Orthopaedic Surgeon, Dr B

A Report by the
Deputy Health and Disability Commissioner

(Case 19HDC01886)

Health and Disability Commissioner
Te Toihau Hauora, Hauātanga

Contents

Executive summary

1. This report concerns the care provided to a woman by an orthopaedic surgeon following surgery to remove a plate and screws from the woman's elbow after a complex fracture. The report highlights the importance of responding appropriately when a patient presents with significant pain.

2. The woman saw the orthopaedic surgeon three times after the surgery, and she continued to experience pain. The surgeon did not arrange an X-ray to investigate this further. Approximately three months after the surgery, the woman's GP referred her for an X-ray, and she was found to have sustained a fracture through one of the screw holes.

Findings

3. The Deputy Commissioner found that the orthopaedic surgeon did not provide the woman with an appropriate standard of care and breached Right 4(1) of the Code because he did not organise for the woman to have an X-ray to investigate her continuing pain.

4. The Deputy Commissioner also found that the orthopaedic surgeon breached Right 6(1) of the Code because he did not discuss with the woman, ahead of the surgery, the risk of re-fracture when a plate and screws are removed. The Deputy Commissioner considered this to be information that a reasonable consumer, in the woman's circumstances, would expect to receive.

Recommendations

5. The Deputy Commissioner recommended that the orthopaedic surgeon apologise to the woman; provide HDC with a copy of the information he now gives to patients ahead of metalware removal surgery; and use an anonymised version of this report for discussion with his orthopaedic colleagues.

Complaint and investigation

6. The Health and Disability Commissioner (HDC) received a complaint from Ms A about the services provided to her by an orthopaedic surgeon, Dr B. The following issue was identified for investigation:

- *Whether Dr B provided Ms A with an appropriate standard of care between September 2018 and May 2019, inclusive.*

7. This report is the opinion of Deputy Health and Disability Commissioner Kevin Allan, and is made in accordance with the power delegated to him by the Commissioner.

8. The parties directly involved in the investigation were:

Ms A	Consumer/complainant
Dr B	Orthopaedic surgeon

9. Further information was received from the DHB, a radiology service, a medical centre, and a physiotherapy service.

10. Independent expert advice was obtained from an orthopaedic surgeon, Dr Craig Ball (Appendix A).

Information gathered during investigation

Background

11. On 18 January 2018, Ms A (aged in her sixties) had a fall and sustained a complex fracture to her left elbow.[1]

12. Ms A had surgery[2] on 22 January 2018 at a public hospital, under locum orthopaedic surgeon Dr C. Dr C used a metal plate and screws to fix Ms A's bone into the correct position. A follow-up X-ray the next day showed normal bone alignment.

13. On 30 May 2018, Ms A was seen at the DHB fracture clinic by an orthopaedic registrar, who suggested that the metalware could be removed after 12–18 months, if indicated.

Care provided by orthopaedic surgeon Dr B

14. On 12 September 2018, Ms A was seen by a private orthopaedic surgeon, Dr B, following a referral by her GP. Ms A presented with a sharp electric-shock-like pain of 8/10 in her elbow, was unable to extend her elbow fully, and also had a loss of supination.[3] An X-ray taken that day showed that her fracture had healed. Dr B felt that Ms A's symptoms were related to discomfort over the plate, but that the loss of supination was likely related to the initial fracture. He recommended removing the metalware in the first instance because he considered that there was a good chance that it would help to relieve her symptoms. Ms A agreed to this plan, as she hoped that it would mean she could return to her work as a hairdresser sooner.

15. On 30 October 2018, Dr B performed surgery at a private hospital to remove Ms A's metalware. He documented that this was achieved without difficulty or complication, and that he planned to review Ms A in eight days' time.

[1] A Monteggia fracture dislocation of the elbow. This involves dislocation of the elbow and fractures of the radial head and ulna.
[2] An open reduction (realignment of the fractured bone after incision into the fracture site) and internal fixation of the left proximal ulna and radial head using metalware.
[3] Rotation of the forearm and hand so that the palm faces forward or upward.

16. Postoperatively, Ms A saw Dr B in clinic three times over two months:

- On 7 November 2018, Dr B documented that Ms A's elbow was "still quite stiff and sore". Ms A reported that she told Dr B that the pain was "ten times worse than after the original reconstruction". Dr B recommended that Ms A see a physiotherapist. Ms A stated that she attended one physiotherapy session but could not continue because of excruciating pain. She told HDC that she vomited because of the pain and had to see an emergency doctor for pain relief and anti-nausea medications.
- Dr B reviewed Ms A again on 14 November 2018 and noted that she had "quite significant pain in the elbow". He felt that this was suggestive of incipient regional pain syndrome (IRPS),[4] which he said Ms A was more at risk of owing to her smoking history.
- At a further review on 19 December 2018, Dr B noted that Ms A's wound was healing well and that she was fit for a graduated return to work. He discharged Ms A from his care with instructions for Ms A to mobilise.

17. Dr B did not order a further X-ray of Ms A's elbow at any of these reviews.

18. On 17 December 2018, Ms A was seen by an independent medical assessor for ACC, who reported that "since having the metal ware removed her elbow ha[d] felt much better" and that her symptoms had improved over the past few weeks. However, the assessor also noted that Ms A's pain levels continued to range from between 2–3/10 at best and 8/10 at worst.

19. On 18 January 2019, Ms A had an X-ray following a radiology referral from her GP for a "bulge left elbow post removal of plates and screws". The X-ray report concluded: "Proximal ulnar appearances are suspicious for chronic osteomyelitis[5] and fracture. Orthopaedic opinion recommended."

20. Ms A's GP re-referred her to Dr B, who saw her on 30 January 2019. Dr B noted that Ms A had developed a re-fracture, and that there was evidence of healing. He stated:

> "I explained to [Ms A] that the fracture had occurred through a screw hole and that this may have occurred at the time of surgery, with subsequent displacement of the fracture. I can categorically say that there was nothing during the surgery which would have indicated that a stress fracture had occurred through the screw hole which would have prompted me to obtain an X-ray."

21. Dr B then reviewed Ms A twice more in his clinic on 25 February and 27 May 2019, and X-rays were taken shortly before each review. While Ms A's pain was noted to have improved, she continued to have problems with rotating her hand and forearm to face upwards and downwards, and in how far she could bend and straighten her elbow.[6]

[4] A condition of chronic severe, often burning pain, usually of part or all of one or more extremities. Typically it occurs following an injury.
[5] Infection in the bone.
[6] Flexion.

22. Dr B advised Ms A to contact him in future if she experienced further problems. He told HDC that he did not propose revision surgery for Ms A, as he felt that the fracture would heal without the need for further surgery.

Further information

Ms A

23. Ms A stated that prior to her metalware removal surgery her prognosis was positive, but that as a result of the second surgery and re-fracture she is now left with a life-long disability. Ms A said that the reduced movement in her elbow is such that she may never return to her profession.

24. Ms A is concerned that Dr B did not send her for an X-ray sooner after the metalware removal when she was complaining of pain.

Dr B

25. Dr B stated:

> "Had there been any doubt as to whether a fracture had occurred [during surgery] I would have X-rayed [Ms A] on the table, and if a fracture had been identified would have re fixed the fracture with a lower profile olecranon plate. There was nothing to suggest to me at the time that a fracture had occurred and in the subsequent post operative visits I did not feel that her pain was above the level of expected pain."

26. In Dr B's opinion, not undertaking an X-ray prior to mid-January 2019 was reasonable.

27. Dr B submitted that the timing of removal of metalware is determined by whether the fracture is united, and whether the patient is experiencing symptoms related to the metalware (rather than by a defined time period). He also submitted that there is no expectation that postoperative X-rays should be performed routinely after removal of metalware.

28. Dr B said that following the metalware removal surgery he gave Ms A instructions about "not forcing the elbow". He recorded in his notes from the 14 November 2018 consultation: "[Ms A] is to undertake gentle movements only and on no account to force the elbow."

29. Dr B told HDC that prior to the surgery, he did not discuss the risk of re-fracture with Ms A as "it is a very rare occurrence". He said that at no stage would he have told Ms A that removing the metalware would give her significantly more movement. He said: "[T]he plate was removed to relieve pain, not to increase range of movement."

30. Dr B stated:

> "I am sorry that [Ms A] has experienced so many difficulties, and I am sorry if I have failed to recognise the presence of a refracture but these diagnoses are not always obvious. I wish her and her partner well for the future."

Responses to provisional opinion

31. Dr B was given the opportunity to respond to the provisional opinion. Where appropriate, changes have been incorporated to the report.

32. Dr B maintains that it was reasonable not to arrange an X-ray for Ms A postoperatively, because his assessment was that the pain she was experiencing "was not significantly worse than her pre-operative pain in the immediate post-operative period and therefore did not trigger concern".

33. Ms A was given the opportunity to respond to the "information gathered" section of the provisional opinion. She reiterated her concerns about Dr B's care. Ms A's response has been provided to Dr B to consider.

Opinion: Dr B — breach

Standard of care

Metalware removal

34. Nine months after Ms A's initial surgery, Dr B removed the metalware from Ms A's elbow.

35. My expert advisor, orthopaedic surgeon Dr Craig Ball, advised that the timing of removal of metalware depends on the nature and severity of the patient's symptoms. He said: "If the patient decides that the nature and severity of their symptoms are sufficient to warrant further surgery, then metalware can be removed at any time."

36. Dr Ball noted that the comment from the orthopaedic registrar regarding leaving metalware in place for 12 to 18 months is purely anecdotal, "as it is felt that the longer metalware is left insitu, the better the initial fracture would have healed and remodelled, and this might also minimise the risk of refracture through the original fracture site". However, Dr Ball said that there is no absolute scientific data regarding this. He told HDC that he saw no issue with the indications for removal of Ms A's metalware.

37. I accept this advice, and therefore consider that the removal of Ms A's metalware nine months postoperatively was reasonable in the circumstances.

Failure to obtain X-ray in postoperative period

38. Following the metalware removal, Ms A presented to Dr B three times over two months. She continued to experience pain. Dr B did not order a further X-ray of Ms A's elbow at any of these reviews, and maintains that this was reasonable.

39. For the purpose of my opinion, it is not necessary for me to make a finding as to when the re-fracture occurred. I agree with Dr Ball that the key issue in this case is that Dr B did not X-ray Ms A's elbow when she continued to present with significant pain in the early period following the metalware removal. Dr Ball noted that Dr B felt that Ms A's significant pain in

the elbow was suggestive of IRPS. However, Dr Ball said that there was no clear evidence for the basis of Dr B's opinion.

40. Dr Ball advised:

> "Routine post-operative X-rays after metalware removal are not indicated and that is clear … this is not that circumstance, this is a situation where a patient has had an orthopaedic procedure where there is always a risk, albeit small, of re-fracture and the patient re-presented on more than one occasion complaining of significant pain at the operative site. The fact that [Dr B] did not consider this possibility and undertake the simple task of an X-ray of the elbow to exclude this, is in my opinion a moderate departure from accepted clinical practice."

41. Dr Ball said that a peer review would also uphold that a failure to perform a plain X-ray in this situation would be a departure from standard practice.

42. Dr B submitted in response to the provisional opinion that he assessed Ms A's pain as "not significantly worse than her pre-operative pain in the immediate post-operative period". This is in contrast to Ms A's statement that the pain was excruciating, and "ten times worse".

43. It is difficult to resolve the conflicting accounts about whether Ms A's pain was worse than before her surgery. However, both parties accept that Ms A continued to experience pain and that the pain was, in itself, significant. I note Dr Ball's comment:

> "An X-ray is an inexpensive and very easily obtained investigation with minimal radiation exposure and any patient who has had a bony intervention and subsequently has problems, then the standard of care would be that an X-ray would be obtained."

44. I accept this advice. In the circumstances of Ms A re-presenting with continuing pain, I would have expected Dr B to organise an X-ray to investigate this further, and I am critical that he did not do so.

45. Ms A had the right to have services provided to her with reasonable care and skill by Dr B. Because of the failure to organise an X-ray in the circumstances detailed above, I consider that Dr B did not do this. Accordingly, I find that Dr B breached Right 4(1) of the Code of Health and Disability Services Consumers' Rights (the Code).

Provision of information

46. Prior to the removal of Ms A's metalware, Dr B did not discuss with her the risk of re-fracture after the removal. He said that this was because "it is a very rare occurrence".

47. Dr Ball advised:

> "Re-fracture after removal of metalware is a very well accepted complication and I would have thought with any metalware removal that that would be the first potential complication to advise the patient of. Whilst it is not common, it is certainly well reported in the literature …

> This is always a risk with metalware removal and the risk is not insignificant. I would have thought that discussing such a complication would be considered the standard of care in this country."

48. Dr Ball also noted that Ms A had risk factors for a re-fracture; namely, her smoking history, COPD,[7] and that the metalware was removed only nine months after sustaining a very complex fracture.

49. I accept this advice. I consider that Dr B should have discussed with Ms A the risk of re-fracture with metalware removal. In my view, this is information that a reasonable consumer, in Ms A's circumstances, would have expected to receive, and she did not. Accordingly, I find that Dr B breached Right 6(1) of the Code.

Other comment

50. Dr B said that he did not propose revision surgery for Ms A as he felt that the re-fracture would heal without the need for further surgery. Dr Ball advised that it may have been prudent, once the re-fracture had been identified, to make a referral to a subspecialist upper limb surgeon "to give [Ms A] at least the best available opportunity to understand her longer term options, even if this required further surgical management".

51. I accept that while offering revision surgery and a referral to a subspecialist may not have been absolutely necessary in accordance with accepted practice, these additional steps would have been prudent in Ms A's case. I encourage Dr B to reflect on Dr Ball's comments in this regard.

Changes to practice

52. Dr B said that he has reflected extensively on Ms A's case and has undertaken to make the following changes to his practice:

- He will produce a brochure for his practice that will include indications and potential risks and benefits of the removal of metalware. This will include the risk of re-fracture through a screw hole.
- He will document in more detail the specific instructions given to the patient in his postoperative consultations.

[7] Chronic obstructive pulmonary disease (progressive lung disease).

Recommendations

53. I recommend that Dr B:

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

b) Provide HDC with a copy of his brochure that outlines the indications, risks, and benefits of metalware removal, within three weeks of the date of this opinion.

c) Use Ms A's case as a case study to discuss with his orthopaedic colleagues. This should focus on the indications for X-ray when a patient presents with ongoing significant pain after metalware removal. This is not to suggest that postoperative X-rays should be taken routinely after every metalware removal operation. HDC will provide Dr B with a link to the anonymised version of this report for this purpose. The shared learning should be undertaken within three months of the date of this opinion.

Follow-up actions

54. 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 and the Royal Australasian College of Surgeons, and they will be advised of Dr B's name in covering correspondence.

55. 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 the Commissioner

The following expert advice was obtained from orthopaedic surgeon Dr Craig Ball:

"I have been asked to provide an opinion to the Commissioner on case number C19HDC01886 and I have read and agreed to follow the Commissioner's guidelines for independent advisors. I am not aware of any conflict of interest.

I am a qualified orthopaedic surgeon having completed my orthopaedic training on the New Zealand Orthopaedic Association training programme. I then had two years post-fellowship overseas experience in shoulder and elbow surgery. For the last 19 years I have practised exclusively as a subspecialist shoulder and elbow orthopaedic surgeon and now have considerable experience in all matters pertaining to shoulder and elbow orthopaedic surgery.

My referral instructions from the Commissioner relate to providing advice on whether I consider the care provided met accepted standards in all the circumstances and to explain my rationale. In particular, I have been asked to comment on five specific questions.

1. Whether there were sound clinical indications for the removal of [Ms A's] metal ware.
2. Whether removal of metal ware, nine months post insertion, was clinically appropriate and consistent with accepted practice.
3. Whether the management of [Ms A's] post metal ware removal was consistent with accepted practice and, particularly given the clinical scenario presented, should post-operative x-rays have been performed sooner than January 2019.
4. Any additional comments on [Ms A's] management by [Dr B] on the content of [Dr B's] response.
5. Any other matters in this case that I consider amount to a departure from accepted practice.

The documents that were provided for my review include:

1. Letter of complaint dated 30 September 2019
2. [Dr B's] response dated 1 November 2019
3. Clinical records from [Dr B]
4. Clinical records from [the DHB] covering the period from January 2018 onwards.

I have also been provided with [Ms A's] radiology, which I have reviewed.

By way of background, [Ms A] is a [woman in her sixties] who slipped and fell on some steps on 18 January 2018 and sustained a closed injury to her left non-dominant elbow. She was taken to the emergency department at [the DHB] where she was assessed, and plain x-rays were taken. The plain x-rays revealed a complex Monteggia variation fracture dislocation of the elbow. She was taken to the operating room that night for

manipulation under anaesthetic and placement of the arm in a back slab. A subsequent CT scan was then arranged prior to definitive surgical management.

On 22 January 2018, [Ms A] underwent open reduction and internal fixation of her left proximal ulna and radial head in conjunction with repair of the lateral ulnar collateral ligament. The treating surgeon primarily responsible was [Dr C], a locum orthopaedic surgeon.

Following discharge, [Ms A] was reviewed again by an orthopaedic registrar in the fracture clinic on 7 February 2018. On removal of her back slab, he noted the wound looked excellent with no signs of infection and that her distal neurology was intact. The plan, as per the operative record, was for an unlocked range-of-motion brace so that some gentle range of motion exercises could be commenced.

When reviewed again on 18 April 2018 by [Dr C], he noted that [Ms A] was doing quite well, and her range of motion was documented as lacking only the last 10 degrees of extension with flexion from that to 100 degrees. However, up until that point, she had not done much with rotation and the plan was to get her going with physiotherapy to help with rotation. He noted on the x-ray that the fracture had significantly improved and there was no subluxation of the joint but he wondered whether the radial head may have collapsed slightly, however, there was no exposed metal ware of note. [Ms A] had been weaning out of her range-of-motion brace since the six-week mark post-operatively.

I understand [Ms A] may have been reviewed again in the fracture clinic on 30 May 2018, but I do not have a copy of that consult note. I understand at this time, [Dr C] was not available because he had subsequently moved overseas to complete a post-graduate fellowship. Instead, [Ms A] was reviewed by one of the [orthopaedic registrars]. In his correspondence dated 30 May 2018 he noted she was not yet able to perform full time work. There was prominence of the plate posteriorly and a range of motion from 25–120 degrees with supination of 50 degrees and pronation to 60 degrees. It was suggested that plate removal could occur some 12–18 months following the surgery if it were felt that this was indicated.

It then appears that [Ms A] was reviewed by an [ACC medical assessor] on 11 July 2018, again I do not have a copy of that correspondence. An x-ray taken on 25 July 2018 was reported as showing no hardware complication and the fracture appeared well healed. It was also noted that there were more loose bodies anteriorly, possibly within the joint.

I understand it was at the request of [Ms A's] general practitioner that she was subsequently referred to see orthopaedic surgeon [Dr B]. I do not have a copy of the general practitioner's consultation records, only the initial consultation letter from [Dr B] dated 12 September 2018. In this consultation record, [Dr B] noted that [Ms A] had a history of previous fracture to the left distal radius in 2013, which was treated with open reduction and internal fixation with the radial plate and tension band wiring of the ulnar styloid. He documented the current symptoms as being that [Ms A] was

experiencing sharp, electric shock-like sensations over the tip of the olecranon at the angle of the plate with a pain she rated as 7 and 8 out of 10 on a visual analogue scale. She had difficulty sleeping and she also noted that the elbow felt weak and stiff and that she had been unable to fully extend the elbow since the injury. There was also loss of forearm rotation and pain with loading of the elbow, which had been causing difficulty with her work and, to date, she has been unable to return to that work. [Dr B] documented well healed scars over the olecranon but that she was very tender over the plate with palpation reproducing her pain. There was no tenderness over the ulnar nerve. He documented range of motion from 30–130 degrees with reasonably symmetric pronation but supination being limited to only 20 degrees past neutral. There was slight loss of dorsiflexion and palmar flexion of the wrist. He noted she had a history of hypertension and chronic obstructive pulmonary disease. A further x-ray of the elbow was undertaken, which again showed union of the fractures with no elbow effusion. It was reported that there were moderately severe degenerative changes of the elbow, most marked within the radiocapitellar joint but no intra-articular loose body.

[Dr B] believed that [Ms A's] symptoms were coming from discomfort over the plate but felt that the loss of supination was probably related to her radial head fracture and he recommended removal of the metal ware in the first instance as he felt there would be a very good chance that this would help relieve her symptoms.

That procedure was undertaken on 30 October 2018. The operation notes simply stated that under general anaesthetic, a tourniquet and betadine prep that [Ms A's] previous incision was re-opened and the metal was removed without difficulty. When reviewed on 7 November 2018, one week following her surgery, [Dr B] documented that [Ms A's] elbow was quite stiff and sore but that she was to continue with her exercises and have physiotherapy. She was reviewed again on 14 November 2018 and one week later he noted her wound was healing well but she had quite significant pain in the elbow, which he felt was suggestive of incipient regional pain syndrome. He noted that [Ms A] was a smoker and may be at increased risk of developing this. He felt there was no sign of infection. He instructed her to undertake gentle movements only and on no account to force the elbow and the plan was to review her in a further six weeks.

She was reviewed again on 19 December 2018. He noted the wound was healing well. A small suture fragment was removed and that she was to mobilise and was fit for a graduated return to work and he discharged her from the clinic. On 13 January 2019, she was seen again by [Dr B] at the request of her GP as she was continuing to have discomfort over the proximal ulna at the site of metal ware removal. He noted it was not red or fluctuant, but it was tender to palpation. Her GP had organised an x-ray of the elbow, which was reported as showing new patchy osseous lucency and sclerosis of the proximal ulna over a length of approximately 32mm. On the AP radiograph there was a somewhat separated triangular shaped piece of bone at the medial margin and there was a well-defined fracture line in the oblique radiograph. There was surrounding soft tissue swelling. The proximal radius was intact. The conclusion was that the appearances were suspicious of chronic osteomyelitis and fracture and orthopaedic

opinion was recommended. [Dr B] felt that the x-rays demonstrated that [Ms A] developed a re-fracture through one of her screw-holes, but that there was copious callus formation around the fracture indicating that it was attempting to heal. I understand there was some discussion about a further cast, but [Dr B] was concerned about developing stiffness and did not feel that her pain was significant enough to warrant that. He organised a full blood count and C-reactive protein to ensure there was no evidence of infection, but he did not feel this was the case clinically, and the plan was to review her again in a further month with another x-ray at that point.

When reviewed a month later, [Dr B] noted that [Ms A's] elbow was settling down and that she had lost a lot of the pain over the proximal ulna and the swelling was receding. He felt the fracture through the previous screw-hole was healing and he believed that this accounted for a symptomatic improvement. He was happy for her to start work again and the plan was to review her again in three months. This further review was on 27 May 2019 when [Dr B] noted that [Ms A's] elbow had improved significantly. She had not improved her pronation and supination movement and her flexion extension range of motion remained from 30–100 degrees. He felt further x-rays on 23 May 2019 demonstrated that the fracture was progressing to union. The report documented that there was progression of the sclerosis of the proximal ulna, but complete healing had not yet occurred. At that stage, [Dr B] suggested continuing with her exercises and asked her to contact him if there were any further problems in the future.

I note that there are differing accounts of events in this case. In the letter of complaint dated 30 September 2019 from [the] Community Law Centre, Section 21 of that states that on 30 January 2019 when [Ms A] was referred to [Dr B] again that she saw him with a support person. She asked why the pain she had experienced following the removal of the metal ware on 30 October 2018 had been so severe. In that letter of complaint, it states that [Dr B] proceeded to tell her that he had fractured her ulna during surgery when he was removing some of the screws as he had to use considerable force. [Ms A] states that this was a shock as [Dr B] had never told her this before and he had ordered her to have physiotherapy after the surgery and then when she complained of the terrible pain, he suggested that it was a pain syndrome. Section 22 of that letter of complaint also states that at that meeting [Ms A] asked [Dr B] if it was worth him putting a further plate in to correct the deformity but he said that even putting her arm in a cast at that stage would further inhibit movement. In [Dr B's] response to that letter of complaint dated 1 November 2019, he states that the surgery on 30 October 2018 was absolutely uncomplicated and her metal ware was removed without difficulty. He documents there was no intra-operative evidence of a crack or a fracture and that in his opinion the fracture occurred sometime after discharge through one of the screw-holes which, in the early days after removal of metal ware, is an area of potential weakness in the bone. He later went on to further document that there was no problem with removal of the metal ware and no excessive force was required to remove the screws. He stated that if there was any evidence of a fracture it would have been dealt with at the time with re-plating of the ulna.

With regards to the specific questions posed by the Commissioner:

1. I have been asked whether there were sound clinical indications for the removal of [Ms A's] metal ware. Without having had the opportunity to take a history or examine [Ms A] at the time she first presented to [Dr B], it is difficult to answer this question. Normally, the indication for removal of metal ware relates to whether a patient has significant symptoms and clinical signs that can be related directly to the presence of metal ware. This may relate to prominence and, particularly in [Ms A's] case, a plate over the posterior aspect of the olecranon is always somewhat prominent because of the relative lack of soft tissue cover in that area and there is a reasonably high incidence of patients requesting metal ware removal because of the prominence of such a plate. It appears from [Dr B's] clinical record that there were symptoms directly related to the tip of the olecranon overlying the plate and he felt that the symptoms she was experiencing could, at least, in part be related to the prominence of the plate. Therefore if, following full informed consent, the patient is happy to undergo metal ware removal with the hope of improving such symptoms, then it is certainly reasonable to consider metal ware removal in such circumstances. I would add here though that the other issue [Ms A] had was limitation in her range of motion both in terms of her flexion and extension arc as well as with forearm rotation. It is not clear whether [Ms A] was also wanting an attempt made to improve that range of motion at the time of any further surgery. This would typically involve a much more involved procedure with soft tissue releasing in and around the elbow and that was not undertaken. However, if the purpose of the 30 October 2018 surgery was purely to try and eliminate some of [Ms A's] sensitivity over the olecranon then removal of the metal ware would be reasonable so long as the patient understood that this would not help her range of motion.

2. The question is whether removal of [Ms A's] metal ware nine months post insertion was clinically appropriate and consistent with accepted practice. The answer to that unfortunately depends on multiple factors. As [Dr B] alludes to in his response dated 1 November 2019, there are no set guidelines regarding metal ware removal. The issue with removing metal ware is that there is always a small risk of refracture through the screw-holes during the early post-operative period. The reason for that is twofold. Firstly, the bone is left with holes in it from where the screws had been placed and secondly, the bone is weakened by being protected from stress by the metal ware. It is normally considered that a period of six to eight weeks is required after metal ware removal where stress and impact is limited across the bone where the metal ware has been removed to try and minimise the risk of refracture. The removal of metal ware also depends on the nature and severity of a patient's symptoms because ultimately that is what one is trying to address by removing the metal ware. If those symptoms are felt to be significant and, as mentioned above, if after full informed consent the patient decides that the nature and severity of their symptoms are sufficient to warrant further surgery, then metal ware can be removed at any time. The comment from the registrar regarding the 12–18 month mark is purely anecdotal as it is felt that the longer metal ware is left insitu, the better the

initial fracture would have healed and remodelled, and this might also minimise the risk of refracture through the original fracture site. However, again, there is no absolute scientific data regarding this. Further comments I would make here relate to the fact that [Ms A] had chronic obstructive pulmonary disease and had continued to be a smoker. [Dr B] made a reference to that with regards to her pain syndrome, but smoking is also significantly associated with hindering fracture healing and, in a smoker, one may wish to delay metal ware removal longer for that reason. One further comment relates to my response above with regards to what the aim was with the metal ware removal surgery. As I suggested, removing [Ms A's] olecranon plate would, at best, have possibly helped the sensitivity and tenderness over the olecranon region in the area of plate prominence but would not have done anything to improve her range of motion. Because of what I have outlined above, it is possible that over aggressive attempts to try and improve [Ms A's] range of motion, in the early period following her metal ware removal, was a contributing factor in terms of her re-fracture. Normally, one would want to protect the bone where the metal has been removed from for a six to eight-week period and not undertake any aggressive attempts at mobilisation for fear that such refracture could occur.

3. The question is whether the management of [Ms A's] post metal removal was consistent with accepted practice, particularly given the clinical scenario presented, and should post-operative x-rays have been performed sooner than January 2019? Given my comments regarding the risk of re-fracture, either at the original fracture site or through screw-holes, this is always a concern in a patient following metal ware removal. Therefore, any pain that would be out of proportion to what one would normally expect, allowing for the surgical insult, would normally warrant further investigation. The first thing that would normally be undertaken in this situation would be an x-ray assessment to exclude such a fracture. It was not clear to me why [Dr B] did not re-x-ray [Ms A's] elbow, particularly when he reviewed her two weeks following the operation on 14 November 2018. He noted that she had quite significant pain in the elbow but felt that this was suggestive of incipient regional pain syndrome. There is no clear evidence on what basis he was thinking that she might have a regional pain syndrome. There was certainly no mention prior to the metal ware removal that she was in the process of developing a regional pain syndrome. Normally, one would not expect a complex regional pain syndrome to be evident within such a short period of time following a relatively simple surgical procedure, such as removal of metal ware, unless the patient already had a complex regional pain syndrome prior to that procedure being performed and the surgery subsequently making that worse. Given [Ms A's] risk factors of smoking and chronic obstructive pulmonary disease, the fact that it was only nine months following a very complex comminuted proximal ulna fracture, then normally I would expect the first thing to come to mind, if a patient had significant pain after that procedure, would be a refracture and an x-ray should have been ordered. Whilst there are no absolute written guidelines with regards to this, this would normally be what would be considered accepted practice and the normal standard of care.

4. I have been asked whether there are any additional comments on [Ms A's] management by [Dr B] and on the content of his response. [Dr B] refers to an email from [Ms A] dated 26 March 2019 to which he indicates that he felt it was likely, after the physiotherapy, that that is when the fracture through the screw-hole occurred. In that email, [Ms A] indicated her frustration that she had seen [Dr B] four times after removal of her metal ware complaining of her ongoing pain, but that [Dr B] had kept saying to her that it was normal and suggested it was a pain syndrome and to continue with physiotherapy. [Ms A] also expressed concerns about the x-ray report showing that there was no evidence of bony union. [Dr B] felt that the x-ray from 23 May 2019, showed that the fracture was progressing to union and that alignment of the fracture was satisfactory in that the deformity in her ulna would improve significantly as the callus around her fracture remodelled itself closer to the shape of her original bone. I do not agree with those comments. The sequence of x-rays from 18 January 2019 to 23 May 2019 clearly show that [Ms A's] proximal ulna fracture had displaced with increasing dorsal angulation and quite a considerable deformity and, at her age, this will not remodel. The angulation, which measures some 25 degrees, will have a significant biomechanical impact on the function of her arm, particularly rotational movements and the distribution of forces across the elbow joint, which will have a significant impact on her longer term outcome. He documented at the last consultation that her elbow had improved significantly but also documented that there had been no increase in her forearm rotation and, in fact, she had lost further motion through the flexion extension arc with 30 degrees of flexion and flexion from there to only 100 degrees.

5. In that response, [Dr B] also indicated that it was not routine practice to re-x-ray following removal of metal ware unless there was a history of significant further trauma or other clear evidence to suggest re-injury and he went on to say that any x-ray involves exposure to radiation and that, unless there was a clear reason to x-ray, these should be avoided. I would have thought in this situation, particularly considering the nature and severity of the pain and for the reasons I have outlined above, that there was a clear indication to re-x-ray and his decision not to would amount to a departure from normal accepted practice. [Dr B] also documented in that correspondence that [Ms A] had other reasons for having pain in her elbow, given the severe nature of the original injury and the developing arthritic change. However, I did not accept these as being sufficient reasons not to have re-x-rayed her elbow in that early post-operative period. [Dr B] also states that in his opinion the long term problems with her elbow are the result of the original fracture dislocation and not a result of the fractures through the screw-hole, a condition which he feels is unlikely to cause any significant long term disability and should heal without a problem. Clearly, that is not the case because the series of x-rays, after identification of the refracture, unfortunately shows that there has been progressive dorsal angulation at the fracture site and now a 25 degree malalignment will have profound implications on her longer term upper extremity function. [Dr B] appears to have been concerned about her range of motion as a reason to not have done anything further, even at the time the re-fracture was identified. However, I would

> have thought, given the progressive angulation that has occurred, that revision surgery should have been proposed to [Ms A] as a way to try and improve her outcome. Range of motion loss following fracture dislocations of the elbow are extremely common but usually with adequate treatment they do not result in any significant long-term implications. Many patients, in fact, require further surgery to perform aggressive releases of the elbow to regain a better flexion extension arc and, in particular, improvements in forearm rotation, and this does not appear to have ever been offered to [Ms A]. I would have thought that obtaining adequate union would have been the priority, then addressing the range of motion loss, and then considering metal ware removal at a later stage if still indicated. Whilst I appreciate that [Dr B] is not a sub-specialist in elbow surgery, there is good literature on these elbow fracture dislocations and the terrible triad variants, including literature that has been published by myself in the Journal of Shoulder and Elbow Surgery. It may have been prudent, once the re-fracture had been identified with the developing dorsal angulation, that referral to a subspecialist upper limb surgeon may have been appropriate to give [Ms A] at least the best available opportunity to understand her longer term options, even if this required further surgical management. I do not accept that [Ms A's] long term problems are the result of her original fracture dislocation. That would be a part of it, but a significant component has unfortunately been the refracture she has sustained, the delayed union of that, and the progressive deformity that has developed. Further, the invariable malunion that will have occurred will have more significant longer-term ramifications for her upper extremity function.

I acknowledge that there are limitations to my opinion as some information, as I have outlined above, is lacking and there has been differing accounts of the events that transpired, particularly with regard to [Ms A's] proximal ulna refracture and how and when this may have occurred. It should also be appreciated that my opinion is coming from the level of an expert shoulder and elbow surgeon as that is the extent of my orthopaedic practice and I appreciate the limitations that general orthopaedists face in the peripheral sector when having to look after all manner of orthopaedic injuries. However, there is a generally accepted practice and standard of care that is upheld by the New Zealand orthopaedic association as part of the wider body of the Royal Australasian College of Surgeons and there has been deviations from that accepted practice in the areas I have outlined above. Whilst many of these standards of care are not written documents, they relate more to what one learns as part of training through the New Zealand Orthopaedic Association training programme as best practice and guidelines that, in general, should be followed in order to ensure adequate standards of patient care, particularly ensuring that no harm comes to the patient. I am sure that given the clinical circumstances surrounding this case, the lack of post-operative x-rays, in particular, and given [Ms A's] presentation after removal of her metal ware that a peer review would also uphold that a failure to perform a plain x-ray in this situation would be a departure from standard practice. This departure from Standard practice I would rate as moderate.

I trust this information is helpful to the Commissioner. Please do not hesitate to contact me if there are further questions or concerns.

Yours sincerely

Craig Ball
Orthopaedic Surgeon"

The following further advice was received from Dr Ball:

"Thank you for asking me to provide further comment on this case and for the further documentation you provided in your email to me. There has been a response dated 16 October 2020 from [Dr B]. There are medical notes from [Ms A's] physiotherapist dating from 9 November 2018. There is correspondence from [Ms A's] [managing solicitor] dated 8 October 2020 and you also sent me a copy of my report dated 20 April 2020.

I have looked at all these documents together and I am happy to provide further thoughts. Perhaps if this is done in concert with the response from [Dr B], it will flow more easily.

In [Dr B's] correspondence dated 16 October 2020, he was clearly answering a number of specific questions that had been posed. The first question was a response to my expert adviser's report. This was set out in a number of sections, from a) to f).

a) Is related to my comment that failure to arrange a further x-ray in the circumstances following [Ms A's] metal ware removal, was a moderate departure from standard practice. [Dr B's] response to that was that he documented there were no problems with the removal of the metal ware and that this was supported by the contemporaneous operation record, the operating time, and the fact that special equipment such as the Difficult Screw Extraction Set was not required. Despite this, in [Ms A's] response through her lawyer dated 8 October 2020, it is made very clear that on an appointment visit with [Dr B] on 30 January 2019 that [Dr B] outlined to [Ms A] that her arm had possibly been fractured in surgery during the removal of some of the screws as he had to use force to do so. At that appointment, [Ms A] also had [her partner] in attendance. [Ms A's partner] has provided a signed statement, which was attached to that document attesting to what she heard [Dr B] say at that appointment.

   I agree, normally one would not take immediate post-operative x-rays following the removal of metal ware unless there is reason to do so. My opinion was that when [Ms A] presented for her first post-operative appointment with significant ongoing pain that that would normally prompt an x-ray examination to be performed. An x-ray is an inexpensive and very easily obtained investigation with minimal radiation exposure and any patient who has had a bony intervention and subsequently has problems, then the standard of care would be that an x-ray would be obtained.

   [Dr B] went on to further raise the question about when the so-called stress fracture occurred, however, I am not sure that stress fracture is the appropriate terminology

here. She has really had a fracture through either a previously placed screw hole or through an incompletely healed previous fracture. [Dr B] states that in his opinion it occurred later when she was having physiotherapy but, again, in [Ms A's] solicitor's report, [Ms A] explained that although she saw a physiotherapist at the recommendation of [Dr B] on 9 November 2018, she was experiencing considerable pain and therefore, the physiotherapist recommended only very gentle treatment. On looking through the physiotherapy record, this confirms that [Ms A] was continuing to have a lot of pain and this was worse after the initial session of physiotherapy but the physiotherapist notes that the intervention at that stage was very gentle with no aggressive manipulations likely to have been of sufficient force to cause any injury.

For the purposes of my report, it is not necessarily when the refracture occurred but the lack of investigation as to the cause of [Ms A's] severe ongoing pain after the metal ware removal, and this was not taken by [Dr B] as a sign to further investigate with an x-ray. Although [Dr B] states that in his professional opinion not taking an x-ray prior to mid-January was reasonable, he states that that is when [Ms A] developed a sudden severe exacerbation of her pain, but that again seems at odds with the solicitor's report where clearly the patient had been experiencing significant pain right from the time of the metal ware removal and she had mentioned this on several occasions at follow-up appointments with [Dr B].

b) As mentioned in my original report of 20 April 2020, I see no issue with the indications for removal of the patient's metal ware.

c) [Dr B] talks about the indication for removing the plate being simply to remove pain, not to increase range of motion. Perhaps that was not clearly conveyed to [Ms A] because she clearly believes that the indication for removing the metal ware was not only to help with the pain but also to provide her with a better functional range of motion, so that she could have a chance of returning to her preinjury hairdressing work. In terms of the choice of physiotherapist, it is often better for patients to go back and see physiotherapists who they are familiar with and have had a good working relationship with. Having reviewed the correspondence from the physiotherapist, I am happy that at no stage was any of the treatment provided overly aggressive as has been suggested by [Dr B].

d) Please see my comments above regarding the indication for metal ware removal. I have no issue with the indication for that.

e) In terms of revision surgery, most fractures heal without further surgery but the question, as I alluded to in my original report, was of displacement and angulation that had occurred at the fracture site and whether this may prove an ongoing issue in terms of [Ms A's] ability to regain range of motion because of the resultant altered mechanics through the forearm and across the elbow joint that may occur with a resultant malunion.

f) [Dr B] discusses this angulation and feels that I have overstated the degree of that. I can assure [Dr B] that I took the callus into consideration. The dorsal or posterior surface of the ulna and olecranon is a flat surface and that is why plating on that

surface is preferred to ensure that alignment is restored. Any malunion will result in a change in mechanics between the two forearm bones and across the elbow and will contribute to persistent range of motion loss in elbow flexion and extension but particularly supination and pronation. I raised this issue, which was not in the original request for me to provide a clinical comment on, purely as an experienced shoulder and elbow clinician ensuring that patients get the best outcome. I suggested that this may have been a possibility to try and restore better alignment to the elbow by refixing the fracture purely to try and give the patient a better functional outcome. I opined that any angular deformity would affect [Ms A's] outcome.

In terms of [Dr B's] comments regarding [Ms A's] fixed flexion deformity when she first presented, this is unrelated to her fracture and relates more to soft tissue contracture and potential impingement from prominent metal ware and not related to malalignment as noted elsewhere. Prior to metal ware removal, alignment was near normal. This being guided by the plate having been positioned on the posterior aspect of the olecranon and proximal ulna. Unfortunately, with her refracture, this has allowed the ulna to angulate dorsally to the position where it is now.

There does not appear to be a response to Question 2. Question 3 relates to the attendance of physiotherapy and I have no issue with a patient being referred to physiotherapy. Further, it appears from the physiotherapist's record that at no stage were aggressive attempts to regain movement undertaken. [Dr B] in this section also notes that he did not discuss the risk of refracture with her as it is a very rare occurrence. I would disagree with this. Refracture after removal of metal ware is a very well accepted complication and I would have thought with any metal ware removal that that would be the first potential complication to advise the patient of. Whilst it is not common, it is certainly well reported in the literature. My comments regarding the need to take things very cautiously in the first four to six weeks purely relates to the fact that when metal is removed, the bone is left weakened because it has been stress protected by the plate and there are a number of screw holes weakening the bone. I would have thought it imperative that every patient who has metal ware removed be advised of this potential complication.

The remaining responses to the questions posed by [Dr B] are not relevant to any further comments I have to make.

Overall, having read the correspondence you have provided, I would not change my advice in relation to the departure from accepted practice that I have identified previously. Please do not hesitate to contact me if there are any other questions or concerns pertaining to this.

Yours sincerely

Craig Ball
Orthopaedic Surgeon"

The following further advice was received from Dr Ball:

> "With respect to your further questions:
>
> 1) It appeared from [Dr B's] response that the indication to remove the metalware in his mind was to improve pain and not range of motion. This appeared to be at odds with what [Ms A] expected and indeed wanted in order to allow her to return to her preinjury work. Perhaps [Dr B] did not convey clearly to [Ms A] that an improvement in her range of motion was unlikely. This may have been a matter of simple misunderstanding.
>
> 2) Yes, it did surprise me that the risk of refracture was not discussed with [Ms A]. This is always a risk with metalware removal and the risk is not insignificant. I would have thought that discussing such a complication would be considered the standard of care in this country. That is why in part I believed that not X-raying [Ms A's] elbow when she returned complaining of significant pain was a moderate departure from the standard of care. I would have been immediately concerned that the cause of her pain was a possible refracture.
>
> I hope this answers your further questions. Please feel free to get in touch if there is anything else you require.
>
> Kind Regards,
>
> Craig Ball"

The following further advice was received from Dr Ball:

> "The further correspondence from [Dr B] does not change any of my previous comments. I of course read the medical report written by [the ACC assessor]. This was part of an initial medical assessment completed on 17 December 2018. Of note, in that assessment, [the ACC assessor] documented that [Ms A] underwent removal of metal ware from her left elbow on 31 October 2018 when she was reviewed one week following her surgery on 7 November 2018. [The ACC assessor] documented that [Ms A's] elbow was noted to be quite stiff and sore and she was advised to continue with her exercises and physiotherapy. [The ACC assessor] went on to further document that when [Ms A] was reviewed again by [Dr B] on 14 November 2018, that he had noted significant pain in the elbow which [Dr B] felt was suggestive of incipient regional pain syndrome.
>
> With that in mind, one of the main questions posed to me at the outset was whether something more should have been done at that stage and my opinion was that, given that presentation, this should have prompted an x-ray examination of the elbow to exclude a refracture.
>
> This is very different from the article that [Dr B] refers to from the Orthopaedic Journal of the Harvard Medical School. This article specifically looks at the role of post-operative x-rays after routine orthopaedic hardware removal and not the use of post-operative x-

rays when the need arises. I do not advocate routine post-operative x-rays after removal of metal ware as there is no need to do that at all. However, in [Ms A's] case, she re-presented with significant pain in the elbow and, in that situation, it is paramount that a refracture or other complication associated with the surgery is excluded by undertaking an x-ray.

Furthermore, I do not agree with [Dr B], who believes that the refracture and subsequent displacement of that fracture occurred sometime after [the ACC assessor] saw [Ms A]. At the time of that assessment, although [the ACC assessor] documented that [Ms A] reported she felt generally well and that there had been improvement in her symptoms in the past few weeks, she also documented that, at best, her pain was 2–3 out of 10 and at worst, it still rated 8 out of 10 when it ached and throbbed. She had also recently started to take paracetamol at night as her sleep was being disturbed by the pain in her elbow when she lay on it, and it would wake her. Furthermore, [the ACC assessor] documented that the barriers to rehabilitation were of ongoing pain and reduced function and she recommended that [Ms A] should continue with her current physical therapy rehabilitation programme and attend her appointments with her surgeon. [The ACC assessor] felt that [Ms A] was restricted to sedentary to light physically demanding work and could not undertake work requiring significant lifting, gripping or repetitive use of her left forearm because of those ongoing restrictions.

The role of the initial medical assessment is to help ACC understand what potential roles a patient can undertake with the current limitations they have. Clearly, [Ms A] was unable to return to her pre-injury employment as a hairdresser and the roles that were suggested were all sedentary to light work only, which would not put any strain across her elbow. This is very different from the assumption that [Ms A] was fit to return to all forms of work and that her elbow was fine because, clearly, it was not.

I emphasise again, that the issue was with not x-raying [Ms A's] elbow when she continued to present with significant pain in the early period following metal ware removal. Routine post-operative x-rays after metal ware removal are not indicated and that is clear, and it is also what is in the article that [Dr B] suggests. Again, this is not that circumstance, this is a situation where a patient has had an orthopaedic procedure where there is always a risk, albeit small, of refracture and the patient re-presented on more than one occasion complaining of significant pain at the operative site. The fact that [Dr B] did not consider this possibility and undertake the simple task of an x-ray of the elbow to exclude this, is in my opinion a moderate departure from accepted clinical practice.

Yours sincerely

Craig Ball
Orthopaedic Surgeon"