the claimant's condition insofar as it records the signs and symptoms which were affecting her at that time.

56. On 20 November 2017, in accordance with the advice of Professor Richards, the claimant underwent venous stenting at University College Hospital London and remained in hospital until 24 November. It is important to note that the claimant must still have been suffering from the impact of the DVT and post thrombotic syndrome, before the stenting, otherwise there would have been no need for it and the clinicians would not have performed the procedure as Professor Stansby, for the defendant, later accepted in cross-examination. The stenting obviously had an immediate, albeit short-lived, positive effect on the claimant's left leg.

57. On 16 January 2018 the claimant returned to see Professor Richards who noted that following the stenting there had been *"a very good physical and mental improvement…Physically the leg has reduced significantly and this has improved her complex regional pain syndrome."* That report would tend to suggest an overlap or connection between the conditions which the claimant had been suffering from but does not assist me, in looking at causation, in identifying the links between the negligence and the ultimate need for amputation.

58. The claimant herself says that after the stenting:

> *"My leg had physically improved…and the swelling had improved dramatically. My leg had changed in volume and the colour had also changed. I recall that it actually became quite skinny in terms of what it had been like previously..."* (para 62 of her witness statement).

She says that Professor Richards recommended that she have intensive physiotherapy and hydrotherapy to help her to start to walk again but, she says, *"Unfortunately, however, my left leg was bent and twisted and I was in too much pain to benefit from this…".* She could not straighten her leg. In cross-examination she said that her ankle and foot were bent inwards and stiff and she could not do anything to relieve that situation.

59. By February 2018 the claimant says that her leg had started to deteriorate again, the effect of the stenting having been limited:

> *"…This was extremely disappointing for me. The ulcers brought more pain and caused a throbbing pain. All of the toes on my left leg became black and had open wounds on them."*

Given that the occlusion which had been present had been dealt with by the stenting the question arises as to why the claimant continued to be in pain, suffering the symptoms which she described in this paragraph.

60. The claimant was also recorded as suffering from what was described as a "*flexion deformity on her left knee"* and *"an inversion deformity on the left foot and ankle"*. It was from this point that the claimant, after taking advice from an orthotist on 22 February 2018, began to consider having an amputation, which she then discussed with her General Practitioner and consultant.

61. I have been shown a series of photographs of the claimant's left leg and foot from February to September 2018 which show the continuing deterioration of her condition. They show a number of ulcers, lesions, swelling of the left leg and discolouration. She said that in the late summer of 2018 her toes remained a problem, with recurrent ulceration on the toes and shin of her left leg, and there came a point when the ulcers would not heal, they would close and reopen repeatedly. That is consistent with the photographs.

62. The notes from the claimant's General Practitioner for 26 February 2018 set out their observations on her condition at that point:

> *"Patient reviewed. Ongoing chronic vascular problem to the left leg. Patient has [District Nurse] come out on a regular basis. Seen a different [District Nurse] who advised to contact GP for a review. Patient reports has chronic black, blue discolouration to left leg and highly painful. Reports over the last week feels pain is a lot worse and leg feels heavy. No fevers no oozing, reports has small ulcers to toe big toe, 3rd and 4th toe. 4th toe has been a bit wet. Jessica feels there is no definitive plan and she*

> *feels she gets sent into hospital and nothing much happens and is sent back out. She has been thinking about the idea of amputations but in the pasat has been rejected. o/e alert Left leg discolouration dark blue purple, up to knee. Difficult to palpate pulses. Highly painful on light touch. Dry ulcers to toes no evidence of infection. D/W SG regarding increased pain whether needs acute admission, advised chronic problem and do referral to Prof Imray urgently. Informed Jessica of plan she is happy and is aware if symptoms get worse or any concerns to call back. Plan. Referral urgently to Prof Imray."*

The claimant accepted that these notes contained a reasonable description of her condition at the time.

63. Professor Imray saw the claimant again on 29 March 2018 when he noted that despite the successful recannulation of her veins, by introduction of a stent, she still suffered from CRPS and he was of the view that an amputation *"may well be a reasonable approach"*.

64. The claimant set out her thinking at this point in time in paragraph 67 of her witness statement:

> *"I discussed having an amputation with my GP and the vascular consultant at University Hospital Coventry in March 2018. I gave very considerable thought to this option as a way out. I really felt that I could not go on any further. It was clear to me that the stenting had not worked as well as I had hoped, and that I was facing a lot of problems with infections from the ulcers, which could be life threatening."*

65. The fixed position of the claimant's left leg was also a problem as noted in the notes of a chronic pain specialist nurse dated 3 May 2018:

> *"Has problems with orthotics regarding the stiffness and twisting of knee and ankle."*

66. On 16 July 2018 NHS Resolution, writing on behalf of the Hospital and the defendant, admitted negligence in the treatment of the claimant at the time of her back surgery in 2015 in the following terms:

> *"The Trust admits that following the Claimant's operation for prosthetic lumbar disc replacement on or around 7 July 2015, the Claimant should have received Clexane within 24 hours following the surgery. To not have provided Clexane within that timeframe represents care which fell below a reasonable standard."*

67. On 21 July 2018 Professor Imray saw the claimant again and advised her to proceed with an above knee amputation of her left leg explaining to her that he was:

> *"optimistic that we will substantially improve her ability and pain but also there is a risk that the situation may remain the same [or] possibly get worse. However the current status quo is not an acceptable long term option…".*

68. The operation was carried out on 18 September 2018.

69. The claimant accepted in cross-examination that there were three principal reasons for that surgery: the pain she was suffering, the ulceration to her left leg and the bent position of her knee and foot, reflecting what had appeared in paragraphs 8 and 9 of her witness statement.

70. As to the pain the claimant accepted in cross-examination that it continued up to the point of amputation:

> *"Q. Okay. Insofar as the sensitivity to touch is concerned, so that if anything touches it, it causes exquisite pain. My understanding is that that symptom remained present thereafter, so that there was no not a time when that symptom improved? You had that up until the point of the amputation?*
>
> *A. Yes."*

The pain was, it seems to me, the allodynia which had been described as early as 24 September 2015 in Professor Imray's notes (para 35 above) but had not improved some three years later.

71. The claim for damages was issued on 28 January 2021. By its defence dated 2 July 2021 the defendant repeated its admission of negligence but denied liability (on the grounds of causation) for the amputation undertaken in September 2018 asserting that the likely cause was CRPS.

The expert evidence

72. I heard evidence from experts in vascular surgery, Mr Jenkins (referred to in their joint statement as "MJ") for the claimant and Professor Stansby (referred to in their joint statement as "GS") for the defendant, and pain management experts, Dr Towlerton for the claimant and Dr Simpson for the defendant, all of whom were, in my view, of considerable distinction in their respective fields having regard to the details of their qualifications and experience described in their respective reports and cv's. They gave evidence "back to back" as it were, so that I had the opportunity of hearing the expert evidence of both experts in the discipline of vascular issues before turning to the two experts who gave evidence in relation to the other discipline of pain and pain management.

The vascular experts

73. In their joint statement dated 22 March 2023, in a document described as "Agenda for meeting of vascular experts", the vascular experts having discussed, by telephone, a series of questions which had been posed by both parties, set out their respective views.

The joint statement records the fact that the experts agreed that the diagnosis of DVT, the subsequent administration of Clexane and the stenting which the claimant underwent would probably not have occurred but for the admitted negligence of the defendant. They went on to agree, later in the statement, that *"DVT is a very rare cause of CRPS"*, but they both deferred to the pain experts on the link between the two conditions. They also both deferred to the opinion of the pain experts as to whether it was likely that the claimant suffered from CRPS at all, although they agreed that a diagnosis of CRPS was made by excluding other possible causes of the relevant symptoms.

74. The essence of their disagreement is to be found in their answers to question number 1, which probed the issue of causation, in the following terms:

> *"MJ believes that the trigger event which set off a chain of clinical complaints and management consequences was the DVT and therefore believes that amputation would not have occurred but for the negligence.*
>
> *GS believes on a balance of probabilities, the Claimant's symptoms and request for amputation were as a result of CRPS rather than DVT/PTS and would have occurred even if the DVT had been avoided."*

Focussing on whether the amputation would have been necessary even if the defendant had not been negligent in its treatment of the claimant the experts said:

> *"MJ – no. The main indication for amputation was ongoing swelling, a fixed flexion deformity and fears about sepsis related to ulceration. These symptoms could be attributed to the post-operative DVT.*
>
> *GS – yes. The indication for amputation related to symptoms and signs probably as a result of CRPS."*

They repeated the essential reasons for the difference between them in their answer to question number 10, which asked:

> *"Please consider the extent to which, if at all, the following are consistent with a diagnosis of an "untreated DVT and post-thrombotic syndrome" and/or a diagnosis of chronic regional pain syndrome, giving reasons for your answers:*
>
> *a. The Claimant's medical history."*

They responded:

> *"Both MJ and GS agree that the medical history is variable, and aspects in the medical history are consistent with both conditions.*

> *GS believes that the history that ultimately [led] to the need for amputation is most consistent with chronic regional pain syndrome.*
>
> *MJ believes that the main indication leading to amputation was the fixed flexion deformity, swelling, pain and the Claimant's fear of sepsis secondary to ulceration."*

They noted, however, that the *"presence of this fixed flexion is not reported in her records"* (in answer to question 10f).

75. Mr Jenkins' report is dated October 2022. He recited that he had reviewed the claimant's medical records and the images of scans taken between 2006 and 2018. His conclusion, in paragraph 7.9 of his report, was that the requirement for the claimant to undergo amputation *"was a direct consequence of the development of a DVT as a result of her inability to use the left leg which mandated a wheelchair causing the development of a fixed flexion contracture."* At trial he said that he thought that the post-thrombotic syndrome was severe, *"not mild to moderate"* because of the presence of oedema, tenderness of the claimant's leg on compression, redness, and the claimant's reports of swelling, heaviness and pain, objectively scoring 18 on the "Villalta" scale where 9 to 14 would represent moderate post thrombotic syndrome. He did not include the ulceration suffered by the claimant in calculating the score.

76. Mr Jenkins also expressed the view, that, on the balance of probabilities, CRPS would not have occurred if the claimant had not suffered a DVT, adding *"If successful spinal surgery had alleviated her back pain, but for the development of the DVT, there should not have been any impact on her left leg."* He went on to explain this in the following paragraphs of his report:

> *"7.11 I note the admissions by the Defendant. What remains to be determined is whether this led to the need for left above-knee amputation. DVT per se is a very rare indication for amputation. Equally, the development of a complex regional pain syndrome is very unusual following a DVT and post-thrombotic syndrome is a much commoner scenario. It is clear to me that the Claimant did develop a post-thrombotic syndrome in that she describes gross swelling of her leg, profound suffusion and pain consistent with venous outflow obstruction (heaviness, feeling her leg was "On fire" with an exacerbation every time she put her foot to the floor). Additionally, she developed ulceration and these are all symptoms and signs consistent with a severe post-thrombotic syndrome.*
>
> *7.12 I am unable to comment further on the diagnosis of complex regional pain syndrome as it is out with my area of expertise, but note the opinion of Dr Towlerton in his report. I accept that now that the limb has been amputated, an objective assessment would not be possible.*

> *7.13 Regardless of this however, it is clear that the main indication for amputation was as a result of the above symptoms and crucially, the fixed deformity of the left knee. This meant that the leg was effectively useless in terms of mobilising or transferring and the Claimant recalls that she was told following the amputation that the leg would not straighten even under a general anaesthetic and the amputation had to be performed with the leg in its fixed position."*

He said that after having heard the claimant give evidence at trial his view was unchanged. However, he accepted in cross-examination that he had only dealt with patients suffering from CRPS once or twice in the course of his 30 year medical career.

77. Therefore it seems to me that Dr Jenkins' view, very much simplified, was that the amputation was, in essence, necessitated by the fixed deformity of the claimant's left knee and leg, which had, it is to be inferred, in turn been caused by the DVT which was the result of the defendant's negligence in not administering Clexane at the appropriate time. He did not deal in his report with the allodynic pain which had been noted.

78. Professor Stansby's report is dated 27 October 2022. He also reviewed the claimant's medical records and the relevant images. In paragraph 7.14 of his report he described the typical symptoms of post-thrombotic syndrome as *"aching, heaviness, swelling, cramps or itching. Signs would include oedema and skin changes of pigmentation and lipodermatosclerosis* [subcutaneous inflammation]. *In severe cases ulcers may develop usually on the medial aspect of the calf and usually on a prior development of lipodermatosclerosis."* In his live evidence Mr Jenkins agreed with that assessment of the signs and symptoms of post thrombotic syndrome.

79. Professor Stansby commented that the claimant's photographs did not show lipodermatosclerosis or pigmentation or ulceration in the gaiter area of her calf, ie the lower medial calf above the ankle where, in his experience, most venous skin changes or ulcers occur. Therefore, he concluded, that what appeared in the claimant's photographs was not consistent with post-thrombotic syndrome.

80. His conclusion, expressed in paragraph 7.31 of his report was that the ultimate cause of the claimant's amputation was the CRPS *"and resultant pain and knee fixed flexion, and not because of PTS. The CRPS was more likely due to her long-standing back problems and not her DVT."*

81. In support of his reasoning Professor Stansby commented that he could only find one reported case, which did not relate to a leg, and that in more than 30 years of practice he had not seen *"any case where CRPS was caused by a DVT or [post-thrombotic syndrome] in the leg or indeed heard about such a case…".* On the other hand he noted that the claimant had a very long previous history of back problems and spinal surgery *"both of which are well described as causes of CRPS and well documented in the literature".* He noted the following in paragraphs 7.23, 7.24 and 7.29 of his report:

> "*7.23 She appears to have had very severe leg symptoms at a very early stage after DVT which in my experience would not be typical for PTS, which by convention can't*

> *be diagnosed at an early stage. When reviewed on the 24th September 2015 around 7 weeks after her DVT which occurred on or around 17th July she was requiring a wheelchair and was unable to stand because of pain and she had oedema and allodynia which are features consistent with CRPS at that stage and indeed was suggested by Professor Imray at that stage. Indeed, most of the experts who assessed her prior to amputation were of the [opinion] that she was suffering with CRPS.*
>
> *7.24 The severe features in September 2015 would suggest she had already developed CRPS at that time, and they are not consistent with PTS.*
>
> *…*
>
> *7.29 She had no real benefit from or improvement from the venous stent and the occluded vein was well collateralised in any event so the lack of improvement was not surprising. This also supports the fact that PTS at that stage was no a significant issue in causing her symptoms."*

82. The vascular experts were asked, via their joint statement, to identify the claimant's symptoms which were in their view attributable to a DVT. There was a measure of agreement between them:

> *"MJ and GS agree that there is an overlap between symptoms and signs of DVT and CRPS.*
>
> *Both agree that symptoms in the first 6 months after a DVT relate to the DVT itself and only after 6 months can they be attributed to PTS.*
>
> *Both agree that the initial symptoms the Claimant described when she returned to hospital on 17/7/2015 – namely pain, swelling and an inability to weight bear were related to the acute iliac DVT."*

They also agreed that the DVT had not resolved by 28 November 2015, contrary to what had been reported by Professor Imray.

83. In cross-examination Mr Barnes took Mr Jenkins through the various symptoms which the claimant suffered between the original surgery and the amputation. Mr Jenkins' evidence was that the acute onset of swelling and increase in pain reported when the claimant returned to hospital on 17 July 2015 was likely to be associated with the onset of the DVT. However, Mr Jenkins also accepted that the later severe allodynia reported by Professor Imray in his letter to the claimant's GP dated 24 September 2015 would not be regarded as consistent with a DVT. He also accepted that if the severe pain

symptoms continued that would not be consistent with post-thrombotic syndrome either.

> *"Q…if the learned judge were to conclude that the description of the claimant's symptoms as set out in her witness statement (which we looked at, the "shards of glass" etc), and if the learned judge accepts that the description of Ms Tuffin's symptoms as set out in Professor Imray's letter (so, "severe allodynia")… If that continued, in the same way that it is not consistent with DVT, it would not be consistent with post-thrombotic syndrome, would it? Agreed?*
> *A. Correct, agree[d]."* (Day 1, p.123)

84. Mr Barnes also asked about the reports of severe pain more than a year later which were noted in the letter of Dr Costanzi to the claimant's GP. Mr Jenkins accepted that the pain levels reported at that point in time were not consistent with a post thrombotic syndrome:

> *"Q. Okay. Again, just bear with me a moment, I just want to check one entry. Yes, can you look, please, at page 43 of the medical records, F43. This is a letter from Dr Costanzi, who is a clinical research fellow in pain medicine. I just want to ask you about one aspect of his description of the pain. We are now in October 2016, and he says (just by the bottom hole punch), "The CRPS of her left leg is a constant pain, severe (10/10)". Now, just leave out the word "CRPS" for the moment, and just focus on "constant pain, severe (10/10)". That would not be consistent with what you would expect with a PTS, a post-thrombotic syndrome, would it?*
> *A. Not "10/10", I agree.*
> *Q. Okay.*
> *A. That sounds very severe."* (Day 1, page 133)

85. Mr Jenkins later accepted that after venous stenting in November 2017 there was an improvement in symptoms associated with venous insufficiency in that the swelling in the claimant's leg reduced but the pain which she had suffered persisted, which suggested that it was not related to venous insufficiency:

> *"Q. Is it reasonable to conclude then that the improvement in the swelling would suggest that, at least in part, the swelling was the result of venous insufficiency, but if the other symptoms did not improve that would suggest that they were not related to venous insufficiency. Is that a reasonable way of looking at it?*
>
> *A. It is. I'm just quoting Professor Toby Richards who says: "There's been a very good physical and mental*

> *improvement in this lady following the opening of a chronic iliac vein occlusion. Physically the leg has reduced significantly and this has improved her complex regional pain syndrome."*
>
> *Q. Yes.*
>
> *A. So it sounds as if the majority of symptoms had improved temporarily.*
>
> *Q. Yes, and then returned."* (Day 1, page 140)

86. Mr Jenkins was then asked about absence of evidence of skin changes evidencing veinous insufficiency on examination in October 2016 and the presence of ulcers which appeared on the claimant's toes in February 2017. He accepted, as I mention above, that there was no lipodermatosclerosis or chronic venous insufficiency skin changes and that the ulcer on the pad of the claimant's big toe was not what one would expect to find as a result of post-thrombotic syndrome. He also accepted that the further ulceration seen on the claimant's toes in the photographs taken later, in February 2018, was also not consistent with post-thrombotic syndrome commenting that the digital ulcers are not features of venous ulceration but "*would be consistent with chilblains or Reynaud's, both of which the claimant had."* He accepted that the lesion on her left shin would have expected to have been lower if the cause was a venous ulcer.

> *"Q. Just so that we understand the answer, I think the point you are making is because there is no altered pigmentation and because there is no evidence of lipodermatosclerosis, it does not look like a venous ulcer. Agreed?*
>
> *A. Agreed."*

87. As to the claimant's inability to extend her left leg Mr Jenkins accepted that the twisted positioning of the claimant's foot reported in March 2017 by the claimant's CP was not consistent with a DVT or post thrombotic syndrome but was *"consistent with being confined to a wheelchair"* adding that to identify the cause of the fixed flexion deformity of the claimant's left knee one had to understand the cause of the use of the wheelchair by the claimant.

88. It seems to me that in cross-examination Mr Barnes caused Mr Jenkins to shift very considerably from the views which he had expressed in his report.

89. As to the reason for using a wheelchair Professor Stansby accepted in cross-examination that pain, heaviness, fatigue and itching (which there was no evidence of) could be due to post thrombotic syndrome but that it would be highly unusual for a patient suffering from a DVT and post thrombotic syndrome to need to use a wheelchair long after the occurrence of the DVT saying "*I think it is also true that someone with a DVT, it would be very a rare situation for someone of this age to continue to need a wheelchair beyond at most a day or two."* However, he also accepted that while it was difficult to disentangle the symptoms which the claimant was reporting throughout 2016 and 2017 that at least until the claimant underwent the stenting procedure at the

end of 2017 she *"still had a problem that was connected to the negligent DVT and post thrombotic syndrome"*.

90. In respect of disentangling the symptoms Professor Stansby said:

> *"A. Well, I think in the earlier parts of that 7.23 [of my report] what I am saying is that post thrombotic syndrome really should not be diagnosed for at least six months after the DVT has occurred because the initial and the natural history of having a DVT is that you get swelling and you get what you get from the DVT that over a period of time in the majority of people will go away, either completely or leave you with ongoing symptoms which are due to post thrombotic syndrome. So one should not regard the early signs and symptoms as post thrombotic syndrome. One should regard those as the DVT and the resolution subsequently of the DVT and after six months one can then say, "Well, at this stage the DVT is now in the past, what is continuing? We will regard as post thrombotic syndrome." So that might be a little bit semantic, but that is the approach. Um, so the early signs and symptoms would be the DVT, but by more than six months, then it would be post thrombotic syndrome.*
>
> *Q. In the year of 2016 and 2017, if you take the six months from July –*
>
> *A. Yes.*
>
> *Q. -- for two years the most likely position, as I see it, if one is going on what the treating doctors are saying, which is all one can go on, is that she is suffering from a combination which it is impossible to disentangle.*
>
> *A. Yes, and I think that was what Professor Bradbury and Professor Richards were stating in their reports as well, prior to the venous stenting."*

In cross-examination Professor Stansby accepted that the claimant's symptoms were *"a sort of continuum leading up eventually to the amputation"* and I accept that analysis of the contemporaneous notes and the records.

91. When he was re-examined by Mr Barnes Professor Stansby explained the relevance in disentangling a DVT/post thrombotic syndrome and CRPS of some of the symptoms and signs recorded in the treating doctors' notes from time to time. His view was that the pain in her left leg complained of by the claimant (described in the notes as *"severe allodynia"*) was a *"useful discriminator*", adding *"…and I have never seen a patient*

with post thrombotic syndrome who had it or have it due to the post thrombotic syndrome so I think it is a useful discriminator".

92. Professor Stansby was asked about the various signs and symptoms recorded by Professor Bradbury in his letter dated 13 October 2016 and how they were to be attributed as between DVT/post thrombotic syndrome and CRPS. He said

> *"...I think it's important to separate signs and symptoms. They're not the same thing in relation to CRPS or post thrombotic syndrome. The absence of the skin changes on examination would be an important factor for me if I had been able to examine the patient in weighing up the balance between the two conditions and their contribution. I think in terms of description of pain one would, if one was examining and seeing a patient, would want to take more detail. So I think allodynia is a very different thing to paraesthesia and I'd want to have information which tried to differentiate those two things in an individual patient in order for me to estimate between the two conditions. So the descriptions that I took from Professor Bradbury's examination and history and also from several of the other letters that we've gone through was that allodynia-like pain was a very predominant feature and that on examination where the examination is detailed, there doesn't appear to be very major swelling or the long-term skin changes as we heard yesterday of pigmentation and lipodermatosclerosis and ultimately in some patients ulceration on the ankle area were not present, so there would be those factors to take into account to try and get a broad but probably not very accurate apportionment between the contributions of the two conditions"* (Day 2, p.69)

93. Professor Stansby was then taken one by one through the claimant's symptoms and asked to try to disentangle those usually associated with a DVT when compared with CRPS. Of the reports of pain he said:

> *"A. Immediately after a DVT the leg is described as feeling swollen and painful in a usually diffuse aching pain that would be the normal description.*
>
> *Q. What is "immediately afterwards"?*
>
> *A. A few days afterwards.*
>
> *Q. And thereafter?*
>
> *A. And then actually in the majority of patients where there's a DVT it completely resolves over a few*

> *weeks, gets much better in the first few days and then usually by three to six months the pain has either gone or has become quite minimal. We normally advise the wearing of a support stocking if there's any residual pain and swelling, to control that, at least for the first few months. We used to advise them to be worn long-term but we no longer insist on that. So in most patients, sometimes with the addition of a stocking to control swelling, their symptoms resolve completely or resolve to at least only minor levels in the first few weeks and months.*
>
> *Q. We have heard the claimant describe her pain as accepting it was severe allodynic-type pain and it is recorded that it was ten out of ten. To what extent, if at all, is that consistent with the pain expected following DVT or from post thrombotic syndrome?*
>
> *A. That would be very unexpected*."

94. As to skin changes he said:

> "*A. In a DVT you get swelling but you don't really get any skin changes other than due to the swelling because they do take some time to develop, but when they develop they consist of brown pigmentation of the skin which is usually on the inside of the lower leg above the ankle in the gaiter area, and a condition called lipodermatosclerosis which just comes from the words for fat and skin sclerosing and becoming hard and atrophy, so that leads, as we heard yesterday, to this loss of volume in the lower leg with the inverted Champagne bottle-type shape and that can be assessed by looking but also feeling the skin and subcutaneous tissues, and then ultimately leg ulceration can develop ankle ulceration.*
>
> *Q. From the evidence that you have seen in this case, did that occur to Mrs Tuffin?*
>
> *A. No, I don't think it did. I think experts like Professor Bradbury would have been very aware of that and mentioned it if it had done.*
>
> *Q. We know that Mrs Tuffin's leg was described in various ways, the colour. It was described as red at some point, it's been described as blue in colour, and we have seen the photographs. To what extent is that sort of discolouration consistent with what might be seen in a DVT or post thrombotic syndrome?*

> *A. I think we'd need to differentiate the different phases of her with the DVT, because whilst she had the DVT early on and whilst there was still a blocked iliac vein, if a patient does sit still with their leg down there will be venous engorgement because the blood will be sitting in the veins. Blood in the veins is a blue colour so you do get a sort of dark red bluey colour cyanosed look to the leg in cases of venous obstruction and, by corollary, some cases of post thrombotic syndrome*."

95. Of the ulceration seen on the claimant's toes Professor Stansby's short answer was that what appeared on the photographs of the claimant's leg was not consistent with post thrombotic syndrome.

96. In respect of the claimant's fixed leg position he was of the view that it was not consistent with what would be expected to have been caused by a DVT or post thrombotic syndrome.

97. Finally, as to oedema he said that it was part of post thrombotic syndrome to get some oedema.

98. At the conclusion of the evidence of the vascular experts it seemed to me, as shown in the answers which I have set out above, that Mr Barnes had, in effect, persuaded Mr Jenkins to move considerably from the conclusions which he had expressed in his report to accepting that the symptoms from which the claimant was suffering from 2017 into 2018 were not consistent with DVT or post thrombotic syndrome, in line with the oral evidence then given by Professor Stansby. I found their evidence very helpful in disentangling the causes of the symptoms which were present immediately before and led to the claimant's decision to undergo amputation.

The pain experts

99. Like the vascular experts, I heard the evidence of the pain experts, Dr Towlerton for the claimant and Dr Simpson for the defendant, "back to back". They had prepared written reports and a joint statement dated 24 February 2023, on which they were cross-examined.

100. The extent of pain experts' agreement is as follows:

> *"**We agree the Claimant;***
>
> - *Followed the expected postoperative path from her initial surgery on the 7th July.*
> - *On her readmission, on 17th of July, the main source of pain was due to the left leg VTE [Venous Thromboembolism].*
> - *Possible causes of her pains in the following months were from post-operative pain, DVT and Post*

> *Thrombotic Syndrome (PTS), CRPS caused by her spinal surgery, CRPS caused by the DVT and PTS or a combination*
>
> - *She may at some point [have] satisfied the criteria for CRPS.*
> - *Spontaneous CRPS is unlikely in this case."*

101. The experts took different views on *"the genesis of the Claimant['s] persistent chronic leg pain and changes":*

> - *"Dr Towlerton considers the possible changes were more likely caused by a combination of the DVT, PTS, post operative pains and any CRPS..*
> - *Dr Simpson agrees that all three options considered by Dr Towlertom are possible and would agree that they represent a reasonable range of opinion. However, in her view, for the reasons she has given, untreated DVT and PTS is less likely than CRPS."*

102. On her readmission to the Hospital on 17 July 2015 the experts agree that the main source of pain at that time was due to the DVT.

103. They also agreed that, for the reasons given in paragraph 8 of the claimant's witness statement, the symptoms which led her to decide to seek amputation were the pain and the ulceration which she was suffering.

104. The pain experts agree that the question of whether the claimant developed CRPS should be determined according to what are known as The Budapest Criteria, which, according to the "UK guidelines for diagnosis, referral and management in primary and secondary care" published by the Royal College of Physicians (2018) state that the following four diagnostic criteria must be met:

> *"A) The patient has continuing pain which is disproportionate to any inciting event*
>
> *B) The patient has at least one sign in two or more of the categories [below]*
>
> *C) The patient reports at least one symptom in three or more of the categories [below]*
>
> *D) No other diagnosis can better explain the signs and symptoms"*

The categories below the above criteria are stated to be:

> *"1. 'Sensory' Allodynia ([pain] to light touch and/or temperature sensation and/or deep somatic pressure and/or hyperalgesia (to pinprick)*

> *2. 'Vasomotor' Temperature asymmetry and/or skin colour changes and/or skin colour asymmetry*
>
> *3. 'Sudomotor/oedema' Oedema and/or sweating changes and/or sweating asymmetry*
>
> *4. 'Motor/trophic' Decreased range of motion and/or motor dysfunction (weakness, tremor, dystonia) and/or trophic changes (hair/nail/skin)"* (Appendix 4 CRPS diagnostic checklist).

105. The guidelines go on to state "*If A, B, C* and *D above are all ticked, please diagnose CRPS. If in doubt, or for confirmation, please refer to your local specialist."* Under the heading "*A special feature in CRPS"* the authors say "*In category 4, the decreased range of motion/weakness is not due to pain. It is also not due to nerve damage or a joint or skin problem. This is a special feature in CRPS and is due to poorly understood disturbed communication between the brain and the limb."*

106. The pain experts addressed the Budapest criteria in considering whether the claimant had suffered from CRPS and, while they could not *"definitively state whether she would have fulfilled those criteria"* because they had not examined her prior to amputation they nevertheless agreed that *"she may at some point [have] satisfied the criteria for CRPS in having disproportionate pain, at least 1 sign in two or more categories (1-4) and at least one symptom in 3 or more categories (1-4)."* After some reluctance Dr Towlerton accepted that in paragraph 43 of her witness statement (cited above) the claimant gave evidence about what could be described as severe allodynic pain and that the reports of her GP and Professor Imray demonstrated the same. While Dr Towlerton also accepted that the contemporaneous evidence showed that the claimant exhibited many of the features of CRPS (ie diagnostic criteria A to C) by September 2018 he could not exclude a different diagnosis and said that he would be reliant on the vascular experts to say that there was nothing else they could do before he would conclude that the claimant had suffered from CRPS. He said that he was *"struggling with the exclusion diagnosis"* in other words diagnostic criteria "D". The question posed in criterion D is whether any other diagnosis can better explain the signs and symptoms.

107. Dr Simpson's evidence was that the claimant's medical records and photographs demonstrated signs and symptoms in all 4 of the Budapest categories.

108. Dr Towlerton was asked whether there was another diagnosis that better explains the claimant's signs and symptoms than CRPS and said:

> *"A. A contribution from persistent neuropathic pain and residual changes from the DVT and/or post-thrombotic syndrome. There is nowhere that, in my clinical understanding and how I approach this clinically, that looks at the magnitude of one or the other. The old definition, the Orlando and then the Atkins, actually talked about: is the magnitude of change of any other diagnosis sufficient to say we can say that's complex regional pain syndrome or not. This doesn't. So, if I was admitting the*

> *claimant's pain state into a trial, I wouldn't diagnose them as complex regional pain syndrome. Neuropathic pain, but I wouldn't diagnose them as complex regional pain syndrome, but I respect some people that would. And that's the nuance, I think, of D."*

However, as I view his evidence he was not able to offer another diagnosis that better explained the claimant's signs and symptoms.

109. One of the essential differences between the pain experts, as I view their evidence, is as to whether the allodynia noted by the treating doctors was a significant factor. In answer to question 4 in their joint statement they said:

> "*Dr. Towlerton considers there is a great deal of crossover between the signs and symptoms of CRPS and PTS. Dr Simpson agrees that there are some similarities but, in her view, there are also quite marked differences. In her experience she has not seen such marked allodynia in PTS. If this was common then it would make it very difficult to use compression garments that many patients with PTS rely on.*
>
> *Dr Towlerton agrees not all case[s] follow a textbook presentation. In a patient with pre-existing neurological changes in the left leg prior to surgery, a mixed clinical picture from [and] VTE/PTS or CRPS would be expected. He had not seen the leg before amputation and therefore would not comment on any marked allodynia. However, he agrees, whilst allodynia can make wearing clothes uncomfortable, neuropathic [sufferers] often find relief wearing tight/compression garments."*

110. In respect of the signs and symptoms displayed by the claimant prior to amputation Dr Towlerton gave the following evidence in cross-examination:

i) allodynia – he accepted that allodynia would not be consistent with a DVT or post-thrombotic syndrome and was more consistent with what he called a neuropathic process and may have been present even if the DVT had not developed (Day 2, page 152);

ii) skin changes – he accepted that in September 2015 the claimant did not present with the skin changes which one would expect from post thrombotic syndrome;

iii) the ulcers on the claimant's toes - Dr Towlerton was of the view that they were not consistent with a DVT or post thrombotic syndrome. He said: *"I am happy to accept that it may be related to complex regional pain syndrome, yes"*;

iv) dystonic positioned foot or knee – Dr Towlerton said that such signs would be unlikely in a post-DVT or post thrombotic syndrome and while it was consistent with CRPS it might have been the result of the conflation of a number of conditions.

111. Dr Simpson's view on the symptoms which she was asked about was as follows:

i) allodynia was not caused by a DVT;

ii) the ulcers on the claimant's toes shown in the photographs were classical signs of CRPS and were not caused by a DVT;

iii) the particular photograph of the inverted dystonic posture (and ulceration) which she was taken to in cross-examination also evidenced a classical sign of CRPS and was not consistent with post thrombotic syndrome, although she accepted that other photographs which only showed the fixed foot position and not the ulcers could be consistent either with CRPS or post thrombotic syndrome.

112. Dr Simpson's evidence was that she could definitively say that CRPS had developed by September 2015:

> *"A….because by that stage there was severe allodynia, not consistent with a vascular problem, that over time followed the pathway one would expect of classical CRPS resulting in allodynic limb, ulceration in areas that are not consistent with a vascular problem and, importantly, that classical inverted dystonic posturing of the foot. That was reversible, therefore not simply due to flexion contraction."*

113. As to the causal connection between CRPS and the spinal surgery which the claimant had undergone Dr Towlerton said that there was medical literature which suggested a possible link between the two but he disagreed that the CRPS said to have been suffered by the claimant had been caused by the surgery. When asked about the medical research and literature while he was reluctant to accept that there were no reports of evidence of a DVT or post thrombotic syndrome causing CRPS he nevertheless agreed that he had never seen a patient who had developed CRPS following a DVT or post thrombotic syndrome or from spinal surgery. He accepted that CRPS could, rarely, be caused by spinal surgery but he did not accept that the more likely cause of the claimant's CRPS was her spinal surgery because, he said, the pain would have been expected at the site of the wound rather than in her leg in which she had the DVT. He ultimately accepted that he could not say that the DVT was a causative factor, adding *"I agree. I do not think anyone can, no."* (Day 2, page 150).

114. Dr Simpson's evidence was that she had seen *"many hundreds of cases of CRPS"* but she had never "*seen a case caused by VTE*". Nor had Dr Towlerton. Dr Simpson commented:

> *"CRPS can be over-diagnosed, so I would prefer to rely on… it… vascular problems are incredibly common. I worked in a vascular unit in a (?) hospital. They are so common. If CRPS occurred after vascular surgery then we would see it in our clinics, and we never do. So, I find it difficult to accept an anecdotal report of "a couple of cases" having been*

> *seen as a way of determining in this case what's happening."*

She disagreed that disentangling the two pathologies was difficult:

> *"I think disentangling the pathology is fairly simple, because if a person has the correct… correct... the appropriate symptoms and physical signs, and no other pathology better explains what you're seeing, then we've got CRPS. So it's not difficult at all, I think it's very easy. Because if they've got CRPS, they've got it; if they haven't, they haven't. This lady has CRPS, so that's the pathology. The aetiology is either spontaneous (well, it's not: it would be too much of a coincidence) ,or it's from the spinal surgery (which, although rare, is reported), or it's a vascular cause (well, that's just something we do not see). So, I think it's not a difficult thing to untangle, but in a vascular clinic, Professor Bradbury's seeing Ms Tuffin for the first time, it's a very complicated case, and I fully understand why he found it very difficult to untangle."*

Dr Simpson went on to give a clear, comprehensive and compelling reason why her opinion on a diagnosis of CRPS was the correct one:

> *"Q. Yes. Your opinion is that it's connected to the spinal surgery, but in terms of the spinal surgery, the spinal surgeon who conducted the surgery reported that the patient's spinal pain had resolved after fifteen years, and her recovery was very good indeed --*
>
> *A. Yeah.*
>
> *Q. -- so the spinal pain.*
>
> *A. Yeah.*
>
> *Q. So, why would she develop CRPS as a result of that?*
>
> *A. That's -- that's the key to it all, in my view. I worked in a regional pain clinic, but we have a spinal unit as well, so 50 percent of my work was spinal. So -- and I also used to anaesthetise for spinal surgery. There are various reasons after spinal surgery why a patient can get worsening of their existing limb pain or new limb pain. The back pain's kind of not relevant, it's the leg pain that's the focus here. So if, unfortunately, during surgery the surgeon damages a lumbar nerve root, that is obvious in the recovery*

> *room: you know straight away that something horrendous has happened. If, however, the neurological injury is more subtle, then a nervous system can take some time to make changes that occur, that cause pain such as CRPS. So the evolution to CRPS after spinal surgery, unless there's been a direct nerve injury, could happen over weeks or months, and the postulated mechanisms include, possibly, irritation of the sympathetic chain, which is anterior to the lumbar vertebra. So, patients who get a CRPS picture after spinal surgery, there is often but not always a delay. It's not a wake up with a nerve injury, it's a happening a week (?). So, the surgery in this case, for her back problem, was initially helpful. And then the leg pain, as I've seen happen, evolved over time. So, the history's much more in keeping with a neuropathic pain following a spinal surgery."*

115. Dr Simpson said that she had treated patients with CRPS in a leg after spinal surgery, having seen three or four cases where the CRPS was always in one leg adding, again *"…we don't see people with CRPS after a clot…people who get clots in their…veins (I've seen dozens of them, they're all in vascular clinics) – they don't get CRPS, otherwise my clinics would be full of people with CRPS from vascular complications".*

116. In answer to a question from me as to the interplay between post thrombotic syndrome and CRPS she said, focussing on the facts of this case:

> *"A. I think the interplay between the two is: this lady had pre-existing chronic pain conditions already, evidence of nerve irritation in that left leg; she had a spinal cord stimulator put in in the past for that, to manage the pain before she ever came to have the surgery that we're speaking about. So, she had a pre-existing history of lumbar nerve irritation going back many, many years. She had a spinal cord stimulator in situ. She then had spinal surgery. She developed symptoms that -- and signs that were perfectly in keeping with CRPS. The later pictures show the evolution of that, thus confirming that's what it always was. Added into that, she has the DVT. My view is: that will have caused swelling and a heavy feeling in her leg that will have contributed to the symptomatology. But, even if you had taken all that away and she'd never had a clot, the 10/10 allodynia, the ulceration on her legs and that neurological CRPS-induced inversion of the foot would have meant that she'd have the leg off anyway, even without -- the clot was just an additional burden the poor woman had to endure, but I think it didn't alter the trajectory or end point of her CRPS."*

117. Her final answer in cross-examination was this:

> *"The world literature on CRPS doesn't contain anything about clots. And, you know, I've been doing this for 43 years, I would have thought I might have seen one."*

118. The pain experts were also asked their views on the claimant's alternative case that if the DVT was not the cause of the decision to seek amputation then at the very least it made a material contribution. They recorded their differences as follows in response to question 14:

> *"Dr Towlerton considers on the balance of probabilities it more likely that the postoperative surgical complications, DVT, swelling and ongoing induration of the limb has contributed to the claimant's persistent pain changes and choosing to pursue an amputation. Whether this was solely a post-thrombotic syndrome, or a combination of complex regional pain syndrome and vascular changes and post-thrombotic syndrome would be largely unknowable and possible that it is both or either and therefore considers the DVT was wholly attributable or more likely made an indivisible contribution to the claimant's symptoms prior to amputation.*
>
> *Dr Simpson takes the view that matters of material contribution and indivisibility are for the Court to determine."*

119. I find the analysis of Dr Simpson, based on her very considerable experience, persuasive, focussing as it does on the symptoms and signs which led the claimant to decide to undergo amputation. Dr Simpson was able, in my judgment, to disentangle the symptoms and their causes.

The claimant's submissions

120. The claimant submits that the need for amputation was entirely due to the development of the DVT and post-thrombotic syndrome, which had themselves been caused by the admitted negligence of the defendant in not administering Clexane as directed by the post operative plan within 24 hours of the operation on 7 July 2015. It is said that if the post thrombotic syndrome was the reason why the claimant was in so much pain that she requested amputation *"then causation is straightforward"*.

121. Alternatively, the claimant submits that if it is found that the claimant developed CRPS then the court should conclude that, on the balance of probabilities, this resulted from the untreated DVT and post thrombotic syndrome. In support of her submissions the claimant relies on Bailey v Ministry of Defence as explained by the Privy Council in Williams v Bermuda Hospitals Board (NHS Litigation Authority intervening) [2016] UKPC 4. She also relies on Simmons v British Steel Plc [2004] UKHL 20.

122. The defendant submits that from late 2015 the claimant had symptoms which met the Budapest Criteria and were inconsistent with symptoms caused by a DVT or post thrombotic syndrome and that from 24 September 2015 no other diagnosis could better

explain the claimants signs or symptoms than a diagnosis of CRPS. It was further submitted that while the claimant suffered a DVT (a) there is no good scientific evidence that DVT causes CRPS; (b) but there is good evidence that spinal surgery causes CRPS; and (c) in the circumstances it is likely that the spinal surgery and not the DVT or post thrombotic syndrome were the causes of the CRPS; and (d) it was the symptoms attributable to the CRPS, and not the DVT, which led the claimant to seek amputation in 2018, those symptoms being (i) the allodynic pain, (ii) the dystonic position of the claimant's left leg and ankle, (iii) the fixed flexion contracture of the claimant's left knee, and (iv) the ulceration on the claimant's toes.

The cause of amputation

123. In considering the question of whether the claimant has proved on the balance of probabilities whether, but for the negligence of the defendant, she would not have suffered amputation of her left leg it seems to me helpful to consider the totality of the evidence, factual (in which category I place the contemporaneous notes and reports) and expert beginning with the causes of amputation.

124. There seems to be little doubt that the failure to administer Clexane led to the claimant suffering a DVT which was diagnosed when she returned to the Hospital on 17 July 2015 but that is only the start of the chain of events which the claimant says led to amputation. The factors which led to amputation, on the claimant's case by the close of the evidence were, I find, severe allodynia, continuous or repeated open wounds and ulcers on the leg and toes and the fixed position of her leg.

125. It is submitted by Ms Gumbel KC that if it is found that these symptoms are typical of CRPS and I conclude that the claimant was suffering from CRPS then it is more likely than not to be connected to the DVT and post thrombotic syndrome rather than the spinal surgery, which was, in itself, successful. Her case is that the development of CRPS is likely to be connected to the DVT because:

    i) The spinal surgery was successful and is therefore unlikely to be the cause of CRPS;

    ii) It is inherently unlikely that the CRPS is totally unconnected to the problems with the claimant's left leg;

    iii) The DVT was an obvious trauma to the claimant's left leg where the claimant suffered all the symptoms which led to amputation;

    iv) The symptoms suffered by the claimant in her left leg continued until she underwent stenting in 2017, which produced a measure of relief; and

    v) When Professor Imray diagnosed CRPS he was acting under a misapprehension on two occasions that the DVT had cleared up, and he was not in any event a pain specialist.

126. I am wary of the risk of concluding that the occurrence of the DVT and CRPS must be more than coincidental and that they are therefore connected and led to the decision to amputate. My approach is to examine the evidence as to the reasons which have been expressed by the claimant and her treating doctors for the decision to undergo

amputation and ask whether the evidence shows that such symptoms were caused, in the but for sense, or materially causally contributed to, by the negligence act of the defendant which led to the DVT.

127. It was only from the end of August 2015 that the claimant's testimony and the contemporaneous records show that the claimant developed symptoms which it is said by the defendant lead to the conclusion that she was by then suffering from CRPS. I agree and find as a fact that the from this point on the claimant had the signs and symptoms of severe allodynia, she developed ulceration of her left leg, over her shin and on her toes, and began to be affected by abnormal posturing of her knee and ankle. Those symptoms and signs developed and became apparent over time but were thereafter present until amputation.

128. It is also to be noted that the stenting in November 2017 brought limited or short term relief and did not solve the underlying problem. However, it did bring some relief and there is no doubt that prior to the stenting, and indeed it was the reason for it, the claimant was suffering from a DVT and post thrombotic syndrome. Thus it is difficult to accept that the post-thrombotic syndrome was "mild to moderate in severity" as I am invited to find given that it had lasted for more than 2 years. However, that does not, as I find, explain the symptoms which were the express basis for amputation.

129. Those symptoms were allodynia, ulceration and the fixed position of the claimant's leg.

Allodynia

130. The vascular experts' consensus, as I view it, is that severe allodynia is not consistent with DVT or post-thrombotic syndrome. Mr Jenkins accepted that proposition at two points in his cross-examination [see paragraphs 83 and 84 above]. Professor Stansby said that it would be "*very unexpected"* of a DVT or post-thrombotic syndrome.

131. The claimant gave graphic evidence, in paragraphs 42 and 43 of her witness statement [paragraph 32 above], of the severe pain which she suffered from the end of August 2015 in her left leg which meant that a splash of water on it *"would be enough to make me vomit"*. That evidence, which I accept, was consistent with the findings of Professor Imray recorded in his note dated 24 September 2015 of "*exquisite pain"* and *"severe allodynia".* The exquisite pain, which I take as a lay description of the allodynia, never went away. It is recorded in the notes of the claimant's GP dated 26 February 2018 "*Highly painful on light touch*" and the claimant accepted in evidence [paragraph 70 above] that it was still there at the point of amputation.

132. In the light of expert's consensus I find, on the balance of the probabilities, that this particular cause of amputation, allodynia, was not caused by the DVT or post thrombotic syndrome.

Ulceration of the left leg

133. The first signs of ulceration were recorded in September 2015 [paragraph 39 above] but there is no evidence of their further development until February 2017, when they were recorded at University College Hospital [paragraph 52 above]. However, by February of the following year the ulcers, which appeared on the toes of the claimant's left leg, had become a matter of considerable concern to the claimant, with throbbing pain and

open wounds [see paragraph 59 above]. The contemporaneous photographs show the worsening state of the ulcers.

134. The consensus of the vascular surgeons' opinions was that the ulcers were not consistent with a DVT or post thrombotic syndrome, although they expressed their views slightly differently. Mr Jenkins accepted that the ulcers were not consistent with post thrombotic syndrome and were not features of venous ulceration and that the lesion on her left shin would have expected to have been lower if the cause was a venous ulcer [paragraph 86 above]. Professor Stansby said that the ulcers shown in the claimant's photographs were not consistent with post thrombotic syndrome.

135. I accept their consensus, which leads to the conclusion, on the balance of probabilities, that the ulceration was not caused by the DVT or post thrombotic syndrome and were not, therefore, attributable to the negligence of the defendant.

Position of the claimant's left knee and foot

136. On analysis the conclusions which I draw from the evidence of the experts was that the deformity, as it had become, was not consistent with post thrombotic syndrome but was consistent with CRPS.

137. Mr Jenkins had accepted that the twisted positioning of the claimant's foot reported in March 2017 by the claimant's GP was not consistent with a DVT or post thrombotic syndrome but was "consistent with being confined to a wheelchair". Professor Stansby said that the positioning of the leg was not consistent with what would be expected to have been caused by a DVT or post thrombotic syndrome. He was also of the view that it would have been *"highly unusual"* for a patient to need to use a wheelchair after a DVT of the sort suffered by the claimant. Thus it seems to me that the two vascular experts were agreed that the fixed position of the claimant's leg was not consistent with the DVT but they differed, to a degree, as to the reasons why she used a wheelchair.

138. The pain experts were both of the view, as they each explained in cross examination, that the fixed position of the claimant's leg was consistent with CRPS. Dr Towlerton said that such signs would be unlikely in a post-DVT or post thrombotic syndrome and while it was consistent with CRPS it might have been the result of the conflation of a number of conditions. Dr Simpson said that the position of the claimant's leg and foot shown in the contemporaneous photographs was a classic sign of CRPS and not consistent with post thrombotic syndrome.

139. The preponderance of the expert opinion, which I accept, is that the fixed position of the claimant's leg was not consistent with DVT or post thrombotic syndrome but was consistent with CRPS.

140. I have come to the conclusion, on the balance of probabilities, that the DVT and post thrombotic syndrome did not cause the claimant to suffer an inversion deformity, as it has been described, of her left leg, knee and foot.

CRPS

141. I return to consider the Budapest criteria, set out in paragraph 104 above. The only real issue between the pain experts as to whether the Budapest criteria are satisfied is as to

criterion D, namely whether *"No other diagnosis can better explain the signs and symptoms."* Starting with my conclusions above I find that neither the DVT suffered by the claimant nor the post thrombotic syndrome which occurred later can better explain the signs and symptoms which led to amputation. In those circumstances I find that the claimant was suffering from CRPS and that the symptoms which led to amputation were caused by CRPS.

142. I am fortified in that view by the contemporaneous records of the treating physicians who consistently diagnosed CRPS from a relatively early stage and who had the benefit of seeing the claimant prior to amputation.

143. I have heard expert evidence and submissions on the cause of the CRPS. I was also taken to various learned medical research papers and literature. It has been suggested that it was caused by the non-negligent elements of the spinal surgery. Both of the defendant's experts argued that the CRPS was caused by the spinal surgery. The literature supported the proposition that the occurrence of CRPS after spinal surgery is rare: 1 in 2000. I was taken to what has been described as the Wolter paper which suggests that it is an inflammation of the nerves which causes the transmission of pain messages. The author described the mechanism for the link between spinal surgery and CRPS as: *"a sympathetic reaction due to the instrumental mobilisation of the sympathetic trunk"* in the course of spinal surgery. Dr Simpson's evidence was that she had seen examples of CRPS developing in patients in the weeks and months after undergoing spinal surgery.

144. What is clear to me is that the CRPS was not caused by the DVT or post thrombotic syndrome. The medical literature and the experience of the experts did not support the conclusion that it was so caused. I have considered the comment of Professor Bradbury in his note dated 13 October 2016 where he says *"While CRPS after iliofemeral DVT complicated by PTS has been reported and I have seen a couple of cases where this appears to have occurred, it is extremely rare".* I am afraid that this somewhat anecdotal, non-specific comment was not something which could be properly evaluated at trial. In particular no details were given of the reported case(s) or the instances seen by Professor Bradbury such that they could be explored at trial. Unfortunately the Professor was not called to give evidence by either side before me. Moreover, his anecdotal experience was at odds with the experience of the experts who did give evidence which was explored in cross-examination. There was no satisfactory evidence of CRPS after DVT, nor of the alleged mechanism leading from one to the other.

145. Based on the expert evidence which I accept I have therefore come to the conclusion, on the balance of probabilities, and tempting though it is to reach the opposite conclusion on the grounds of coincidence, that the CRPS was caused by the spinal surgery rather than the DVT. There was no good medical evidence before me in either the literature or the experience of the experts to support anything other than an anecdotal connection, which is not a sound basis, for concluding that the CRPS was caused by the DVT.

146. I turn then to the question of material contribution.

<u>The test for material contribution</u>

147. Ms Gumbel KC submits, after conclusion of the evidence, that, on the balance of probabilities, she has proved that the original negligence led to the DVT which was a material contribution to the major injury suffered in amputation of the claimant's left leg.

148. Ms Gumbel KC relies on Bailey and Simmons v British Steel Plc [2004] UKHL 20 which she says are, by analogy, both relatively close to the facts and issues of the present case. She submits that they are examples of cases where the immediate (more minor) injuries caused by the negligence contributed to the sequence of events that led to the main injury as a result of which the defendants in those cases were held to be liable to the claimant/pursuer. In Bailey's case a lack of post-operative care contributed to the claimant's overall weakness in that it contributed to her inability to cope with aspirating her own vomit as a result of which she suffered a heart attack. I refer back to the passage cited in paragraph 15 above where Waller LJ identified the test to be applied when considering whether a factor made a material contribution to an injury for which compensation is sought.

149. In Simmons' case the pursuer's psoriasis and mental health were exacerbated as a result of the accident he suffered at work at the defendant's premises which led to him undergoing a much more serious personality change and depression. The issues and facts and are set out in paragraphs 3 to 5 of the speech of Lord Steyn:

> "3. The pursuer sustained injuries on 13 May 1996 in the course of his employment as a burner at Clyde Bridge Steel Works, Cambuslang. He tripped and fell from the burning table and struck his head on a metal stanchion. There was a severe impact, but fortunately the pursuer was wearing protective head gear. So his head injury was not as serious as it might have been. Nevertheless he sustained a severe blow to the head. He was dazed and shaking, and developed a swelling on the right side of his head. This was accompanied by headaches, disturbance to his eyesight and suppuration from his right ear. The Lord Ordinary (Lord Hardie) held, for various reasons which are no longer in issue, that the accident was caused by the fault of the defenders. He awarded the pursuer the sum of £3,000, with interest, as solatium for these physical injuries: 2002 SLT 711.
>
> 4. But the consequences of the accident were not confined to the physical injuries for which the Lord Ordinary awarded damages. After the accident the pursuer experienced an exacerbation of a pre-existing skin condition, and he developed a change in his personality which has resulted in a severe depressive illness. He has not returned to work since the accident. While there has been some improvement in his condition, it is likely to be several years before he is fit to do so. These further consequences have turned out to be much more serious than the immediate effects of the head injury. The Lord Ordinary found that the pursuer's pre-existing skin condition was exacerbated and that he was suffering from a depressive illness and a complete change in his personality. But he was not satisfied that the pursuer had proved

> on balance of probabilities that either of these consequences had been caused by the accident. [Ms Gumbel's emphasis]
>
> 5. The question whether the pursuer is entitled to damages for these consequences was the subject of the reclaiming motion in the Inner House and of the appeal from the Inner House to your Lordships. It raises issues of law about the tests to be applied in awards of damages which do not seem to have been fully explored in the courts below and were, unfortunately, touched on only briefly in their opinions."

150. Ms Gumbel KC relies on the two following passages in the speeches of Lord Steyn and Lord Rodger of Earlsferry in support of her submission that her client is entitled to succeed where the original relatively minor injury caused by the negligent acts of the defendants made a contribution to the sequence of events which led to the major injury even if one cannot apportion the contributing factors.

> "26. An analogy can be drawn between this case and *Wardlaw v Bonnington Castings Ltd* 1956 SC (HL) 26, where there were two sources of dust, one of which came from defective swing grinders and was due to the fault of the defenders. The pursuer's pneumoconiosis could not be wholly attributed to the material from one source or the other. Lord Reid said, at p 32:
>
> > "It appears to me that the source of his disease was the dust from both sources, and the real question is whether the dust from the swing grinders materially contributed to the disease. What is a material contribution must be a question of degree. A contribution which comes within the exception *de minimis non curat lex* is not material, but I think that any contribution which does not fall within that exception must be material. I do not see how there can be something too large to come within the *de minimis* principle but yet too small to be material."
>
> In this case there were several causes of the pursuer's anger. It was enough that one of them arose from the fault of the defenders. The pursuer did not need to prove that that cause would of itself have been enough to cause the anger which produced the exacerbation. [Ms Gumbel's emphasis] He was entitled to succeed if it made a material contribution to it: see also *McGhee v National Coal Board* 1973 SC (HL) 37, 53, per Lord Reid." per Lord Steyn.

And:

> "58. … His anger at the defenders that the accident had occurred at all, despite the warnings, also made a material contribution to the development of his condition. Before the House, Mr Smith sought to argue that the principle in *Wardlaw v Bonnington Castings Ltd* 1956 SC (HL) 26 did not apply in this situation, but

> he cited no authority for his proposition and, in my view it is unsound. The usual rule applies and, in the absence of any basis for identifying and apportioning the respective roles played by the various factors in the development of the pursuer's condition, the pursuer is entitled to recover damages for all of his injuries. [Ms Gumbel's emphasis]
>
> The other clue to the Lord Ordinary's approach lies in his indication, 2002 SLT at p 714C, that he had found difficulty in identifying the stresses that were "a *direct* result" of the accident. Similarly, at p 714F, he was not satisfied that the pursuer's mental condition was "*directly* attributable to the accident". For these reasons, it had not been established that the accident was "*sufficiently* causally connected to the accident" to justify an award of damages: at p 714H. It may be that he thought that the exacerbation of the pursuer's skin condition and the onset of his depressive illness occurred too long after the accident for it to be the "direct" cause of these developments. By contrast, the Second Division, who held that the pursuer's skin condition worsened within days, considered that the evidence presented a coherent and cogent picture of a causal link "in the most *direct* sense" between the accident and the pursuer's present condition in both its dermatological and psychiatric aspects: 2003 SLT 62, 67D…" per Lord Rodger of Earlsferry.

151. Ms Gumbel KC also placed reliance on the analysis of Bailey v Ministry of Defence (cited above) by the Privy Council in Williams v Bermuda Hospitals Board (NHS Litigation Authority intervening) [2016] UKPC 4, which I have had regard to.

152. In Bailey the trial judge did not find that "but for" the negligence in treating the claimant the injury for which she brought the claim would not have occurred. He found, however, that the negligence made a material contribution to the injury suffered, in other words "a contribution which was more than negligible" as Waller LJ described it [para 36], which the Court of Appeal held to be sufficient to succeed on the question of causation. The passage shows, in my view, that before liability can be established the factor which is said to have made a material contribution must be shown to have added to the cause of the injury for which the claim is made.

153. Ms Gumbel KC argues that the DVT added to the complications which led to the decision to amputate and was a more than negligible factor in the thinking of the claimant in reaching that decision. However, the claimant's evidence, expert and lay, does not establish, on the balance of probabilities, that the DVT added to the cause of the injury, merely that it was present up to a certain point. I accept, as I have already held, the evidence of Dr Simpson as to the disentangling of the respective symptoms and signs of DVT and CRPS and the causes of the amputation, which were the symptoms and signs of CRPS rather than those of the DVT.

154. I return to the expert consensus – there is no expert opinion which supports the conclusion that the DVT or post thrombotic syndrome made a more than negligible (or indeed any) to the allodynia suffered by the claimant up to the point of amputation and was one of the reasons for the amputation itself.

155. Mr Barnes' submission in closing that "there is simply no good evidential basis for [the court] to conclude that the negligence made a material contribution to the allodynia [and] ulceration." I am afraid that I accept that submission.

Conclusion

156. For the reasons which I have set out above, having regard to the terms of Master Cooke's order, I find that the defendant is liable to the claimant for the DVT and post thrombotic syndrome but not for the CRPS and not for her left above knee amputation.