Neutral Citation Number: [2018] EWHC 3283 (Fam)

Case Number has been redacted

IN THE HIGH COURT OF JUSTICE
FAMILY DIVISION

Royal Courts of Justice
Strand, London, WC2A 2LL

Date: 30/11/2018

Before:

MR JUSTICE NEWTON

- -

Between:

A County Council	**Applicant**
- and -	
A Mother	**1st Respondent**
A Father	**2nd Respondent**
Maternal grandparents	**3rd & 4th Respondents**
A & B by their Guardian	**5th and 6th Respondents**

Mark Twomey QC and Richard Harris (instructed by **Chief Legal Officer, A County Council**) for the **Applicant**
Anna McKenna QC and Sally Bradley (instructed by **Miles and Partners**) for the **1st Respondent**
Tina Cook QC and Katie Phillips (instructed by **Wilson Solicitors LLP**) for the **2nd Respondent**
Sylvester McIlwain (instructed by **GT Stewart Solicitors & Advocates**) for the **3rd and 4th Respondents**
John Tughan QC and Julia Wright (instructed by **David Barney & Co**) for the **5th and 6th Respondents**

Hearing dates: 15-26 October 2018

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Approved Judgment

I direct that pursuant to CPR PD 39A para 6.1 no official shorthand note shall be taken of this Judgment and that copies of this version as handed down may be treated as authentic.

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MR JUSTICE NEWTON

This judgment was delivered in private. The judge has given leave for this version of the judgment to be published on condition that (irrespective of what is contained in the judgment) in any published version of the judgment the anonymity of the children and members of their family must be strictly preserved. All persons, including representatives of the media, must ensure that this condition is strictly complied with. Failure to do so will be a contempt of court.

Mr Justice Newton:

1. On the evening of 17th July 2017, a six week old baby girl, A,was taken to the Hospital by her parents with a hot and swollen right leg. On X-Ray a spiral femoral fracture was discovered. Whilst no explanation for the injury could be given at the time by the parents, the mother subsequently said that A had been jumped on by her older two year old brother. Understandably, the hospital staff were concerned that they may be dealing with a case of inflicted injury and alerted children's services.

2. The hospital wished to carry out a full examination of A, including a full skeletal survey. The parents refused, not finally acquiescing until the following afternoon. The skeletal survey carried out the next day by Dr M (19th July), confirmed the right femoral fractures, but also discovered fractures to the left sixth to ninth ribs, an irregular proximal right humeral and tibial metaphysis (suggesting fracture) and an unusual appearance on the right scapula. A' s bone density appeared normal. A remained in hospital and her brother B was placed under police protection and thence into foster care. The parents were arrested, and later interviewed making "no comment."

3. On 20th July 2017, a CT Scan revealed a skull fracture (possibly two) and a bleed in the brain. Ophthalmology and blood tests revealed no abnormality. Interim care orders were granted on 21st July 2017.

4. A second clinical report from Dr Landes, Paediatric Radiology Consultant at the Alder Hey Hospital, was obtained on 28th July 2017, she found:

   i) A fracture of the right femur less than 14 days of age at the time of the x-ray dated 17th July 2017.

   ii) A fracture of the posterior aspect of the left sixth rib between 2 and 4 weeks of age at the time of the skeletal survey dated 19th July 2017.

   iii) A fracture of the posterior aspect of the left ninth rib between 3 and 6 weeks of age at the time of the skeletal survey dated 19th July 2017.

   iv) A fracture of the tip of the left acromion process between 2 and 4 weeks of age at the time of the skeletal survey date 19th July 2017.

   v) A fracture of the right acromion process between 2 and 4 weeks of age at the time of the skeletal survey dated 19th July 2017.

   vi) A fracture of the proximal metaphysis of the right tibia less than 2 weeks of age at the time of the skeletal survey dated 19th July 2017.

   vii) A fracture of the distal metaphysis of the right tibia less than 2 weeks of age at the time of the skeletal survey dated 19th July 2017.

   viii) A skull fracture which she could not date.

   ix) The presence of a high attenuation haemorrhage on the CT scan in keeping with an event occurring within 2 weeks of the scan dated 20th July 2017.

5. Based on the imaging appearances, she concluded:

   i) that the fractures had occurred as a result of at least 2 separate events, and

   ii) In a non-mobile infant of this age these fractures could not have occurred as a result of an unwitnessed event. In the absence of a clear and satisfactory account of the mechanism of a trauma or of a medical explanation for the fractures, the most likely explanation for the numerous fractures of different ages, including metaphyseal fractures and rib fractures, was inflicted injury.

6. Those events occurred 16 months ago. On 8th August 2017 both children went to live, and remain with their maternal grandparents under child arrangements and supervisions orders. Under those agreed arrangements the parents have spent ever increasing daily periods with the children, but obviously supervised. The grandparents who put their entire lives on hold, have provided quite exceptional care for their grandchildren.

7. The case was heard over two weeks in the Family Court in February 2018. Judgment (exonerating the parents) was handed down on 4th May 2018. The Local Authority and Guardian sought to appeal to the Court of Appeal, permission being granted by Jackson LJ on 11th May 2018. Necessarily, the protective arrangements for the children had to continue until the hearing of full hearing on 10th July 2018. The appeal was allowed by the full court (2018 EWCA Civ 1810), and a re-hearing ordered.

8. Time being of the essence and no other suitable judge being available, by removing other cases I have been able to hear the case over 6 days from 15th October (with a number of days in August in particular to deal with interim placement, which had become contentious).

9. Some of the complex issues in this case are close to the edge of medical knowledge and experience. The Court has had the benefit of some of the best experts in their fields, the case has been described by at least one as 'challenging'. There are over 16 bundles of documents and a number of other materials. Whilst it is not unusual for the Court to thank Counsel for their assistance in a case, I especially wish to record the impressive professional conduct of those representing the parties. For many reasons, not least its litigation history, this is a difficult case, raising complicated issues of conflicting evidence, it is a good example of the absolute necessity for really experienced specialist advocates and solicitors at the highest level.

10. The case for understandable reasons has become highly charged, yet not a single superfluous question was asked by any advocate; illustrated so plainly by the fact that the evidence in this second hearing was completed in just 6 days.

The Law

11. In determining the issues at this fact finding hearing I apply the following well established legal principles. These are helpfully summarised by Baker J (as he then was) in *A Local Authority v M and F and L and M* [2013] EWHC 1569 (Fam).

   i) The burden of proof lies with the Local Authority. It is the Local Authority which brings the proceedings and identifies the findings that they invite the Court to make. The burden of proving the assertions rests with them. I bear in

mind at all times that the burden is fairly and squarely placed on the Local Authority, and not on either parent. Recent case law (such as *Re B* 2013 UKSC and *Re BS* 2013 EWCA 1146) reinforces the importance of proper findings based on proper facts; the principles are the same for whatever the proposed outcome. Here there is, as in many cases, a risk of a shift in the burden to the parents to explain occasions when injuries might have occurred. Whilst that can be an important component for the medical experts, it is not for the parents to explain but for the local authority to establish. There is no pseudo burden as Mostyn J put in *Lancashire VR* 2013 EWHC 3064 (fam). As HJ Bellamy said in *Re FM (A Clinical Fractures: Bone Density):* [2015] EWFC B26.

> "Where… there is a degree of medical uncertainty and credible evidence of a possible, alternative explanation to that contended for by the local authority, the question for the Court is not "has that alternative explanation been proved" but rather… "in the light of that possible alternative explanation can the Court be satisfied that the local authority has proved its case on the simple balance of probability."

ii) The standard of proof of course is the balance of probabilities (*Re B* [2008] UKHL 35). If the Local Authority proves on the balance of probabilities that baby A was killed by the mother or sustained inflicted injuries at her hands the Court treats that facts as established and all future decision concerning the future welfare of B, based on that finding. Equally if the Local Authority fails to prove those facts the Courts disregards the allegations completely.

> "the "likelihood of harm" in s31(2) of the Children Act 1989 is a prediction from existing facts or from a multitude of facts about what happened… about the characters and personalities of the people involved and things which they have said and done [Baroness Hale]"

iii) Findings of fact must be based on evidence as Munby LJ (as he was then) observed in *Re A (A child) Fact Finding Hearing: (Speculation)* [2011] EWCA Civ 12:

> "It's elementary proposition that findings of fact must be based on evidence including interferences that can properly be drawn from the evidence, not on suspicion or speculation."

That principle was further emphasised in *Darlington Borough Council v MF, GM, GF and A* [2015] EWFC 11.

iv) When considering cases of suspected child abuse the Court must inevitably survey a wide canvass and take into account all the evidence and furthermore consider each piece of evidence in the context of all the other evidence. As Dame Elizabeth Butler-Sloss P observed in *Re T* [2004] EWCA Civ 558 [2004] 2 FLR838.

> "Evidence cannot be evaluated and assessed in separate compartments. A judge in these difficult cases must have regard

> to the relevance of each piece of evidence to other evidence, and to exercise an overview of the totality of the evidence in order to come to the conclusion whether the case put forward by the Local Authority has been made out to the appropriate standard of proof."

v) The evidence received in this case includes medical evidence from a variety of specialists. I pay appropriate attention to the opinion of the medical experts, which need to be considered in the context of all other evidence. The roles of the Court and the experts are of course entirely distinct. Only the Court is in a position to weigh up the evidence against all the other evidence (see *A County Council v K, D and L* [2005] EWHC 1444, [2005] 1 FLR 851 and *A County Council v M, F and XYZ* [2005] EWHC 31, [2005] 2 FLR 129). There may well be instances if the medical opinion is that there is nothing diagnostic of a non-accidental injury but where a judge, having considered all the evidence, reaches the conclusion that is at variance from that reached by the medical experts, that is on the balance of probability, there has been non-accidental injury or human agency established.

vi) In assessing the expert evidence, and of relevance here, I have been careful to ensure that the experts keep within the bounds of their own expertise and defer where appropriate to the expertise of others (*Re S* [2009] EWHC 2115 FAV), [2010] 1 FLR 1560). I also ensure that the focus of the Court is in fact to concentrate on the facts that are necessary for the determination of the issues. In particular, again of relevance here, not to be side tracked by collateral issues, even if they have some relevance and bearing on the consideration which I have to weigh.

vii) I have particularly in mind the words of Dame Butler-Sloss P in *Re U: Re B* [2004] EWCA Civ 567, [2005] Fam 134, derived from *R v Cannings* [2004] EWCA 1 Crim, [2004] 1 WLR 2607:

a) The cause of an injury or episode that cannot be explained scientifically remains equivocal.

b) Particular caution is necessary where medical experts disagree.

c) The Court must always guard against the over-dogmatic expert, (or) the expert whose reputation is at stake.

viii) The evidence of the parents as with any other person connected to the child or children is of the utmost importance. It is essential that the Court form a clear assessment of their reliability and credibility (*Re B* [2002] EWHC 20). In addition, the parents in particular must have the fullest opportunity to take part in the hearing and the Court is likely to place considerable weight of the evidence and impression it forms of them (*Re W* and another [2003] FCR 346).

ix) It is not uncommon for witnesses in such enquiries, particularly concerning child abuse, to tell untruths and lies in the course of the investigations and indeed in the hearing. The Court bears in mind that individuals may lie for many reasons such as shame, panic, fear and distress, potential criminal proceedings, or some

> other less than creditable conduct (all of which may arise in a particular highly charged case such as this) and the fact that a witness has lied about anything does not mean that he has lied about everything. Nor, as *R v Lucas* [1981] 3 WLR 120 makes clear does it mean that the other evidence is unreliable, nor does it mean that the lies are to be equated necessarily with "guilt". If lies are established I do not apply *Lucas* in a mechanical way but stand back and weigh their actions and evidence in the round. I bear in mind too the passage from the judgment of Jackson J (as he then was) in *Lancashire County Council v C, M and F* (2014) EWFC3 referring to "story creep".

x) Very importantly, in this case in particular, and observed by Dame Butler-Sloss P in *Re U, Re B (supra)*

> "The judge in care proceedings must never forget that today's medical certainty may be discarded by the next generations of experts, or that scientific research will throw a light into corners that are at present dark"

That principle was brought into sharp relief in the case of *R v Cannings (supra).* As Judge LJ (as he was then) observed

> "What may be unexplained today may be perfectly well understood tomorrow. Until then, any tendency to dogmatise should be met with an answering challenge."

As Moses LJ said in *R v Henderson Butler and Oyediran* [2010] EWCA Crim 126 [2010] 1 FLR 547:

> "Where the prosecution is able by advancing an array of experts to identify non-accidental injury and the defence can identify no alternative course, it is tempting to conclude that the prosecution have proved its case. Such temptation must be resisted. In this as in many fields of medicine the evidence may be in sufficient to exclude beyond reasonable doubt an unknown cause. As Cannings teaches, even where, on examination of all the evidence, every possible known cause has been excluded, the cause may still remain unknown."

12. Strongly submitted, and I bear in mind, is the need to avoid speculation or jumping to a particular conclusion from an unknown cause: *E v Harris* 2005 EWCA Crim 1980 (in relation to the triad of head injuries); *Re R, Cannings and R v Henderson* all demonstrate situations where injuries singly or taken together could give rise to presumptive or misconceived findings, especially where there may be (as here), naturally occurring conditions that may have caused or contributed to, a particular medical finding.

13. I have in mind also what Hedley J said in *Re R* [2011] EWHC 1715 (Fam), [2011] 2 FLR 1384:

> "A temptation described is ever present in Family Proceedings and in my judgment, should be as firmly resisted as the Courts are required to resist it in the Criminal Law. In other words, there

> has to be factored into every case which concerns a discrete aetiology giving rise to significant harm, a consideration as to whether the cause is unknown. That affects neither the burden nor the standard of proof. It is simply a factor to be taken into account in deciding whether the causation advanced by the one shouldering the burden of proof is established on the balance of probabilities… a conclusion of unknown aetiology in respect of an infant represents neither a professional or forensic failure.it simply recognises that we still have much to learn and…it is dangerous and wrong to infer non-accidental injury merely from the absence of any other understood mechanism"

14. Finally, when seeking to identify a perpetrator of a non- accidental injury the test as to whether a particular person is in the pool of possible perpetrators is whether there is a likelihood or real possibility that he or she was the perpetrator (see *North Yorkshire County Council v SAV* [2003] 2 FLR 849). In order to make a finding that a particular person was the perpetrator of non-accidental injury the Court must be satisfied on the balance of probabilities. It is always desirable, where possible, for the perpetrator of non-accidental injury to be identified both in the public interest and in the interests of the child although where it is impossible for a judge to find on the balance of probabilities that for example parent X rather than parent Y caused injury, then neither of them can be excluded from the pool and the judge should not strain to do so (*Re D* [2009] 2 FLR 668 and *Re SB* (children) [2010] 1FLR 1161).

The Background

15. The parents met in 2009 and began living together in 2011, subsequently marrying in June 2013. Both parents have the great advantage of extensive, close and loving parents and families, and a wide range of supportive friends. Both had loving, stable childhoods. The parents are intelligent and articulate. They are both respectable people. They describe themselves as family orientated. Both children were planned, their son B was born 19th August 2015 and their daughter A,on 3rd June 2017. There is a great deal of evidence of the parents' loving and attentive care of both children.

16. Apart from the circumstances which led to these proceedings, the only significant contentious event occurred in October 2015 when B (then a couple of months old) was taken to the Hospital with an injury to his nose and cheek. The explanation for the injuries was accepted by the hospital and he was discharged home. On subsequent review by the hospital (as happens in all cases), it was evident that the protective protocol of the hospital had not been followed and the family were asked to return, which they did. The meeting was not a productive one, the parents conduct was remarkable, they refused to agree to any further tests and in particular a full body scan. They returned home. The mother's behaviour at the hospital in particular was really quite extreme, conducting herself in a most unusual, even bizarre fashion. That event, and the responses of the parents are relied upon by the authority now, contending that having successfully avoided further enquiry in 2015, the parents' avoidant, hostile and obstructive conduct in July 2017 was designed to achieve the same end. The parents countering that their (largely admitted) conduct was due entirely to the closed attitudes, minds and approaches of the hospital safeguarding teams.

The Expert Evidence

17. Dr Offiah, Reader in Paediatric Musculoskeletal Injury and Consultant Paediatric Radiologist at Sheffield Children's Hospital, the UK's centre for the treatment and management of bone disease especially in children, was an important witness. Her findings were as follows:

The right femur

i) A displaced oblique fracture of the femoral shaft of the right femur with associated soft tissue swelling with no evidence of a healing reaction apparent on x-ray on 17.7.17.

ii) By 25.7.17 the soft tissue swelling had resolved and the fracture was surrounded by a significant amount of callous.

iii) By 2.8.17 there was a marked callous (due to the displaced nature of the fracture) and the fracture line remains visible.

iv) Oblique shaft fractures imply a twisting force.

v) The fracture could have been caused on the 17.7.17, or in the preceding 10 days (i.e. since 7.7.17)

Rib fractures

There were healing posterior arc fractures to the left 6th to 9th ribs. By 2.8.17 there was progressive healing of the rib fractures, and an additional healing fracture of the left 10th rib, which had not been apparent earlier.

vi) These were caused by compressive forces in the front to back, or side- to-side, directions

vii) These are not consistent with the location usual in CPR, she notes that even with the force applied during CPR, only 1% of cases result in rib fractures.

viii) The left 6th rib was fractured between 2 and 4 weeks prior to 19.7.17 between 21.6.2017 and 5.7.17

ix) The left 9th rib fracture occurred between 4 and 6 weeks before 19.7.17 i.e. between 5.6.17 and 21.6.17.

x) The left 10th rib fracture occurred between 2 and 4 weeks before 2.8.17, i.e. between 5.7.17 and 17.7.17.

Skull fracture

xi) On 19.7.17, there was an apparent right parietal skull fracture associated with (subtle) mild scalp swelling, with the fracture line extending to the sagittal suture.

xii) The skull fracture was no more than 14 days old on that survey so that it occurred between 5th and 17th July. It did not date back to birth, and was caused by an impact by an external force.

Metaphyseal fractures

xiii) These were apparent on 19.7.17, the metaphyseal fractures were identified to:

a) The right proximal humerus;

b) The right proximal tibia (right knee); and

c) The right distal tibia (right ankle)

xiv) There was progressive healing apparent on all of these fractures by 2.8.17

xv) Metaphyseal fractures are caused by gripping, pulling and twisting forces

xvi) The metaphyseal fractures are all up 2 to 4 weeks old as at 19.7.17 occurring between 21.6.17 and 5.7.17.

Bilateral Acromial fracture

xvii) Right shoulder blade fractures involve the body of the acromion and the left fracture the tip of the acromion.

xviii) The left fracture was less advanced in healing by 2.8.17

xix) Acromial fractures are due to indirect forces generated by shaking or abnormal or traction forces, levering applied to the shoulder or upper limb.

xx) The left shoulder injury occurred less than 2 weeks prior to 19.7.17 and so between 5 and 17.7.17

xxi) The right shoulder injury occurred 2 and 4 weeks prior to 19.7.17 and so between 21.6.17 and 5.7.17

18. Dr Offiah concluded that on balance inflicted injury was the most likely mechanism to account for the fractures seen. In particular, self-evidently A was non-ambulant and no satisfactory mechanism by way of explanation had been provided; there were no abnormal test results or examination, and nothing in the relevant radiographic features suggested any cause other than inflicted injury. Outside the context of a reported accident or inflicted injury fractures may be seen in conditions associated with brittle bones (e.g. rickets or osteogenesis imperfecta), Menke's Kinky Hair syndrome, osteopathy (bone disease) prematurity or scurvy. It is also reported in children with cerebral palsy, with diminished mobility, and EDS. She expressly addressed the possibility of EDS. She said even if A had the relevant type of EDS (which she maintained should only be determined on a face to face assessment) the paper produced by Professor Holick was not persuasive because (a) the author refers to "temporary brittle bone disease" as if it were a recognised condition (and such a theory has been discredited) and (b) bone density is reduced in those patients with a predisposition to fracture. Whilst the images relating to A cannot exclude reduced bone density, the best

evidence would have been on-going fractures occurring in a safe environment. Importantly too, had A been so susceptible she would have sustained observable birth injuries, which were absent.

19. She concluded that A was the victim of at least 9 separate applications of excessive force on at least 3 occasions between 7th June and 17th July 2017.

20. In relation to EDS, in the experts' meeting, she said that the distribution and number of fractures is not seen even in children with EDS unless there is also evidence of reduced bone density apparent on x-rays, or evidence of Osteogenesis Imperfecta (OI). Metaphyseal fractures are rare and there was only one report of such a fracture being associated with OI. Even with severely reduced bone density in children, metaphyseal fractures are not encountered.

21. Having raised the paper by Professor Holick, and now seen his report (as well as discussion in the experts meeting) she expressed strong views about his opinion (describing it as an "opinion piece"). She was critical of its methodology and conclusions, it was not primary research, there was no proper protocol, no proper comparative cohort, no proper analysis, it was an observational study. Her restrained but clearly articulated views were ones echoed by the other experts in this case and more widely. Professor Holick is a controversial figure, his views are very far from mainstream.

22. On further examination she expanded upon Professor Holick's hypothesis of "temporary brittle bone disorder" which is not a recognised phenomenon (indeed its main proponent, Dr Paterson, has been struck off). One of the main difficulties is that all the main case studies concerning reduced bone density are in adults. There are no studies of children, for whom very different considerations may apply. Of the 6 studies relied on by Professor Holick in his paper, she observed that 5 examples had abnormal biochemistry or bone disorder. In the sixth example (who had simple EDS), Professor Holick had omitted to mention that the father had pleaded guilty to charges of assault. Dr Offiah was clear that the journal should be told, it was, she said, unethical to leave the information uncorrected. In fact, Professor Holick was the deputy editor of the journal, which was, he told the Court later, in any event no longer in production. Whilst children can sustain fractures even in utero, or during the birth process, and obviously post birth, Dr Offiah gave clear reasons as to why she did not consider that any of the fractures sustained by A were caused by the birth process, or before. She held firm to her advices that if the fractures sustained by A had occurred during normal handling, it was unlikely that the process of birth (especially as it was being maintained that the birth was not straightforward) would have resulted in no fractures.

23. In relation to each injury she concluded that the mechanism would have been memorable, in particular the injury to the femur and the skull. That would be irrespective of any question into the area of bone density, and/or the risk of easy fracture whether through circumstance, genetics or hEDS, or their combination. In her earlier evidence (in February) Dr Offiah had said, in line with current teaching, that reduced bone density was not apparent unless 30% or more, but was prepared to agree up to 40% (Dr Saggar, who is not an expert radiologist had contemplated up to 50%).

24. The real issue is that there is no study of the correlation between reduced bone density, bone fragility and fractured bones in children, partly because in children under 5 years

there is no reliable method of testing, so whilst it is not seen, it cannot necessarily be said that it is not there. Dr Offiah drew parallels with OI. There is also a dearth of research on the impact of children with EDS.

25. In relation to vitamin D insufficiency (a key component of Professor Holick's experience), she described it as almost an epidemic, but did not conclude that it was relevant to A (by extrapolation from her own result taken at 6 weeks, and considering (as irrelevant) the mother's result taken much more recently).

26. Having stood back, Dr Offiah was a powerful witness. I did not consider that her evidence was dogmatic or didactic, in fact quite the reverse, she was firm in relation to some of the contentions put to her, but it was very apparent that she was keen to restrict her considerations to what was (or was not) known medically, and not be side-tracked by hypotheses which had no real basis. Her evidence in relation to hEDS was especially pertinent in this regard. She acknowledged that whilst genetically, A had a 50% chance of having hEDS, she also had a 50% chance of <u>not</u> having hEDS. I thought she brought together rather well in a rational, coherent and balanced way the different considerations. It is not without note that her final opinions mirrored the other domestic experts from other disciplines.

<u>Dr Ng</u>, Consultant Paediatric Endocrinologist advised as follows:

i) A' s earliest blood test results demonstrated normal calcium levels, normal parathyroid hormone, and normal vitamin D levels. Her x-rays in July at 6 weeks of age did not show evidence of osteopenia. No phosphate or alkaline phosphatase levels were available (such tests significantly increase the sensitivity of the screening and identification of infants at risk of metabolic bone disease).

ii) A demonstrated no evidence of Vitamin D deficiency, or abnormal levels of calcium or parathyroid hormone levels or evidence of radiological rickets.

iii) The mother's antenatal history (and/or gestational diabetes), or constitutional issues were not relevant to A' s injuries, nor is A' s birth weight (2 – 59kgs).

iv) Osteogenesis Imperfecta was highly unlikely in this case.

v) Rib and femoral fractures are extremely painful and the vast majority of children would cry. Metaphyseal fractures are consistent with excessive pulling and twisting, or from shaking. No proper explanation has been provided by the carers.

vi) The history given of B jumping on to A cannot account for her injuries. The injuries are not due to any underlying bone fragility, or genetic cause, and are likely to have been inflicted.

27. Commenting on the genetic report of Dr Saggar, Dr Ng noted that:

i) The chromosome deletion noted does not mean that A has either Prader Willi or Angelman's syndrome;

ii) Neither syndrome is associated with bone fragility or fractures in infancy;

iii) There is a distinction to be made between genetically detected and hypermobility EDS;

iv) Hypermobility can be hard to determine in a child under 5 given their flexibility generally at that age;

v) Hypermobility EDS is not generally associated with bone fragility or fractures in infancy.

28. Further, Dr Ng advised that A does not have OI or neonatal rickets and significantly did not suffer fractures a birth.

29. In her addendum, Dr Ng advised in the light of "M's diagnosis of hypermobility EDS", she wished to make no significant amendments to the opinion offered to the court. Her opinions also remained the same having considered (and sent a further short report to the court after her evidence) the two papers by Harrast and Kalkwarf and a second by Namgurg and Tsang, discovered by counsel on the internet during the course of questioning. She said the significance of A' s genetic micro deletion (or its interplay with hEDS) was not well understood.

30. In oral evidence she was particularly pressed on the issue of pain upon fracture and its subsequent manifestations. Dr Ng's mainstream views were not altered by the paper by Farrell, Rubin, Downes and Christian Study (published in 2011 in the official journal of the American Academy of Paediatrics) which I shall comment on later, but which found that 9% of children did not cry at the time of the injury, and a significant number did not exhibit signs or symptoms after the crying. Dr Ng could not explain why some children (including potentially A) exhibited no distress. She entirely disagreed with Professor Holick's extrapolations that A was Vitamin D deficient at birth. She, like Dr Offiah, was polite but critical of Professor Holick's work overall, she also described it as an "opinion piece", not drawing on real evidence. She thought it highly unlikely that A suffered (or had suffered) from bone fragility. She was asked about A' s interrupted or stalled intrauterine growth. She was unaware of any link between growth retardation (which is not uncommon) and bone mineralisation.

31. Like the last witness, Dr Ng was evidently a witness of conspicuous intelligence learning and experience, who rather than being overborn by the many issues raised, reflected on each individually, and then together. This became the more apparent as she was questioned further, and like the last witness was pressed quite hard. She nonetheless held to her opinion, that looking at everything overall, inflicted injury was the most likely diagnosis.

Dr Jayamohan – Consultant Paediatric Neurosurgeon at the Oxford Radcliffe Hospital records that A suffered:

i) A right parietal skull fracture – This was caused by force (trauma) in the absence of bone disease or other relevant problem (no such evidence being apparent). It was about 7-10 days old, as the swelling had subsided (rarely there can be no swelling, however) – the trauma might not have been serious enough to alert a caregiver. Birth trauma is unlikely to cause a linear skull fracture, with 5 out of 10,000 sustaining fracture, and none in spontaneous delivery births.

ii) A small superficial parenchymal bleed in the left posterior temporal region - there is fresh blood less than 10 days old which shows no signs of underlying vascular formation or other abnormality so that only trauma is likely to have caused this bleed. A collagen disorder might increase the risk of such bleeding from normal behaviour.

iii) Bilateral frontal cleft lesions – These are quite unusual. They are associated with trauma. They appear to be several days to three weeks old. These are difficult to explain save by way of an undisclosed trauma. The fresh blood suggests it is possible that all these occurred from one event 10 days prior to the CT scan [ie10.7.17]. Alternatively, there could be two incidents; one causing initial cystic change, the next a re-bleed. EDS could be relevant to these bleeds.

32. He concluded that EDS could explain the bleeding but not the fracture. Otherwise trauma must be the relevant issue. The most likely overarching explanation was shaking, or more than one impact injury, especially if the fresh bleeding in the clefts have originated from different events. He was exercised by A' s genetic condition. Following the experts' meeting, Dr Jayamohan advised that he would normally expect that if the brain injuries had occurred from postnatal trauma, that there would have been an episode of clear dysfunction or being unwell, which had not been reported. Such injuries to the brain are unusual, he had seen them after fairly major trauma to cause such shearing, very rarely are they bilateral. Overall, he thought that the brain injuries could be described as 'unexplained'.

33. He ultimately concluded that the fractures were 'likely to have involved a trauma, but may not have been serious enough to have alerted a caregiver'.

Dr Saggar – Consultant in Clinical Genetics is a senior lecturer in medicine, has the great advantage of years of general training and experience (35 years as a medical doctor) and subsequent experience in specialisation (28 years in clinical genetics). He confirmed A' s rare small microdeletion on chromosome 15q (a "de novo deletion"), which explained A' s reduced muscle tone, developmental delay and congenital heart defect; it may have significant consequences for A in the future. This chromosomal area is known to have a neuro developmental locus, and a link in regulating brain formation. That brain area generates responses to pain and also bone formation. EDS is also located in the same area. He advised:

i) Fragility in the bones and the vascular system cannot readily be explained by a single genetic mutation;

ii) In recessive forms of OI you would expect to see more dramatic changes in the x-rays to the skeleton. This is absent in A' s case;

iii) If this were a rare case of vascular anomalies with OI, one would not expect to see spontaneous haemorrhage;

iv) Importantly none of the genes affected by the gene deletion identified in A are known to cause vascular fragility or fractures;

v) It is probable that the mother has type 3 EDS and there may possibly be some EDS in the paternal side too, so that A has a 50% chance (at least) of inheriting

some aspects of EDS, but there was very little clinical evidence of EDS at the time of A' s examination;

vi) Type 3 or hypermobility EDS is not associated with fractures in the absence of vitamin D deficiency, or some other gene mutation mimicking EDS type 3;

vii) The number and distribution of the fractures are most unusual for hypermobility or type 3 EDS, and significantly in any event a memorable trauma would be needed to account for these, and although unlikely, reduced bone density as a predisposing factor could not be completely excluded;

viii) The deleted region would not, however, predispose A to cerebral bleeding;

ix) Subject to birth related trauma (as to which he deferred to others), he was clear that EDS hypermobility was an inadequate explanation for the number and distribution of the fractures;

x) Methylation testing was normal, so any connection with osteoporosis connected to PWS was irrelevant, he confirmed this in the experts' meeting.

xi) Ultimately, he concluded that whilst it was unclear if A had type 3 EDS, the real issue was whether it could really account for the number and extent of the fractures, in combination with cerebral bleeding (if not birth related) and whether there was evidence of force or injury to cause the bleeding or fractures, albeit a lesser force;

xii) Post-birth cerebral bleeds may be different in children with type 3 EDS;

xiii) On balance he reiterated that there is a 50% chance of A inheriting some aspects of EDS hypermobility from her mother, but in the experts' meeting and in evidence confirmed that he could detect no hypermobility in A,so could only say there is a 50% chance of inheritance which might become clear later in testing. He did not however find A to be especially hypermobile;

xiv) Even if A was to be found to have type 3 EDS, and even if a lesser force was applied to produce the fractures and the sub-durals, there would still need to be a memorable event for each.

34. In evidence there was much discussion on the impact, if any, of A having both the genetic deletion and hEDS. Dr Saggar considered that there was an increased risk (whether or not there is a gene within that deleted region that's outside the Prader – Willi imprinted area) that could be causing an influence in combination with anything that hEDS may also be causing, that combination being "uncommon".

35. In evidence he confirmed (as he had earlier) that A' s micro-deletion might have an effect on bone density and thus by extension on the risk of fractures, the impact being unknown. He "felt" that "something might be going on" in relation to microdeletion that had an influence on bone density, but that it was beyond current medical understanding. He ultimately concluded however that A' s deletion was unlikely to be related to bone mineral loss.

36. In discussion he accepted a risk of fragility to bones and had to assume some susceptibility for A to fracture. He agreed with the proposition that it was a big unknown. Microdeletion affects collagen, collagen is within the vascular system, so logically hEDS and the microdeletion might affect the vascular system (although in his third report he had however said that he could find no evidence that microdeletion would be involved with vascular fragility). His ultimate concluding position, as I have already recorded, was that there was no known evidence that this microdeletion is associated with vascular fragility. In evidence at the County Court he had said if there is no credible alternative for inflicted injury we have to assume some susceptibility in this child, the way OI children fracture for no reason during something normal and innocuous. With that hypothesis, no memorable event would likely be evident or capable of recollection. However, weighing everything together, he still concluded and maintained that abusive injury was the most likely reason for A' s fractures, not least because this microdeletion is generally well understood, and not relevant to fractures. Dr Saggar is a widely respected witness of considerable authoritative experience. He was prepared to entertain a number of possible contributory or causative factors individually and together, but nonetheless his conclusions were perfectly clear, and completely in line with the other expert advice to the court (save for Professor Holick), that abusive injury was the most likely cause of the fractured bones in A.

Professor Holick

37. Professor Holick is well aware that his opinions are thought by many to be controversial but that does not necessarily make them incorrect, but as he counters mainstream views, care and analysis are required in evaluating his advices. There could be no doubt that he holds a senior position, having over 40 years of experience, and having specialised and seen many thousands of patients who have or may have in particular vitamin D deficiency, or EDS. Professor Holick discovered "25 hydroxyvitamin", potentially placing him at the forefront of Vitamin D evaluation. His work could properly be described as pioneering.

38. He has not examined A,nor her parents. Nevertheless, on the strength of an email from the father, he responded in short terms –

"It is most likely that your daughter has EDS and this is the cause for what has occurred" – he later told me that he had seen hundreds of these cases, and it was reasonable to reach that conclusion. A had EDS to a high degree of certainty.

39. He subsequently produced a report, in unusual circumstances, that report was heavily amended at the parents' suggestion. For obvious reasons I have not delved too deeply into why nothing was said about that report, nor why it was not disclosed until very much later. There has been much discussion about the boundary of professional privilege, and what proper inferences can or should be drawn. It is however appropriate to say that at the very least what occurred was really most surprising. There has since been a change of solicitor for each parent. In due course when a Part 25 Application was made, the parties agreed with the approval of the Court, Professor Holick became a formally instructed Court expert. I confess, having now seen rather more of the email traffic, at least one of which appears to have been doctored, had the full picture been understood at the time (not just the procedural anarchy), I doubt very much whether the Court would, or indeed should, have sanctioned his instruction.

40. Professor Holick was clear that A had at least a 50% chance of having hEDS, in fact he put it higher, at 75%. He was unshakeable from the view hEDS type 3 alone would dispose A to easy fracturing through normal handling. B jumping onto his mother's lap when she was holding A would explain the femoral fracture he said.

41. Professor Holick maintains that (with hEDS) even the very winding of a baby could cause fractures, if that is so, all the experts from every other discipline are very obviously incorrect. Whilst he claims the advantage of "the longitudinal view", of seeing patients over time, he extrapolates retrospectively, backwards, from adults (where there has been study) to children especially under 5, where there has not, and where different considerations may apply. When challenged, he replied somewhat curiously "that it stands to reason". Yet quite obviously that is too simplistic, so many other factors come into play, that it would be dangerous to assume that that is so, it might be, it might not. No other expert mentions this" fact". He has little difficulty in concluding that there was a reasonable possibility that A' s faltering in utero growth halted the process of mineralisation of her bones, she would have been born "with less cement in her structure".

42. His real perspective, indeed I am afraid, mission, became clear when he was asked about example number 6 in his paper (the only true case of hEDS). At first, he was hostile, refusing to answer the questions on the grounds of confidentiality, which was clearly nonsense. When that clearly didn't wash, he refused to confront or answer the question directly that in that example the father had admitted two counts of assault – "I've seen lots of cases where the parents have been victimised, and where the father falls on his sword to re-establish the family and does a deal with prosecutors." He was pressed repeatedly about example number 6, but twisted and turned in a most unedifying manner – he was completely unrepentant, "I've done thousands of cases where I've helped families be reunited." Put plainly Professor Holick's paper does not establish a link between EDS and easy fracturing.

43. The other experts who gave evidence before me were more moderate, more careful and balanced in their advices, not just in their appraisal of Professor Holick's work, but overall. Dr Saggar said of Professor Holick that he was a" controversial chap and his paper has its problems, its flaws." He had not examined individuals, there was no control. In relation to example number 6 he said it put the paper into disrepute. Clearly it should not have been there. His opinions were echoed and replicated elsewhere. Dr Offiah and Dr Ng both described the paper as observational.

44. A further example of the unsafeness of his approach and conclusions was over the question of mother's vitamin D result (taken on 25 September 2018) which is low within the reference range 34.4nmol/L with a reference range of 30-250, normal but low. A' s vitamin D test was taken on 18 July 2017. It was normal. She had always been fed fortified formula milk. Professor Holick had no difficulty in asserting that the reading for the mother 15 months after birth was sufficient to say that A had been vitamin D deficient at birth. Such a startling conclusion is quite obviously insupportable. It was however similar to Professor Holick's hypothesis that because a fracture had been observed in adults, being down to EDS, the same would apply to children (it stands to reason). Whereas as I have already said, in fact the more considered witness, for example Dr Saggar, was very clear why extrapolation from adults to children may well be inapt and unsafe.

45. Not only are Professor Holick's methods wanting, they are actively misleading. Whilst I do not doubt the sincerity of his beliefs, nor the breadth of his clinical experience, I am afraid that whilst his observations and opinions might have some foundation, in experience, they are hopelessly undermined by a lack of intellectual rigour or analysis, they all inexorably lead him to one conclusion which may well not be correct, effectively starting at the conclusion and working backwards. His undoubtedly invaluable experience is hopelessly marred by what has, I am afraid, become for him a crusade in helping (as he put it, wrongly accused) families to reunite.

Dr M

46. Dr M was the consultant paediatrician responsible for treating A. She recalled the behaviour of the parents at the hospital in particular most of the conversation being led by the mother. There was an element of animosity, she acknowledged that that was mostly directed towards Ms M. Significantly she said that a family being recalled (as happened to the 9 week old B in 2015) quite often occurred after the child had been discussed by the safeguarding multiagency team. Having heard Dr M I was struck how moderate her approach was, in contrast to the reactions of the parents.

47. The safeguarding nurse from the hospital, Ms M, spoke of her involvement with the family in 2015 and 2017. Her evidence and approach towards the family seemed to me rather moderate and far from unsympathetic. Obviously, she might have behaved entirely differently when not in the spotlight of the Court, but I doubt it. Of the mother's behaviour in 2015 she said it was unusual, erratic and uncontrolled. She had only once before encountered a parent who had behaved in such a fashion and would not consent, which no doubt in part was why the Police became involved. I detected absolutely nothing in her approach or demeanour that was remotely reprehensible, let alone responsible for the extraordinary behaviour of the mother; quite the reverse, I thought in fact that she was calm concerned and completely professional when faced with the extremely confrontational behaviour of the mother.

The Parents Evidence

48. The father gave evidence from behind a screen rather than by video link as before, whilst it was a nerve racking experience for him, his anxiety being palpable, nonetheless his evidence was the much more powerful. Whilst I might have anticipated some difficulties, there were in fact none, that was of itself in fact quite surprising, there having been really quite determined and forceful submissions through (different) counsel, both about the giving of his evidence and when his evidence should be taken. Such anxieties as I might have anticipated as to both, simply did not arise. The existence of the screen only appeared to be really significant when he was asked about his dealings with Professor Holick and why he had not spoken to his brother when he visited on 17 July. I found him generally to be quite a good witness. A decent man, devoted to his wife and children, speaking with remarkable and conspicuous pleasure and affection about both B and A. He is rather straightforward, speaking of the marriage to the mother in 2013 he had, I thought, a rather romanticised idealised view, describing it as a "perfect marriage", the "marriage you dream of". What became strikingly clear, especially when the mother gave evidence was the very unequal dynamic between them. The father is essentially a quiet compliant man, loyal, and rather sensible, whose instincts are as straightforward as his personality. The same, I am afraid, cannot be said of the mother. He was asked about the exchanges with

Professor Holick in September and October 2017, he was very obviously uncomfortable, discomforted by the suggestions put to him, he kept looking towards the mother (although obviously, presumably he could not see her because of the screen). What is extraordinary is that Professor Holick's advices took such a long while to surface, on my view of the evidence it is difficult to hold that at just the father's door. What was unusual about much of this evidence was the father's lack of memory of the detail, that may be for all manner of reasons, for example, nerves or elapse of time; although the emails are all mostly framed from the father (with one notable exception, having regard to these, the 2 similar but obviously doctored emails, and the amendments in red to the draft report from Professor Holick), even as he was giving evidence I wondered whether in fact it was not he who was the author of the correspondence, but the mother. Subsequently, the father was asked that very question, whether it was his wife who had told him what to say. His response was unconvincing, the father at his most discomforted.

49. Whilst the sequence of events from the father over the evening of 17th July was confused, what is surprising is that having received the Whats App photographs in the afternoon from his wife, knowing later presumably that the GP had been unsuccessfully contacted, and aware of the online "Pushdoctor" process, that he mentioned not a word to his brother (to whom he is very close) when he visited the family home that evening. Watching him carefully in the witness box this was the second area of evidence where he was evidently highly uncomfortable, whilst that deliberate omission, as I find it was, might have any number of possible reasons, I am satisfied that he wanted to talk to his brother about it, but something held him back. I am satisfied that at no point was the father ever alone in the house caring for the children on his own. Overall, I found the father to be a genuine man, his evidence riddled with regret, torn by his unquestioning and absolute loyalty to the mother, and his well grounded instincts, which on 17 July, only triumphed when A was taken to hospital.

50. The mother struck an altogether contrasting figure. Highly articulate, emotional, an intelligent woman. Her evidence was of a very different character. She spoke of the strength of her (and the father's) close and supportive family and friends, which has formed a significant feature of the background and necessarily of the individuals too. She was at pains to portray herself as an attuned loving mother with no vices. She spoke of the very great difficulties in feeding A,who could only tolerate a very small amount of milk which would make her uncomfortable. She would "moan like a cat". The mother would then have to work quite hard, maybe for 15 minutes until she burped, then she would be able to take another ounce of milk, all punctuated by bouts of colic. The mother described it as tough and difficult, "eat, repeat, eat, repeat" otherwise in all other respects she was a tranquil baby, oddly she told me the only time she ever screamed was when she had the skeletal survey at hospital – "it was like she was being tortured".

51. The mother told me that she had had the "baby blues", "sharper than a period", she would be forgetful and become tearful, "I would often be tearful whilst doing something", but it was not she said, post-natal depression. I gained a strong sense that for a period the mother had found things quite difficult. Very surprisingly her father (to whom she is very close, relying on him, speaking to him daily) was, until she disclosed this from the witness box, completely unaware that any of this this had occurred. The mother did not disclose precisely when this had occurred, nor for how

long, nor whether anyone else was aware of her condition. The father returned to work from paternity leave on 19th June 2017.

52. The mother described the events of 17th July 2017 as "normal" life, there was nothing different about the day. Later she told me that in fact it had been a most unusual, very busy day indeed, the busiest in fact since A' s birth, requiring significant logistical planning as she had had so much to fit in.

53. The mother was questioned about the communications with Professor Holick about which she too was remarkably vague – she said she struggled to remember. I do not accept that, the mother had a remarkably sharp recall of all significant events, evident both from the content and manner of her evidence. Whilst I've little doubt the father has the technical know how and skills, the mother was intimately involved in what was occurring. Her responses in respect of some of the factual inaccuracies in the information going to Professor Holick were unimpressive.

54. She was asked about her extreme behaviours at the hospital (both in 2015 and 2017) the loud, unbridled, confrontational, oppositional and frankly bizarre behaviour e.g. singing "Happy Birthday" at the hospital – "yes it ruined my husband's birthday". She was asked about the anger, the outrage and hostility, describing those who were trying to help as "the Gestapo" or "the enemy". She considered this all to be a perfectly reasonable reaction - she was she said engaging in sarcasm. That behaviour was reinforced, indeed reflected more widely in the family. The mother was unable to offer a satisfactory explanation as to why neither the brother nor her father was told that evening (17th) of her concerns about A,nor significantly why, when she did message her father the next day, she said in terms that "no one else can know".

55. By the time, during cross examination, that she was asked about why she had scratched herself in front of the medical staff (in order to make a point, commenting that it had ruined her life) the mother's manner and delivery of evidence became really very unusual, taking, or endeavouring to take, surprising charge of the process, speaking to me directly in a curious way, asking Mr Twomey QC to 'bear with me'. She was in short, controlling.

56. It was an illuminating performance, entirely consistent with the message written on the father's phone about "staying strong and alert, they're all around us for a reason".

57. Overall the character and delivery of the mother's evidence was remarkable. I make full allowance for the pressure and length of proceedings, and of the really very unusual course that they have taken, which must be unimaginably difficult for the whole family, and of the great strain of giving evidence, and for a second time, and especially what is at stake; but the content of, and delivery and manner of, her evidence was unexpected and illuminating.

58. Mr W the maternal grandfather is an impressive individual. He and his wife have put their lives on hold to an extraordinary degree, and care for their two young grandchildren to an exemplary standard. I was especially impressed by the very obviously close bond between Mr W and A,in particular, he spoke of her with a very obvious fundamental sense of love and understanding.

59. Mr W was behind the consultation with Dr Kapellou because of A' s ungainly manner of crawling, he was concerned that she might have hip dysplasia. What was unusual too, and struck a chord with what had occurred with Professor Holick, was that amendments were sought to the report, such that Dr Kapello felt it necessary to make a safeguarding referral. Mr W was unimpressed by that, she has he told me as a result, not yet been paid, although there is clearly no justification for that. Mr W is a man of sophistication and intelligence, a fighter, prepared to stand up for himself and those near him; whilst I applaud his attention to what he considers to be right and the detail (both characters his daughter shares) illustrated by the successful commercial litigation which he was conducting at the High Court at that time A was admitted to hospital, it is also clear that his approach, whilst more measured and sophisticated, is not dissimilar to the mothers own confrontational style.

60. I lastly heard from the father's brother. A thoroughly decent, impressive man, articulate, thoughtful, a gentle and considered witness, with an especially close relationship with B. Having listened to his evidence, it was quite impossible to understand why nothing of A' s plight was mentioned to him on the night of July 17th.

Discussion

61. Inevitably in such a case where medical experts disagree, and bearing in mind the rubric that today's medical certainty may be discarded by the next generation of experts, together with the fact that a hypothesis in relation to causation must not be dismissed just because it is unusual, all result in the exercise of considerable caution when considering the significance of experts opinion that a condition or combination of conditions is rare. Rare and unknown conditions do exist. It is sometimes not possible to identify what is not known, what has been described in this case as "known unknowns". So particular scrutiny is required here where medical witnesses agree that A' s case is unusual, described by one as challenging. This characteristic undoubtedly heightens the need for the most careful and cautious scrutiny, with particular attention being paid to the possibility that the injuries individually or collectively result from an unknown cause. That is particularly so where the medical evidence is only one part of the evidence, and as there is no direct evidence of inflicted injury, that diagnosis may be just as much a hypothesis, and just as contentious as an unknown cause. Self-evidently, of course, it is not for the parents to prove anything.

The approach of the medical witnesses

62. I have already recorded the thrust of each witness, all from appropriate specialisations. I shall discuss Professor Holick separately. All the other doctors gave evidence appropriate to their professional standpoint. All are specialists within their own disciplines and conspicuously respected in the frontier of their knowledge and expertise. Each, I thought, despite submissions to the contrary, was a) willing to acknowledge the perspectives of the others and b) possessed a good knowledge of the science and research beyond their specific specialisations. Some (Dr Offiah and Dr Ng in particular) have been criticised for being too dogmatic or unprepared to acknowledge or concede any other alternatives, yet I did not understand their evidence in that way. Quite the contrary. It was for example, Dr Offiah who raised the possible alternatives. The fact that she was clear that it was important to concentrate on the evidence of what is known, as opposed to speculation, to my mind strengthened, not weakened, her advices.

63. Additionally, I bear in mind, as I must do in this judgment, that it would be easy to suggest that instead of looking at the canvass overall, each piece of evidence is examined in isolation – in a linear approach. But each witness, examiner, and the Court, must consider each area separately and together, otherwise a fog descends and it is impossible to navigate in any analytical way the different areas of enquiry.

64. Looked at in that way I am satisfied that each medical expert was willing to, and did consider all the available information, none of them arrived at their conclusions by a process of exclusion. I therefore assess the evidence of each witness and their opinions entirely on their merits.

Professor Holick

65. The central core to his thesis is that there is a link between hEDS and "early fractures of bones" in children. I have already commented on the approach and tenor of his evidence and the lack of any proper enquiry, let alone peer review (he seemed unconcerned that there was no other reliable review). Notwithstanding his avowed longitudinal experience, he case studies upon which he relies (published in a journal of which had an editorial role), do not stand up to examination. The only case which on its facts might (number 6) self-evidently should not appear in the study at all, since the father subsequently pleaded guilty to two counts of assault. What was immediately worrying was far from causing Professor Holick to reflect or explain (he told me the conviction arose post publication), he was evidently unconcerned and unrepentant, he immediately went on the offensive suggesting as I have recorded that many parents "fall on their sword "to preserve the family. The manner of his evidence at that point was most unfortunate, he blustered, he was hostile and evasive. The short point is that the example should never have been there, it required removal and correction. I am afraid that I am driven to the conclusion that he is so convinced of the correctness of his contentions, that he merely overlooks anything which is inconvenient, which does not fit his general proposition or thesis; which is that he regularly sees such fracturing, the same applying to children as adults as "it stands to reason".

66. What unfortunately does stand to reason is that the paper published by him provides no objective evidence at all to link hEDS with fragility fractures in children. The only examples of EDS were all of children where they had bone conditions or disease of the bone.

67. The study is observational and was not carried out or analysed scientifically let alone with rigour.

68. His paper fails to distinguish between the many types of EDS. He refers (although not in evidence) to temporary brittle bone distress with approval even though such a theory has been discredited. He referred to Dr Miller and Dr Ayoub (both discredited) with approval.

69. Professor Holick's evidence in relation to the mother's recent vitamin D test was extraordinary. He opined that he was able to say that the mother's low (but within normal) reading (15 months) post birth was evidence for A being deficient at birth.

70. In relation to A,on the reported facts but importantly without examination concluded that A had EDS with "a high degree of medical certainty", and that the fractures could have been caused by EDS.

71. His stance was very much one of a crusader for victimised and wrongly accused parents. It seems he only ever gives evidence for parents, and for no payment. I make no findings about it, but was concerned by his reaction both in manner and content to the allegations put to him contained in the New York Times in August 2018. All the other experts, in a polite way, were critical of his work and opinions, which are certainly not mainstream. None of this predisposes the court to conclude that Professor Holick is anything approaching an independent objective expert, in fact quite the opposite.

72. Having deliberately paused and reflected, I reluctantly conclude that whilst not overlooking the extensive material and data available to him, his methods and conclusions simply fail to stand up to any scrutiny, and do not establish the link between hEDS and fractures in children. Indeed, I am afraid he has been captured by his own theory so that it has become a cause, he being unable to evaluate the real evidence in front of him.

73. I conclude that the Courts in England and Wales are unlikely to find that Professor Holick meets the requirement that an expert witness must be objective and unbiased. In any event if it is proposed that he is instructed in any case concerning fractures in young children that court should be made aware of the criticisms and observations contained in this Judgment.

Conclusions on the medical evidence

74. This case remains difficult and unusual. Special caution is necessary where medical experts disagree, or there may be a reasonable possibility of a natural cause or combination of natural causes. I have therefore taken my time to reflect on the extremely helpful and thought provoking submissions as well as the medical evidence. Where I have recorded aspects of an individual's evidence, this judgment, whilst long, cannot reflect the full nuanced detail of the scientific opinion, although I have endeavoured to record its main points. There is in fact a remarkable degree of unanimity between the domestic experts from their different disciplines.

75. I now give my findings on the medical issues.

Hypermobile Ehlers Danlos Syndrome (hEDS)

76. Notwithstanding the earlier findings in relation to hEDS in the appealed judgment, I am not prevented from reviewing all the evidence and reaching my own conclusions in this fresh hearing. It had earlier been submitted on behalf of the parents (although not pursued in their final submissions), that the local authority and the Court is in some way estopped from doing so. Having reviewed the case of *Aziz v Harp* 2017 EWCA 2215 I do not consider that that is so. I am entitled to review all the evidence available to me and reach fresh conclusions. Whatever stance was taken in the appeal, the case has had to be reheard, and all issues are at large.

77. Whilst genetically A has a 50% chance of having EDS (and as Dr Offiah counters a 50% chance of not having hEDS), Dr Saggar noting the mother's condition, and that of

the father and his family, on examination, whilst making clear that a diagnosis was difficult, concluded that there was no evidence that A had hEDS. He concluded that there was no clinical evidence that A had hEDS.

78. Whilst hEDS can cause bone mineralisation loss, he did not see it resulting in fractures in children where hEDS is a feature. So even if the mother has hEDS, it would not account for the fractures in A. He did not accept that children have reduced bone density with EDS (even though there is some evidence to support that contention in adults) that can lead to fracture.

79. Even if that evidence was somehow equivocal, Dr Offiah gave the clearest evidence of the standard deviation of bone reduction with EDS, where there was no higher than normal risk of fractures in children. Even if A had fragility caused by hEDS she could give no weight to the contention that they might have arisen through normal handling. There would still need to be a memorable event even if A had hEDS the mechanism would be the same.

80. Dr Ng similarly was clear that hEDS would not have caused the fractures. There is in fact no reliable evidence in the medical literature that hEDS causes (or pre- disposes) children to sustain fractures. Dr Jayamohan similarly concluded that taking hEDS out of the picture points to trauma. Subject to the evidence of Professor Holick therefore, which I discount, either with or without hEDS the result is the same. Irrespective of whether A has hEDS I am satisfied on the evidence which I accept and rely on that it did not contribute to the injuries sustained by A.

Vitamin D Deficiency

81. A' s vitamin D level was normal on testing on the 18th July 2017, certainly it was not low enough to cause rickets. Taking account of the fact that A was fed fortified formula milk, other than Professor Holick's remarkable conclusions, there is no evidence that at any time between birth and examination in July 2017 that A had insufficient or deficient vitamin D. The mother's test of 25 September 2018 shows a reading of 34.4 nmol/L within a reference range of 30-250. That reading is low but within the reference range. Dr Ng described it as normal. The Report in fact says that some parents may be deficient in the range 30-50 nmol/L. There is no evidence that A' s vitamin D level was critically low at any relevant period, such as might have any substantial effect on her bone mineralisation.

The chromosomal micro deletion 15q at 11.2

82. The evidence is clear, confirmed by laboratory test. It is a "de novo" micro deletion. It is a well understood deletion.

83. That chromosomal area is known to cause neuro-developmental loss. The features of the deletion are well known, they include poor muscle tone, developmental delay and congenital heart disorder. It might have caused or contributed to her faltering growth in utero. The deletion is unlikely to be related to bone mineral loss. There is no evidence that it is associated with vascular fragility. There is no evidence that it is relevant to fractures, the micro deletion is not associated with bone fragility. It can be (but is unlikely) to be related to bone mineralisation, but not easy fracture, it can be related to epilepsy and possibly pain.

Pain

84. All the experts in different ways would have expected A to have exhibited pain, either at the time of fracture or subsequently, it being a strong observational factor and relevant to diagnosis. There can be no escaping the curious fact that when the parents consulted Dr McGuinness on Pushdoctor over the internet, that on manipulation and movement A appeared to exhibit no apparent discomfort or distress. An absence of pain reaction was noted by the triage nurse at hospital, and on examination by the consultant and when she was moved for her x-ray. When examined earlier on 11th July 2017 by the Health Visitor (and on 16th June) no one noticed any sign of distress or pain. No family member observed pain. The genetic location for pain is proximate to A' s microdeletion. Dr Saggar confirmed that he had experienced an "unusual pain" response in children with the genetic deletion.

85. I have additionally gained further assistance from the paper Farrell, Robin, Downes, Dormorans and Christian paper "Symptoms and Time to Medical Care with Accidental Extremity Fractures". The study looks at a cohort of 206 children and the delays and possible reasons for seeking medical treatment (which might apply here), and the factors associated with that delay.

86. Relevant parts of the text include

> "Despite its prevalence physical abuse is difficult to diagnose. Suspicion increases when the reported mechanisms of trauma seem inconsistent with the injury, when trauma is denied as when there is a delay in seeking medical care. Such inferences are frequently no more than a clinician's expectations about an average child's response, crying, guarding the injury or behavioural changes, in turn prompting the parents to seek medical attention. Perceived delays in seeking medical assistance may raise a concern of abuse. Recent guidelines regarding medical evaluations of physical abuse recommend asking about the child's behaviours relating to the injury. In addition, law enforcement and child welfare professionals request medical opinion about a child's expected behaviour after sustaining a fracture", as here.
>
> "91% of children cried after injury. Parents observed no external sign of injury in 15%of children, and 12% of children continued to use the affected extremity normally. The majority of children with accidental fractures are therefore symptomatic at the time of injury, but a significant notable minority do not follow the expected pattern of behaviour, either they use their extremity post injury or exhibit little irritability after injury. When a delay in seeking medical treatment occurs it is most likely to be related to the absence of physical signs of injury rather than crying or irritability".

87. So here (notwithstanding the grainy photograph where it is submitted that A is evidently crying, upon which I express no reliance), I conclude on balance that there is sufficient evidence (both by historical account and of the genetic locus of pain) to suggest that A

might not react in an expected way to pain. That might have a significance if she was roughly handled and showed no reaction (which might ordinarily check the rough handler).

88. Bringing those aspects together, all experts agree, and accepting their evidence, I conclude that there is here no evidence of vitamin D deficiency, no evidence of any bone disease or abnormal density, no evidence of O.I. or Rickets, and apart from the recorded fractures no evidence of any bony abnormality. In fact, radiographically the bones appear to be normal. There is in addition no evidence of any bone abnormality caused by stalled inter uterine growth, since such would be evidenced on birth (and would still be identifiable). Gestational diabetes is not relevant.

Undiagnosed metabolic bone disease

89. There is no evidence of any bone disease. Whilst I must consider the possibility of a new unknown condition, whether in some way related to the genetic deletion, any consequential or otherwise intrauterine stalling of growth, or hEDS in any, or any other combination of those, as other unknown conditions whose interplay is unknown, (and taking account of Dr Saggar who felt something was going on (in relation to microdeletion)), nonetheless there are far greater medical difficulties in the way of a conclusion that the medical findings are the result wholly or in part of an unknown condition. All witnesses were prepared to acknowledge that possibility but were clear in their ultimate opinions. All were agreed that such a catastrophic condition or combinations, was difficult to envisage, especially in the absence of birth injuries, and arising as a result of normal handling, it would have likely to have been "temporary" and then disappear. All examples of why this hypothesis does not have the ultimate support of the experts.

Fractures

90. Looking at the fractures individually and together, there is an overwhelming unity of opinion from the experts that in the absence of any identifiable bone disease, and memorable mechanism, that there is here a unified diagnosis of inflicted injury or trauma. The fracture of the femur was what led to A' s admission to hospital. Dr Offiah advised that the mechanism would be a twisting and pulling (and for the metaphysical fractures too) regardless of any fragility, the bones would not have fractured spontaneously. Even if there was a fragility (caused by EDS or anything else), singly or in combination, they would not have arisen through normal handling. There would be a memorable event (not explained by B launching onto the mother's lap) caused by an external force or mechanism.

91. The rib fractures were likely caused by compression, or shaking, the injury to the shoulders lifting or shaking.

92. The fracture to the skull, accepting her evidence (on swelling) was that it was recent, within 14 days, caused by forceful contact with an object (it could not have been caused by the toy, requiring a force equivalent to a fall 3-5 feet). If the bones appear normal radiographically, it would require more than normal handling to break them. She commented on the apparent lack of fractures since A was removed from her parents' care, but of course A has not been comprehensively tested.

93. Dr Ng similarly advised that the fractured bones would require some mechanism regardless of fragility, the mechanism would be force, there would had to have been a third party intervention, a memorable event. Like Dr Offiah, she could attach no weight to the suggestion that the fractures were caused by normal handling. Clicky hips and delayed growth in utero are common. A had no over laxity of joints. Like Dr Offiah she did not consider that A had fragile bones (from whatever cause). Had A had fragile bones from whatever cause, Dr Ng (and Dr Offiah) would have expected to see more fracturing. The toy could not have caused the skull fracture. The skull fracture would require a severe degree of force. She too concluded that "it was really unlikely" that A had fragile bones. It was highly unlikely that A had fragile bones because "it does not just disappear". She acknowledged that gestational diabetes may have affected A' s growth in utero but there was no evidence of reduced bone mineralisation content. A did not have a bone density problem.

94. Dr Jayamohan's advices, but from a different perspective, were in line with the previous two witnesses. He accepted that the associated swelling with the skull fracture, which he had not spotted. He accepted that birth skull fractures were possible, but here, having regard to the swelling, the fracture would have been as a result of recent trauma, (as swelling would disappear after 14 days). In relation to all the fractures, he too considered that a memorable event was necessary. In the absence of any bone distress "we were looking at trauma". The skull fracture and bleeding are consistent with having occurred at the same time, but they did not necessarily have to have occurred together. Of the two bleeds, the outermost is more associated with any abnormality unless there is one associated with bleeding. The clefts were probably caused by trauma (probably not birth) they are weeks old, possibly a second trauma caused a re-bleed. He conceded that the clefts could pre-date birth. Whilst comparable with shaking, it did not explain why there is only damage to the front of the brain. The cleft may have an unknown cause, but the left sided bleeding was likely the result of trauma unless there is predisposition. The left damage and fracture undermined the explanation of unknown cause. Taking hEDS out of the picture points to trauma. With such brain injury you would expect to see a change in the behaviour of the child. Whilst on one view this evidence might be considered equivocal, taking it in the round I consider that it is more likely than not that head injuries were all precipitated by trauma.

95. Having considered all the medical evidence, and in particular Dr Saggar, I conclude:

1. That I have greater difficulty in adopting a conclusion that the medical findings are in whole or in part of an unknown condition or combination of conditions. No one ruled it out, but the collective view was that A did not suffer from such a condition.

2. That I do not accept that A' s condition arose from some identified medical cause.

3. That A did not suffer from vitamin D deficiency at all, or of such significance that it was responsible for demineralisation of the bones, or that there was any demineralisation from any other cause.

4. That there is no other known overlooked condition, or combination of, conditions.

5. That A' s condition is not as a result of an unknown pathology beyond our current understanding.

6. That A had normal bones.

96. With that background, I turn to the evidence of the parents in particular. The parents' evidence and my assessment of them in the witness box has been strongly determinative of my conclusions. No account is given at all for any mechanism regardless of the level of force, other than the suggestion of B jumping on his mother's lap, and the toy - there is in fact no evidence at all concerning the toy. Neither can explain the skull or femoral fracture, and go no way to explain the other injuries. The mother was the primary carer of A,it is reasonable to ask how was it that A' s leg was twisted and pulled, how were her arms levered above her head, how was it that she sustained metaphyseal fractures? This does not reverse the burden of proof.

97. The mother was clearly appropriately anxious about A' s care, seeking advice and reassurance on many occasions, many speak highly of her attentive care. But it is not difficult to envisage, being responsible for A' s feeding, quite possibly, in exasperation at her slowness or inability to feed, how a carer might momentarily have lost control, and indeed how this might lead to a vicious circle. With that background it is instructive to examine the events of the 17th July with some care. This was an extremely busy day which required careful planning by the mother so that she could attend the dentist. On noticing the swelling and lack of movement the mother contacted the father by WhatsApp with accompanying photographs. She was also in touch with a friend. From 3.30pm there was a delay. It is unclear what was happening. The mother endeavoured to speak to the doctors' surgery, her account for telephoning, as opposed to simply going straight there was unconvincing. The father returned home, and arrangements were made to consult an online doctor. The paternal uncle attended the home to see B.He is a caring, concerned, sympathetic man, yet no one mentioned a word about A' s predicament. Although there are conflicting accounts, the online doctor was clear that the parents were reluctant to seek direct medical assistance that night. The mother was resistant to taking A to A and B. I accept no doubt in part because of the unsatisfactory procedures then employed by Pushdoctor, that Dr McGuiness felt she had no alternative but to make a safeguarding referral (3 different referrals have arisen because of the family's conduct). Only after that call, was A taken to hospital, I sensed at the father's insistence. All those factors taken together present a powerful and unusual picture, an anxious mother keen I find to avoid direct examination, perhaps hoping that the symptoms would resolve by the next day when the mother was attending the doctors in any event. A father who was unprepared or unable to stand up to ensure that his daughter received prompt medical attention, not even consulting his brother.

98. What occurred at the hospital was nothing short of remarkable, referring to the medical professionals endeavouring to do their best for A as "the enemy". I take into account the parents expressed perspectives of their previous experiences of safeguarding, which could have influenced their conduct that night, both in terms of delay and behaviour at the hospital. On the other hand, the behaviours of the mother were in particular really very extreme. No one had ever before encountered such conduct. It was very similar to the mother's extreme behaviour two years previously.

99. Whilst of course each aspect of the above might have an innocent explanation, taken together with the medical evidence, present a formidable catalogue of behaviours which

all I find point in one direction. There are occasions where a witness' evidence is so powerful in quality that it outweighs all other evidence. That is not the case here, quite the opposite, especially I am afraid in respect of the mother.

100. Putting the evidence together:

1. The medical evidence points to a unified diagnosis of trauma.

2. The mother was A' s primary carer, the father, as far as I can tell, was never alone with her, but did care for A when the mother was resting. A may exhibit unusual responses to pain.

3. There is no reported mechanism for any of the injuries (other than the toy and B's injury on his mother's lap – both of which I reject).

4. There is no explanation as to how A might have sustained so many twisting and pulling injuries.

5. The mother failed to take A to be seen by a doctor, doing everything in her power to get advice and opinion without A being physically examined. The mother deliberately delayed.

6. I reject the mother's explanation for not immediately taking A to the doctor or hospital.

7. I find that the parents deliberately chose to hide A' s condition evidenced by not telling AR when he visited that evening of their concerns for A (he could in addition have cared for E, whilst they took A to hospital); by the mother underplaying A' s condition to her friend that afternoon; and by lying to her own father later that evening that all was well (when in fact she was seeking help from the hospital).

8. The parents were reluctant to follow Dr McGuiness's advice and take A to hospital that evening.

9. The parents, the mother in particular, was persistently hostile and obstructive at the hospital, the body scan was as a result delayed, until they finally acquiesced at 3pm the next day.

10. The communications between the parents, which were most unusual, the mother writing on the father's phone (because her own phone battery had died), demonstrates their collusion:

"Hi a couple of things to ponder …

1. Shld we have told them about [B] as I'm sure they are going to check

2. Stay strong and alert they are all around us for a reason."

101. I haven't lost sight of the fact that some families, some individuals, question to the point of confrontation, and are unable to see a wider more balanced perspective. But that does not apply here. The mother is intelligent and articulate; she is very aware of the effect of her behaviour and language and the effect that it can have, as her live evidence so graphically showed. The mother was A' s primary carer, certainly from 19 June 2017. Taking everything together, I find that the mother knew that something was seriously wrong with A' s leg that day. There is no evidence of timing for the leg injury, despite my suspicion that it did occur that day I cannot say with certainty that it did. I cannot say to what extent if at all, the mothers stress (it being the busiest day), or her previously unmentioned baby blues even to her close family (which whilst ordinarily would be an enormous strength, could in those circumstances be precisely the opposite), played any part, nor whether it was through frustration at feeding or some other cause that precipitated the injury. Having considered all the evidence and having considered in particular the submissions of Mr Twomey QC and Ms McKenna QC, (that it is not possible to identify which parent was responsible,) everything is at large, and I take a different view. I am satisfied that the mother was more likely responsible, and having regard to the burden and regime of care, all provided by the mother, all the injuries sustained by A were inflicted by her. I don't lose sight of the fact that A' s unusual responses to pain, sometimes a check on aberrant behaviours, may not have demonstrated the pain which might normally be so apparent. However, the mechanisms being the same, in any event, the mother knew what she had done. Whilst the mother very much supports her husband, her conduct and behaviour are entirely inconsistent with his responsibility for any of the injuries.

102. What of the father? He is devoted to, but dominated by his wife. He knew something was very wrong with A that evening, yet his better instincts were displaced and suborned, I am satisfied, by the mother's direction, I have little doubt that she told him to say nothing to his brother when he visited, and he complied. Although the father has been less than forthcoming over the events of that evening, and his dealings with Professor Holick, as well as the issue of A' s pain threshold in relation to injuries possibly occurring without A crying (thus alerting the mother), it might be reasonable to conclude that either of the parents might potentially be responsible for the injuries to A; but the totality of evidence (of care, conduct, and response) falls against the mother, and not the father. The authority rely strongly in their submissions on the dealings with Professor Horlick, which they primarily lay at the father's door, whilst they are unimpressive, I think it unlikely on the evidence that any of them occurred at his sole instigation. There is however the clearest evidence that he failed to protect A on the evening of July 17th by not ensuring that she received immediate medical attention, and by not standing up to his wife's direction. In short, he failed through misplaced loyalty to fulfil the most basic expectation and requirement of any parent.

Conclusions

103. Accordingly, I find that the local authority has proved that it is more likely than not that A was the subject of inflicted injuries.

104. I conclude that those injuries were more likely to have been caused by the mother.

Post Script 14 November 2019

1. Almost a year ago I handed down judgment in this matter, concluding on the balance pf probabilities that the subject child had been subjected to inflicted injury, and that those injuries had been caused by the mother.

2. Following that judgment, and with the Court's approval, further assessments were carried out. On 22 March 2019 Dr Pipon-Young filed her psychological assessment of the parents and maternal grandparents. In that Report she concluded that the parents did possess the capacity for change, and supported the family undertaking further work with Resolutions. She advised that the parents engage in therapy for at least 6 months.

3. A risk assessment was carried out by Ms Carboni, Resolutions Child Safeguarding consultant. Her first report, dated 3 April 2019, concluded that it was appropriate for this family to commence the Resolutions programme. The Court has seen both the interim and final reports, dated respectively 12 July 2019 and 9 September 2019.

4. A rehabilitation programme commenced on 26 May 2019 consequent to the case management hearing on 15 May 2019. Over the ensuing two months the children were gradually rehabilitated from the grandparents' care to their parents'. The children have settled well, and the professional advice from all quarters is that the children have remained safe. A very significant plank of this arrangement has been the impressive family support network, and the parents' very considerable change in their stance and relationship with the local authority. The local authority (with the comprehensive concurrence of the professional witnesses and parties) submits that the Court can and should make a Supervision Order for 6 months, and I do so. I have seen a full "Working Together Agreement" which forms a clear map for the parties' expectations and conduct.

5. The police have recently informed the local authority that they will be taking no further action.

6. I have added this short judgment as a postscript to the judgment of 30 November 2018 [2018 EWHC 3283 (Fam)] not just so that the final chapter is recorded, but also so that it can be seen that despite the Court making trenchant findings of fact against both parents; that there are circumstances in which, notwithstanding the serious nature of the injuries, with considerable professional input, and the cooperation and support of the immediate and wider family, where it is possible, balancing the risks, for parents and their children to be successfully reunited, which is what very happily has occurred for this family.