District Health Board

Orthopaedic Registrar, Dr B

Orthopaedic Surgeon, Dr C

A Report by the

Deputy Health and Disability Commissioner

(Case 19HDC01348)

Health and Disability Commissioner

Te Toihau Hauora, Hauātanga

Contents

Executive summary

1. This report concerns the outpatient care provided by an orthopaedic surgeon to a man with a broken left femur. Following his discharge from hospital, the man struggled with continuous pain in his left thigh, particularly on weight-bearing. A number of oversights in his outpatient care contributed to a delay in an eventual diagnosis of non-union of the left femur, and subsequent further surgery to correct this.

2. The quality of life and chronic pain the man experienced over the year following his accident led him to have suicidal thoughts and to seek psychiatric help.

3. This report highlights the importance of management plans in the care of bony healing, particularly when the healing is slow and there are factors present that may increase the likelihood of non-union.

Findings

4. The Deputy Commissioner found that the orthopaedic surgeon did not provide services to the man with reasonable care and skill, and therefore breached Right 4(1) of the Code. The Deputy Commissioner was critical that the orthopaedic surgeon failed to order further investigations into the progress of the bony union, particularly given the tendency of high-velocity fractures to be more problematic to heal, the lack of clear evidence of union, and the man's continuing pain and discomfort in his left thigh. The Deputy Commissioner was also critical of the orthopaedic surgeon for not recording a plan to manage the potential delayed union (and possible evolving non-union) of the man's femur after X-rays did not show clear evidence of union, and the man was presenting with pain around the fracture site.

Recommendations

5. The Deputy Commissioner recommended that the orthopaedic surgeon (a) provide a written apology to the man; (b) advise HDC how he intends to ensure that he has appropriate peer/collegial support available to him for consultation on complex orthopaedic cases; and (c) record a management plan in any future case where there is a suspected delay in bone healing.

Complaint and investigation

6. The Health and Disability Commissioner (HDC) received a complaint from Mr A about the services provided by Dr C and Dr B at a district health board (DHB2). The following issues were identified for investigation:

- *Whether DHB2 provided Mr A with an appropriate standard of care between February and September 2018 (inclusive).*
- *Whether Dr C provided Mr A with an appropriate standard of care between February and September 2018 (inclusive).*
- *Whether Dr B provided Mr A with an appropriate standard of care on 16 July 2018*.

7. This report is the opinion of Deputy Commissioner Deborah James, and is made in accordance with the power delegated to her by the Commissioner.

8. The parties directly involved in the investigation were:

Mr A	Consumer
DHB2	Provider
Dr B	Provider/orthopaedic registrar
Dr C	Provider/orthopaedic surgeon

9. Further information was received from:

Dr E	Provider/orthopaedic surgeon
Dr D	Provider/orthopaedic surgeon
Private hospital	Provider
Orthopaedic clinic	Provider
DHB1	Provider

10. Also mentioned in this report:

Dr F	Orthopaedic surgeon

11. Independent expert advice was obtained from an orthopaedic surgeon, Dr John McKie (Appendix A).

Information gathered during investigation

Background

12. This report discusses the care provided to Mr A by Dr B and Dr C as an outpatient at a public hospital (DHB2) between 8 May 2018 and 20 September 2018, with particular regard to the healing of Mr A's fractured femur.[1]

13. On 14 October 2017, Mr A was involved in an accident. He sustained multiple injuries, including two fractures in his left femur, which extended into the knee. He underwent an emergency external fixation[2] of the fractured femur at DHB1.

14. On 16 October 2017, Mr A again underwent surgery on his fractured femur to remove the external fixation and replace it with a less-invasive stabilisation system (LISS)[3] fixation.

15. Mr A was transferred from DHB1 to DHB2 on 3 November 2017, and placed under the care of orthopaedic surgeon Dr C. Mr A was discharged on 6 February 2018, and had three outpatient appointments under Dr C's care in the following months.

16. Mr A told HDC that he received these outpatient appointments only after he followed up about them himself. He stated that he had to call the public hospital himself — twice over a month — to organise these. He recalls initially being told that his care had been discharged to his general practitioner (GP) and rehabilitation team, which he refuted. Dr C stated that once he was made aware that an outpatient appointment had not been arranged, he organised one personally. In a meeting between DHB2 and Mr A on 30 May 2019, it was also noted that the lack of an outpatient appointment was due to a scheduling problem, and that Mr A should not have had to call for an appointment.

Outpatient care

17. Mr A's concerns centre around the management of his fractured femur as an outpatient, following his discharge from the public hospital.

First outpatient appointment

18. On 8 May 2018, Mr A saw Dr C for his first follow-up appointment. Dr C documented that Mr A was experiencing pain in the upper leg, and a stiff knee, and that consequently he was having trouble mobilising. X-rays were taken, and the radiology report stated: "No significant callus[4] noted." Dr C's notes from this appointment make no direct mention of how the left femur was healing, but in a letter to Mr A dated 22 January 2019, Dr C stated:

[1] The bone between the hip and knee (also called the thighbone).
[2] A device that sits on the outside of the skin. Screws are placed into the bone above and below the fracture to keep the fractured bones stabilised and in alignment.
[3] Also known as a bridge plate. It is fixed to the two main bone fragments either side of the fracture, leaving the intermediate fracture area untouched.
[4] Callus formation is a part of the bone healing process. Callus formation generally indicates progress in healing.

"The last Xray that I saw in May [2018] showed [callus] formation around the fracture of the left femur. This could be classified as a delayed union.[5]"

Second outpatient appointment

19. Mr A was unable to attend his second outpatient appointment on 12 June 2018. Dr C had a conversation with him over the telephone instead, and documented that Mr A reported making "little progress with his physio[therapist] concerning his left leg".

Third outpatient appointment and planned arthroscopic release

20. On 16 July 2018, Mr A had an outpatient appointment with orthopaedic registrar Dr B. Dr C was the supervising consultant and was in the clinic with Dr B that day, and they discussed Mr A's case. Dr B's notes state that Mr A had been attending physiotherapy appointments approximately five times a week, but his range of movements in his left leg had decreased over the previous few months. An arthroscopic lateral release[6] of Mr A's left knee was booked and consented to as a planned treatment for this.

21. Dr B also documented that Mr A was experiencing pain when weight-bearing on his left leg, and that an X-ray of the fracture, taken a month prior to this appointment,[7] showed "a significant amount of callous formation".

22. Dr C did not plan for further imaging to be done until the arthroscopic release, at which point he intended to use an image intensifier to evaluate the fracture. He advised HDC that he wanted to manipulate Mr A's knee under anaesthetic to improve mobilisation, and that at the time the decision was made to do an arthroscopic release, "there were no signs of non-union; at that stage it was a delayed union".

X-rays ordered by physiotherapist

23. On 23 August 2018, X-rays were taken of the fracture, as ordered by Mr A's physiotherapist. The radiology report states that the femur showed "evidence of healing, although the fractures do remain visible".

Pain specialist

24. On 5 September 2018, Mr A saw a pain specialist. The pain specialist described the consultation as "abbreviated", because Mr A had brought in the X-rays from 23 August 2018, which appeared to show that the femur was still fractured. The pain specialist suspected that Mr A's pain was from movement at the fracture site, which warranted orthopaedic attention. He referred Mr A to an orthopaedic surgeon, Dr E, at an orthopaedic clinic.

Orthopaedic clinic

25. On 10 September 2018, Dr E saw Mr A for further assessment, particularly of his left femur. Dr E documented that he reviewed the "previous imaging", along with a CT scan he took at

[5] When a fracture takes longer than usual to heal.
[6] A surgical procedure used to realign the kneecap.
[7] HDC has not been provided with any of the X-rays taken after 8 May 2018 until 23 August 2018. HDC understands that Dr B is referring to the 8 May 2018 X-ray, which was two months old at this time.

this appointment, which "confirms non-union[8] of the femoral fracture". Dr E identified that further intervention was needed in relation to the fractured femur and possibly the knee. He referred Mr A to his colleague, Dr D, an orthopaedic surgeon.

26. On 17 September 2018, Dr D met with Mr A. Dr D stated that when he saw Mr A, he was experiencing pain in his mid-thigh, which was worsening, as well as having some pain at rest. Dr D agreed that the CT scan arranged by Dr E confirmed that Mr A had a "symptomatic non-union of his left femur", and arranged surgical intervention for 26 October 2018.

End of DHB2 outpatient care

27. Dr C contacted Mr A on 20 September 2018 to arrange an appointment for the arthroscopic release. Mr A informed him that the procedure was no longer required. He told Dr C that he had been to see a pain specialist due to the leg pain he had been experiencing, and had been told that his leg was still fractured, and now he had planned surgery for his femur at a private hospital.

Surgical intervention at private hospital and postoperative recovery

28. On 26 October 2018, Dr D operated on Mr A's left femur at the private hospital. The surgery involved removal of the plate and screws that had been used in the previous surgery to stabilise the fracture, and insertion of a rod into the femur to stabilise it.[9]

Further information

29. Mr A said that while he waited for the arthroscopic release, he continued to struggle with exercising and the continuous pain it caused him. The quality of life and chronic pain he had over the year following his accident led him to have suicidal thoughts and to seek psychiatric help. He noted that after the operation at the private hospital, he had a "major decrease in pain".

30. Mr A raised his concerns directly with DHB2, but was not happy with the outcome. In his complaint to HDC, he stated:

> "I do not believe my rights to have services provided in a manner that minimises the potential harm to, and optimises the quality of life of, that consumer [have been upheld]."

31. In response to Mr A's complaint to DHB2, the Head of Department for Orthopaedic Services reviewed and commented on the X-rays taken on 23 August 2018. He stated:

> "These images are of [Mr A's] left femur before his surgery at [the private hospital] for non-union. The average healing time for a femur fracture is around 4 months with the diagnosis of a non-union therefore being around 8 months (often defined as twice the usual healing time). In the setting of high velocity multi-trauma this can be even longer. The diagnosis of non-union is therefore not as straight forward as it might perhaps

[8] When a fractured bone has not healed and there is little chance that it will heal without further surgery.
[9] Intramedullary nailing.

seem, and many patients don't end up having further surgery for several months to a year or more after their original injury."

32. In its response to HDC, DHB2 stated that while an X-ray on 16 July 2018 would have been appropriate, "[t]he x-ray would not have changed the diagnosis of non-union or treatment strategy".

33. HDC's expert advisor, Dr McKie, also noted that high-energy fractures such as the fractures sustained by Mr A are often difficult and take a long time to heal. This is evidenced by the long healing time even after the operation on 26 October 2018.

34. There was no recorded plan to manage either the delayed union or a possible evolving non-union.

Responses to provisional opinion

35. Mr A was given an opportunity to comment on the "information gathered" section of the provisional opinion. Where appropriate, his comments have been incorporated into this report.

36. DHB2 and Dr C were given the opportunity to comment on the relevant parts of the provisional opinion, and did not wish to comment.

37. Dr B was given the opportunity to comment on the relevant parts of the provisional opinion, and has not provided a response.

Opinion: Dr C — breach

38. The above facts clearly set out that Mr A was in pain for a prolonged period of time, and that there was a delay in identifying that his femur had not healed properly. Dr C's failure to order further investigations after 8 May 2018 was a key factor in this delay. Dr C also failed to document a care plan for Mr A with regard to his left femur.

Failure to order further investigations

39. Following the X-rays taken on 8 May 2018, no further imaging of Mr A's left femur was arranged by Dr C. The next X-rays of Mr A's left femur were taken on 23 August 2018 (approximately three and a half months later), and were arranged by his physiotherapist. Dr C told HDC that he had not intended to do any further imaging on the fractured femur until the planned arthroscopic release.

40. I sought external clinical advice from orthopaedic surgeon Dr John McKie, who advised that while the X-rays from 8 May 2018 show "some callus", they do not show convincing evidence of healing of all of the fracture. This is supported by the radiology report, which states: "No significant callus noted."

41. Dr McKie advised that at the time of the 8 May 2018 appointment:

> "Notwithstanding the other injuries, given that the patient was clearly still having significant pain and difficulty with load bearing, the lack of callus in the proximal part of the femur on the x-ray would normally raise the suspicion of delayed or evolving non-union."

42. Dr McKie also advised that Mr A had "extensive and high velocity injuries and as such it is not unexpected that some of these may be problematic to get to heal".

43. Given that the X-ray of 8 May 2018 did not show convincing evidence of healing, and as the June appointment had not occurred, it was particularly important that Dr C investigate delayed union or non-union at the appointment on 16 July 2018. Dr McKie advised:

> "With the patient presenting with pain on weight-bearing 9 months out from an injury, with the most recent X-rays over 2 months previously not clearly confirming evidence of union, [this] would normally have led an orthopaedic surgeon to investigate the cause of pain and look for the adequacy of union."[10]

44. Dr McKie advised that he would have expected the next step in management of the fracture to be to "confirm or refute whether the femoral fracture had united, initially with an x-ray", and that if the X-ray did not clearly confirm or refute the fracture, the next appropriate investigation would be a CT scan. I agree, and consider that the lack of further imaging at the 16 July 2018 appointment was a missed opportunity to identify and treat the cause of Mr A's ongoing significant pain.

45. Although orthopaedic registrar Dr B was the clinician who saw Mr A on 16 July 2018, Dr C was the supervising consultant doctor, and discussed Mr A with Dr B that day. Dr C was also in the clinic at the time, although he did not see Mr A at this appointment.

46. As the supervising consultant for Mr A's orthopaedic care, I consider that Dr C was the clinician responsible for the failure to order investigations into the union of the fracture, including X-rays, at this appointment.

47. Dr McKie identified the lack of timely scheduled outpatient review with X-rays and subsequent escalation to higher level imaging in the form of CT scanning, as a moderate departure from accepted practice. He advised that with "more aggressive investigation and management", Mr A may have received surgery earlier and experienced less pain and discomfort.

48. Further, Dr McKie identified the lack of an X-ray study on 16 July 2018 as a "significant departure from the expected level of care" and "probably a major factor in the delay in the diagnosis of non-union". I acknowledge that Dr C and DHB2 do not agree that a diagnosis of non-union could have been made earlier, even with further X-rays (see paragraphs 31 and 32). However, what is crucial here is that Mr A was presenting with pain in his left thigh

[10] Given timeframes are calculated from 16 July 2018.

several months after his injury and subsequent operation, and without clear evidence of union in May 2018, further investigation to confirm or refute union was warranted, but did not occur.

49. Accordingly, I agree with Dr McKie's advice. I am concerned that Dr C did not order further investigation to confirm or refute whether the fracture had united, and that no X-rays were taken at the appointment on 16 July 2018.

Lack of recorded management plan

50. There is no recorded plan for the management of delayed union or possible non-union of Mr A's femur.

51. Dr McKie advised: "[G]iven the lack of obvious healing and the patient's ongoing pain, the lack of a recorded plan to manage delayed or non-union is clearly a deficiency in the care plan."

52. In response to this, DHB2 told HDC:

> "The fact that there is no written plan for management of the delayed union is not unusual. It is usual for surgeons to comment on treatment plans once diagnoses are confirmed. It is uncommon for surgeons to speculate and write about possible treatment options for uncertain diagnoses or where possible outcomes are unknown."

53. However, given that Dr C identified the results of the X-rays from 8 May 2018 as indicating a possible delayed union, a recorded plan to manage this could reasonably be expected, and I therefore accept Dr McKie's advice. I also consider that in the context of a delayed union and the fact that Mr A was presenting with pain on weight-bearing, the management plan should also have included consideration of the possibility of an evolving non-union.

Conclusion

54. In summary, given the tendency of high-velocity fractures to be more problematic to heal, and the lack of clear evidence of union on 8 May 2018 and Mr A's continuing pain and discomfort in the upper thigh, I find that further investigation into the union of Mr A's femoral fracture was clearly warranted following the 8 May 2018 appointment, and by the 16 July 2018 appointment. I also find that as the supervising consultant, it was Dr C's responsibility to arrange this further investigation.

55. Further, I am critical of Dr C for not recording a plan to manage the potential delayed union of Mr A's femur. I would have expected a management plan also to have considered the possibility of an evolving non-union.

56. On the above basis, I find that Dr C did not provide services to Mr A with reasonable care and skill, and breached Right 4(1) of the Code of Health and Disability Services Consumers' Rights (the Code).[11]

[11] Right 4(1) states: "Every consumer has the right to have services provided with reasonable care and skill."

Opinion: Dr B — no breach

57. There was a missed opportunity to investigate the cause of Mr A's pain further by way of an X-ray, when Dr B assessed Mr A on 16 July 2018. However, for the reasons set out below, I am not critical of Dr B individually for not ordering X-rays at this appointment.

58. I sought external clinical advice from an orthopaedic surgeon, Dr John McKie, on the standard of care provided to Mr A.

59. Dr McKie advised:

> "With the patient presenting with pain on weight-bearing 9 months out from an injury, with the most recent X-rays over 2 months previously not clearly confirming evidence of union, [this] would normally have led an orthopaedic surgeon to investigate the cause of pain and look for the adequacy of union."

60. Dr McKie quantified this as a "significant departure from the expected level of care" and "probably a major factor in the delay in the diagnosis of non-union".

61. Although Dr B was the clinician who saw Mr A on 16 July 2018, Dr C was the supervising doctor, and he discussed Mr A with Dr B that day. Dr C was also in the clinic at the time, although he did not see Mr A at this appointment.

62. As the supervising consultant for Mr A's orthopaedic care, I consider that Dr C was the clinician responsible for ordering further investigations into the union of the fracture, including X-rays at this appointment, and therefore I do not find Dr B to have breached the Code.

Opinion: DHB2 — no breach

63. As a healthcare provider, DHB2 is responsible for providing services in accordance with the Code.

64. In this case, I consider that Dr C's departure from the accepted standard of care did not indicate broader systems or organisational issues at DHB2. Accordingly, I consider that DHB2 did not breach the Code directly.

65. In addition to any direct liability for a breach of the Code, under section 72(2) of the Health and Disability Commissioner Act 1994 (the Act), an employing authority is vicariously liable for any acts or omissions of its employees. A defence is available to the employing authority of an employee under section 72(5) of the Act if it can prove that it had taken such steps as were reasonably practicable to prevent the acts or omissions.

66. DHB2 is an employing authority for the purposes of the Act, and Dr C is an employee of the DHB. As set out above, I have found that Dr C breached Right 4(1) of the Code for failing to provide services to Mr A with reasonable care and skill.

67. I accept that the identified departures from the accepted standard of practice were due to individual decisions. As such, I do not consider that DHB2 could have taken any reasonable steps to prevent these actions, and, accordingly, I find that DHB2 is not vicariously liable for Dr C's breach of the Code.

68. In response to my provisional decision, Mr A reiterated his concern that he had to follow up with DHB2 himself in order to arrange his outpatient appointments. I accept that this appears to have been a scheduling issue, and that outpatient appointments were arranged after this was brought to Dr C's attention. However, I agree with the advice given to Mr A in his meeting with DHB2, that the onus should not be on the consumer to ensure that their outpatient appointments are scheduled. I take this opportunity to remind DHB2 of the importance of robust scheduling systems and processes to ensure that consumers receive timely outpatient follow-up.

Change since events

69. Dr C has advised HDC that he will request a CT scan if a delayed union is suspected.

Recommendations

70. I recommend that Dr C:

a) Provide a written apology to Mr A. This should be sent to HDC, for forwarding to Mr A, within three weeks of the date of this report.

b) Advise HDC, within three months of the date of this report, how he intends to ensure that he has appropriate peer/collegial support available to him for consultation on complex orthopaedic cases.

c) Record a management plan in any future case where there is a suspected delay in bone healing.

Follow-up actions

71. A copy of this report with details identifying the parties removed, except the expert who advised on this case, will be sent to the Medical Council of New Zealand, the Royal Australasian College of Surgeons, and the New Zealand Orthopaedic Association. The Medical Council of New Zealand will be advised of Dr B's and Dr C's names. The Royal Australasian College of Surgeons will also be advised of Dr C's name.

72. A copy of this report with details identifying the parties removed, except the expert who advised on this case, will be placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.

Appendix A: Independent clinical advice to Commissioner

16 March 2021

The following expert advice was obtained from Dr John McKie:

> "My name is John Stuart McKie, I am a Consultant Orthopaedic Surgeon based in Christchurch. I am employed in that role by the Canterbury and West Coast District Health Boards and am also in private practice. I am currently President Elect of the New Zealand Orthopaedic Association.
>
> Thank you for sending me the various clinical records and x-rays up until May 2018 on secure encrypted disc. I have also taken the liberty of accessing the more recent x-rays as part of [Mr A's] further orthopaedic management. I have no conflicts of interest with respect to the case under review.
>
> In summary, this is a complex trauma case where [Mr A] was involved in an accident on the 14th of October 2017. He was taken initially to [DHB1] where he received his acute and definitive orthopaedic surgical management. His listed injuries from his accident are extensive and include:
>
> 1. A left proximal humerus fracture.
> 2. A fracture of his right acetabulum.
> 3. A comminuted fracture of his left femur.
> 4. A fracture of his right patella.
> 5. Fractures of his right fourth rib.
> 6. A right perilunate dislocation.
> 7. A fracture of his left olecranon.
> 8. A right intra-articular distal femoral fracture.
> 9. A right thumb carpometacarpal dislocation.
>
> He underwent emergency surgical management on the day of his injury at [DHB1] and this included open reduction and internal fixation of his right patella, intramedullary nailing of his right femoral fracture, external fixation of his comminuted left femoral fracture, as well as reduction of his right thumb carpometacarpal joint and perilunate dislocation. Two days later on the 16th of November he underwent removal of the external fixator from his left femur with fixation with a long bridge plate and open reduction and internal fixation of the fracture of his left proximal humerus.
>
> On the 20th of October he underwent open reduction and internal fixation of his left olecranon and seven days later, on the 27th, he underwent open reduction and fixation of his perilunate dislocation which included placement of temporary K-wires to protect the ligamentous repair while it healed, as well as K-wiring to temporarily stabilise his thumb carpometacarpal dislocation. He was transferred from [DHB1] to [DHB2] on the 30th of October 2017 and subsequently discharged on the 6th of November 2017.

When reviewed on the 27th of November 2017 he was recorded as having a very stiff left knee with a range of motion from only 0 to 20°, so a manipulation under anaesthetic was planned and was carried out on the 31st of January 2018. He was discharged from [the public hospital] early in February 2018.

The care of his hand injuries was being managed by [Dr F], Orthopaedic Surgeon, who arranged for removal of the K-wires from his right hand and these were removed on the 11th of December 2017 which was just over six weeks following his surgery and just over eight weeks from the index injury.

There are extensive notes included from the physiotherapist suggesting on the 18th of December 2017 that 'the patient is doing too much and needs to pull back' and further on the 11th of January noting that at ten weeks post surgery the patient was out of the splint most of the time and was doing well apart from having some pain with crutches. The reports and response, as noted by the physiotherapist, are generally favourable. I note from the operating surgeon's original operating note the suggested post-operative management, as recorded at the time of operation, was to remove the K-wires from the thumb CMC dislocation four weeks post surgery and those from the carpal dislocation at ten weeks post surgery. [Dr F], as the treating surgeon, had elected to remove the wires at just over six weeks post surgery which both seems to have resulted in a good clinical outcome and is completely in line with therapy guidelines as included with the Sussex hand guide.

[Mr A] had an outpatient clinic appointment on the 5th of May 2018. He was noted at that stage to have 80° of flexion in his left knee, a probable external rotation mal-fixation of his femur and noted to be forming good callus about his proximal humeral fracture.

A further appointment was scheduled for the 12th of June 2018. However, the patient didn't attend and thus no x-ray was taken. [Dr C], however, telephoned the patient and discussed the management. A further appointment was rescheduled five weeks later on the 16th of July when [Mr A] attended and was seen by the Orthopaedic Registrar. At that stage the knee was noted to be again stiff with a range of motion of 0 to 75° and the patient noted to have pain on weight-bearing. Note was made of some callus formation being present on the most recent previous x-ray (that of the 5th of May), however, no x-ray was taken on the clinic visit of the 16th of July 2018. An application was made to ACC for a further manipulation under anaesthetic and arthroscopic debridement and lateral release of the knee to try and improve movement and this was scheduled for the 20th of September 2018. However, when the patient didn't present and was telephoned he informed the team at [DHB2] that he had seen a pain specialist and was to have surgery … for his non-union.

I note he had an x-ray taken on the 23rd of August 2018 which was ordered by [the physiotherapist] and on the basis of that he was subsequently referred via a pain specialist to [Dr E], Orthopaedic Surgeon, who reviewed [Mr A] on the 10th of September 2018. At that stage he was noted to have a stiff knee which flexed from 0 to

80° and had a CT scan which confirmed the radiographic suspicions of a non-union of part of his left femoral fracture. The recommended management was for revision of the fixation with possible bone grafting and he was referred to [Dr D], Orthopaedic Surgeon, who carried out the surgery on the 26th of October 2018.

Notwithstanding this treatment, his fracture was still slow to heal. When reviewed by [Dr D] over a year later on the 6th of December 2019 the locking screws were removed from the intramedullary nail in the femur to dynamize the fracture. At that stage he discussed doing an exchange nailing and reaming to auto bone graft the fracture, but the decision was ultimately made to leave things alone to gradually and spontaneously heal on its own.

With respect to your specific questions:

1. Whether or not you consider there was no indication of a non-union of [Mr A's] left femur at any time during his care at the [DHB2].

At the time of his outpatient appointment on the 5th of May 2018 (six and a half months following acute injury and fixation) there was certainly some callus showing distally, however, there was no callus proximally at the fracture. Notwithstanding this, the fixation was still intact with no suggestion of any loosening or incipient failure.

The type of fixation used is designed to be moderately flexible, such that the bone heals by secondary intention rather than primary bone union, and as such one would normally expect there to be significant callus present throughout the entirety of the fracture complex if healing was proceeding at the expected and hoped for rate. Notwithstanding this, the patient had had a high energy fracture and as such the likelihood of delays to union occurring were very real. Notwithstanding the other injuries, given that the patient was clearly still having significant pain and difficulty with load bearing, the lack of callus in the proximal part of the femur on the x-ray would normally raise the suspicion of delayed or evolving non-union.

2. The appropriateness of the decision to perform a lateral release of the knee on the 16th of July 2018 despite the condition of [Mr A's] left femur.

Clearly the patient had significant and expected stiffness of his knee as a consequence of the major and massive trauma that he sustained. It is important to manage the joints and retain their mobility as well as optimising the healing of the bones. In retrospect, the lack of signs of failure of the fixation, I assume, led [Dr C] to focus on the stiffness of the knee as the primary concern. In the presence of an intact and healing femur, the planned actions were not unreasonable, however, with the clear vision of hindsight, focus would have been more appropriately directed at the adequacy or otherwise of the femoral fracture healing.

3. The appropriateness of clinical follow up assessment and treatment planning upon [Mr A's] discharge from [DHB2's] care.

From reviewing the clinical record, it would seem that [Mr A's] left femoral injury, including his associated stiff knee, were the major impediments for his ongoing mobility and rehabilitation. It is surprising therefore that following the x-ray on the 5th of May and notwithstanding the failure to present on the 12th of June, that there wasn't further planned x-ray follow up. I note it was, in fact, [the physiotherapist] who ordered the x-ray in August 2018 which led to the ultimate referral to the Orthopaedic Surgeon for definitive management.

The recorded management with respect to his hand injury, most of which took place prior to his discharge in February all seems entirely reasonable. However, there does seem to be the lack of any recorded coherent and comprehensive management plan for his long bone injuries.

4. Whether all appropriate tests, scans and assessments were undertaken to address [Mr A's] left femoral injury.

As was evidenced by the investigations organised by [Dr E], a CT scan of his left femur between May and July 2018 would have been a useful adjunct to what x-rays were taken. While there is some callus on the distal part of the femoral fracture, there is no evidence of bone healing on the proximal part of the fracture in May and, assuming the patient had significant pain as he did in July and August, CT scanning at that stage would have been a very sensible investigation to undertake.

This patient, as noted above, had extensive and high velocity injuries and as such it is not unexpected that some of these may be problematic to get to heal. As such, if the patient is still having significant and unexpected levels of pain over six months from his injury fixation, and the radiographic findings do not conclusively support solid bony healing, further investigation should have been undertaken.

5. The appropriateness of [Dr F's] decision not to reapply a thumb spica cast.

As alluded to in my brief summary of the case above, [Dr F's] management of the patient's hand injuries was at slight variance to the recommended plan of the operating surgeon in his post-operative note, however, [the] management was entirely within the envelope of contemporary practice, as evidenced by the enclosed information from Sussex hand guide.

I can understand this may have led to some confusion or concern if the patient felt he was getting conflicting advice. However, on reviewing the responses from the hand therapist, it would seem her management was both appropriate and efficacious in his case.

6. Any other matters that you consider amount to a departure from accepted standards of care.

It was unusual that on the clinic visit of the 16th of July 2018, nine months post injury and following the patient having missed an appointment in June, that no x-ray was taken. While it is to be hoped that an x-ray would have been taken on the patient's admission for the manipulation and arthroscopic lateral release and debridement, the absence of this radiographical information at the time of the surgery, if it was to proceed, could have resulted in the fixation being damaged or broken given the absence of bony healing. Similarly, given the lack of obvious healing and the patient's ongoing pain, the lack of a recorded plan to manage delayed or non-union is clearly a deficiency in the care plan. It must be acknowledged, however, that although nothing is clearly recorded, [Dr C] may have been considering further options if the patient was still experiencing pain following his proposed arthroscopic treatment.

It must also be acknowledged that although the delay to his femoral fracture wasn't identified and acted on as early as retrospect would suggest it should have been, this has resulted in no additional harm to [Mr A]. As noted previously, high energy fractures like this are often difficult and take a long time to get to heal, as evidenced by the ongoing delays following his management being taken over by [Dr D]. With more aggressive investigation and management he may have undergone what in retrospect turned out to be the definitive secondary surgical management of his fracture sooner and had less pain and discomfort, but would still have had a very long road to full bony healing.

As already noted, I don't believe there is any deviation from an appropriate standard of care with respect to the management of [Mr A's] hand injuries and I would find no fault with the management of [Dr F].

With respect to the management of his left femoral fracture, the lack of timely scheduled review outpatient appointments with x-rays and subsequent escalation to higher level imaging in the form of CT scanning when the patient was still clearly experiencing pain from his delayed union does represent a deviation from accepted practice. As noted above, other than causing additional delays before secondary treatment was instigated, this has not resulted in any long-term harm to the patient and [Dr C] was obviously focused on the issue of his painful stiff knee. As such, I do not believe this to be a major deviation from accepted care.

In terms of recommendations for improvement to prevent similar occurrences in the future, there is real merit in complex cases, in those that are not following the normal expected natural history, to be discussed with colleagues. In a small unit like [the public hospital], there is clearly benefit in individual consultants who may only manage small numbers of major trauma cases to formally review cases under their care with their colleagues. Often the benefit of someone independently reviewing a case with fresh eyes will gain insights that may have been hidden in plain sight to the treating consultant who has been seeing a patient regularly over an extended period of time.

In summary again, it must be stressed that while there was some delay in appreciating the lack of union of the fracture, this is a consequence of the index injury and not related to any omission or action by any of the treating medical staff.

On reviewing all the information, I was intrigued to read a letter written on the 27th of November 2018 by [the Quality Coordinator], in which, referring to non-unions, she said 'callus formation can contribute to the delay in bone union'. This struck me as being a somewhat bizarre and inappropriate comment and not one that I would expect any orthopaedic medical staff to make.

If you have any further questions or require clarification please feel free to contact me directly and I will endeavour to provide further clarity or insight.

Kind regards

Yours sincerely

JOHN MCKIE, MB ChB, FRACS
Orthopaedic Surgeon"

Emails regarding quantification of departures identified

"Kia ora Dr McKie

I write further to my email below.

I note that you have identified some deviation from accepted practice with respect to the management of [Mr A's] femoral fracture, namely:

1. No X-ray was taken on the 16 July 2018 appointment.
2. Lack of recorded plan to manage the delayed or non-union of [Mr A's] left femur.
3. Lack of timely scheduled outpatients review with x-rays and CT scanning.
4. Delay in identifying the femoral fracture.

Can you please quantify the departures identified as to whether they are a mild, moderate or severe departure from accepted standards of care? I look forward to your reply.

Thank you.

Ngā mihi

[HDC]"

Response from Dr McKie

"1. The lack of an X-ray study on 16-7-18 was a significant departure from the expected level of care and was probably a major factor in the delay in the diagnosis of non union.

2. Often a treating surgeon will have an informal and undocumented plan, however in this case, the absence of any further action or investigation suggests that this omission is also significant.

3&4 become inevitable consequences of the failures noted in 1&2.

In essence the deficiencies are at least moderate departures from accepted practice. If a patient is experiencing significant ongoing pain following a traumatic fracture, the fundamental first question is 'is it healed or not' and this doesn't seem to have been asked until the Physiotherapist ordered an X-ray!

Regards
John McKie"

Addendum to advice

"Thanks for your email of the 22nd of February requesting further comment and review of [Dr C's] response to my report of the 16th of March 2021.

I have reviewed the responses that you sent to me and in [Dr C's] response he confirms that he was present at the Outpatient Clinic on the 16th of July 2018 and supervised [Dr B] who saw and made the annotation of [Mr A's] ongoing care.

As noted in my previous report, the patient was recorded as complaining with pain on weight-bearing at the time of the clinic appointment on 16.07.18. The patient is also recorded as having a relatively stiff knee with a range of motion of 0 to 75°, however, this would not normally be expected to cause significant and ongoing pain on weight-bearing. It also has to be noted that this clinic appointment occurred just over 9 months following the date of the index trauma and his most recent previous x-rays done over 2 months earlier on the 5th of May, while showing some callus, did not show convincing evidence of healing of all of the comminuted fracture.

With the patient presenting with pain on weight-bearing 9 months out from an injury, with the most recent x-rays over 2 months previously not clearly confirming evidence of union, would normally have led an orthopaedic surgeon to investigate the cause of pain and look for the adequacy of union.

I would have expected at this stage the first line of management would have been to confirm or refute whether the femoral fracture had united, initially with an x-ray. If the x-ray was equivocal, the next appropriate investigation to ascertain whether there was adequate fracture callus bridging the fracture would have been a CT scan.

To use an image intensifier in an operating theatre situation to assess union would seem an unlikely and probably ineffective manoeuvre to obtain useful diagnostic information. It would not be a manoeuvre that was easily performed with the patient set up for a therapeutic arthroscopy of the knee and would give poorer quality imaging of any healing bone that was present. The only possible advantage of image intensification would be to do live screening to see if there was objective movement at the fracture site on stressing, although I would expect this to be ineffective given the patient had a fracture that was internally fixed and therefore stabilised.

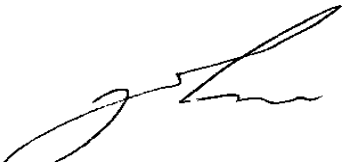
I think a more likely explanation is that [Dr C] had overlooked the possibility of a non-union being the cause of [Mr A's] symptoms because he was focused on the reduced range of motion of the knee.

His proposed arthroscopic surgery for a stiff knee was not unreasonable. However, at the time it was planned, this was a more peripheral problem for [Mr A] compared to the clearly ununited femoral shaft fracture.

If any further clarification is required please feel free to contact me.

Kind regards

Yours sincerely



John McKie, MB ChB, FRACS
Orthopaedic Surgeon"