HEALTH & DISABILITY COMMISSIONER
TE TOIHAU HAUORA, HAUĀTANGA

Failure to adequately address leg length discrepancy post hip replacement surgery

Summary

1. This investigation concerned the care provided by Dr B, Orthopaedic Surgeon, to Mrs A regarding a hip replacement procedure and subsequent leg length discrepancy (LLD) that required revision surgery. Having considered all the information, I find that Dr B breached the Code of Health and Disability Services Consumers' Rights (the Code) as follows:

- Right 4(1)[1]: for improper placement of the hip component and failure to identify and appropriately respond to this at the point of postoperative X-ray; and
- Right 6(1)[2]: for failing to advise Mrs A of the identified real LLD and the options available.

2. Dr B was given the opportunity to comment on my provisional decision and had no comment to make.

3. Mrs A was given the opportunity to comment on the 'background' and 'information gathered' sections of the report, including Dr B's responses and the expert advice. Comments have been included where appropriate.

Recommendations

4. In the provisional opinion, I recommended that Dr B:

a) provide a written apology to Mrs A for improper placement of the component, resulting in a real LLD; not advising Mrs A of the identified real LLD and that it was caused by the improper placement; not advising what alternative treatment options were available; and for continuing to take a 'wait-and-see' approach after it was clear the component was improperly placed;

b) complete the Health and Disability Commissioner (HDC) online training module about the Code of Health and Disability Services Consumers' Rights on informed consent.

5. Dr B has completed these recommendations.

Background to complaint

6. On 9 June 2021, Mrs A underwent a left hip replacement, performed by Dr B. Mrs A told HDC that, upon standing the day after the operation, she noticed that her left leg felt 'significantly' longer than the right leg and that Dr B told her this feeling was a misalignment of her pelvis due to arthritic degeneration of her hip and that it would 'come right' with time as her body readjusted.

[1] Every consumer has the right to have services provided with reasonable care and skill.
[2] Every consumer has the right to the information that a reasonable consumer, in that consumer's circumstances, would expect to receive, including an explanation of their condition and an explanation of the options available.

7. An X-ray taken after the operation identified a 'real' LLD, which is a measured difference, usually determined via X-ray. Opinions differ as to the size of the discrepancy, as discussed throughout this report.

8. Between June and October 2021, Mrs A attended follow-up appointments and continued to report feeling a clear LLD. Mrs A told HDC that Dr B did not advise her at any stage that there was a confirmed real LLD and did not undertake any further examination to determine the cause of the LLD. Mrs A told HDC that she would have appreciated Dr B clearly advising her about the LLD. Without this, she felt that Dr B had not taken responsibility and that she was not provided an opportunity to understand what could be done to address it.

9. No further imaging was requested by Dr B during this time. The records show that Dr B recommended a 'wait-and-see' approach, hoping that Mrs A's pelvis would adjust, and suggested a heel raise on the other leg to help with the discrepancy. Mrs A told HDC that no other options (such as surgical revision) were discussed with her at any stage.

10. At Mrs A's last appointment in October 2021, Dr B recorded 'her leg still feels 2cm long[er] and it certainly looks like it'. There is no record of a discussion with Mrs A about Dr B's finding of a real LLD on X-ray.

11. In November 2021, after experiencing the need to limp and increasing back pain due to the LLD, Mrs A sought a second opinion from Dr C. Dr C's review indicated a real LLD of 2–3cm. Mrs A told HDC that she only became aware of the real LLD when Dr C told her. Dr C told HDC that there was a 'technical error in her index procedure, whereupon the femoral component [of the prosthetic hip joint] was not the appropriate size and wasn't seated deep enough in the femur, leaving it prominent'. Consequently, Mrs A underwent revision surgery to remove and replace the stem entirely. Dr C noted that the delay in revision (five months) resulted in more complex surgery because, by that stage, the stem was firmly anchored.

12. In February 2022, the Accident Compensation Corporation (ACC) determined that Mrs A had suffered a treatment injury on 9 June 2021 (the date of the surgery performed by Dr B) of 'left leg length discrepancy' of 2–3cm.

Information gathered

13. Information was gathered from Mrs A, Dr B, Dr C, ACC, and independent expert advisor Dr John McKie, Orthopaedic Surgeon (**Appendices A and D**). Dr B was given a copy of Dr McKie's report for comment and subsequently provided reports from Drs D and E from his morbidity and mortality audit meeting group[3] (**Appendices B and C**, respectively).

Dr B's responses to HDC

14. In responding to HDC, Dr B apologised for the outcome experienced by Mrs A and for not meeting 'the standard of care that Mrs A expected'. He told HDC that, during the operation, he used a leg length device to ensure leg length and offset were appropriate, and the results indicated they were satisfactory.

[3] Interactive discussion between a group of clinicians and those involved in individual cases. It includes review of management to understand factors (including those related to systems) that contributed to mortality or morbidity.

15. However, he also acknowledged that, when he placed the prosthetic, he perhaps 'didn't seat the stem as well as [he] had hoped and [it] therefore sat proud' (i.e., in an elevated position outside the norm), which resulted in a real LLD that he did not pick up on at the time of the operation. Dr B told HDC that, from the postoperative X-ray, he was aware of a 1.06cm real discrepancy and was of the view that Mrs A's pelvis would adjust back to normal over time and the LLD would become less noticeable to her (although the real LLD would remain). Dr B told HDC that he considered the possibility of later surgically swapping the femoral head component to a shorter one if symptoms persisted.

16. Dr B also apologised that he did not adequately communicate to Mrs A that he had identified an LLD of 1.06cm on the postoperative X-ray and that the discrepancy was a direct result of the surgery. Dr B advised that LLD is a known risk of hip replacement surgery, and records confirm that this was discussed with Mrs A in preoperative discussions.

17. Although Dr B acknowledges the above deficiencies, he maintains his view that his conservative approach of 'wait and see' was appropriate, because Mrs A's subjective feeling of 'significant' LLD may ease, the real LLD of 1.06cm might be manageable without intervention, and Mrs A reported over time that it was slowly improving.

Reports submitted by Dr D and Dr E

18. The reports by Drs D and E were provided to HDC on behalf of Dr B (**Appendices B and C**), after review of the report by HDC's independent advisor, Dr McKie.

19. Dr D told HDC that LLD is a well-recognised and relatively common consequence of total hip arthroplasty, with studies reporting postoperative LLD in 3–30% of cases, and discrepancies of 1–2cm classified as 'moderate' and occurring in a minority of otherwise uncomplicated primary hip replacements. Dr D told HDC that most moderate LLDs are dealt with by conservative measures in the first instance, such as physiotherapy, gait training, and heel lifts, to allow time for pelvic realignment and soft tissue adaptation and usually improve over time without the need for surgical intervention. Dr D stated that surgical revision in the first few weeks after hip replacement is not usually recommended because of the elevated risk of deep infection and wound complication.

20. Dr D noted that, during the operation, Dr B used a leg-length gauge and recorded a satisfactory assessment of leg length and offset, in line with standard practice. Dr D told HDC that a slightly high stem or femoral cut does 'not automatically equate to abnormal reconstruction if other variables have been adjusted to restore functional length and offset' and that length and offset are frequently increased to address hip instability issues.

21. On review, Dr D considered that Mrs A's real LLD was between 1.5cm and 2cm, placing it in the moderate discrepancy category, and both he and Dr E noted that, at the time, no other concerning factors[4] were identified or reported that would warrant consideration of surgical review in the early postoperative stage.

22. Acknowledging that the postoperative X-ray showed LLD, Drs D and E considered that the surgical components were appropriately positioned by Dr B and that there was no

[4] For example: nerve deficit, dislocation, fracture, gross malposition.

radiographic or clinical indication for immediate or urgent revision in the early postoperative period. Both doctors were of the view that it was reasonable and consistent with good practice for Dr B to favour conservative management of Mrs A's LLD in the early postoperative period. Consequently, Drs D and E considered that the standard of care provided by Dr B during and after surgery was appropriate.

Independent expert advice

Surgery

23. My independent advisor, Dr McKie, considered that there was a moderate departure from standard practice regarding the surgery performed by Dr B (**Appendix A**). On review of the records, including the postoperative X-ray, Dr McKie identified that the implanted component 'clearly sat proud', with the shoulder of the component significantly above the level of the tip of the greater trochanter[5] by approximately 0.7cm,[6] which he considered was 'well beyond any zone of tolerance that would be normally accepted or in any way acceptable'. Dr McKie told HDC that any attempt to insert the component further would likely have fractured Mrs A's femoral shaft.

24. Dr McKie suggested that, if the issue had been identified during surgery, the component could have been removed, the femur broached further, and possibly a slightly lower neck cut be undertaken to allow a smaller component to be advanced further down the femoral shaft.

Postoperative care

25. Dr McKie considered that the component Dr B used was too large and resulted in a 'significant' lengthening of the limb that, in his opinion, was a real LLD of 1.8cm. Dr McKie did not agree that the LLD was in the moderate category, instead forming the view that it 'was bordering on the extreme'. Dr McKie considered that an independent observer reviewing the postoperative X-ray would 'deduce that the hip replacement was never going to be acceptable and was always going to require revision'.

26. Dr McKie advised that, in cases with a high degree of patient concern regarding LLD after the operation, most surgeons would consider doing a scanogram[7] to accurately document the real variation in leg length, noting that this would have provided greater accuracy in terms of quantifying the LLD. Dr McKie notes that, regardless, the postoperative X-ray clearly demonstrates an obvious lengthening.

27. To assist in forming his opinion, Dr McKie provided Mrs A's postoperative X-rays (with all parties de-identified) to the management committee of the National Joint Registry.[8] Dr McKie reports that all members acknowledged that the hip replacement was unacceptable

[5] A large, bony projection located on the proximal (upper) part of the femur (thigh bone), just below the hip joint.
[6] Dr McKie's email to HDC Senior Investigator […] 19 January 2026.
[7] A diagnostic imaging technique that provides a detailed visual representation of an anatomical area, usually the full length of a limb or the spine. It is often used to assess bone alignment, measure limb length discrepancies, or monitor the progression of scoliosis.
[8] https://www.nzoa.org.nz/nzoa-joint-registry

and 'with the femoral component so far out of the femur, it was never going to be fully functionally satisfactory and was always going to require revision'.

28. Dr McKie acknowledged that preoperative complexities of patients, including level of arthritis and muscle contracture around the joint, can result in a perceived LLD for the patient after the operation and will often settle with increased mobility, and in some cases can be managed with a heel raise if the symptoms persist, as outlined by Dr D in paragraph 19.

29. However, Dr McKie considered that this did not apply to Mrs A's circumstances, reporting that her preoperative imaging displayed some dysplasia but well-preserved hip cartilage height and no evidence of pelvic obliquity[9] or significant fixed flexion deformity.[10] On the basis that Mrs A had such unremarkable preoperative morphology, Dr McKie considered that the real LLD of 1.8cm was exceptional and that the LLD would never settle over time because it was caused by the component and placement being inappropriate, not any underlying pelvic issues.

30. Dr McKie acknowledged that it is possible for surgeons to become deceived or to some extent disoriented at the time of surgery regarding the position of the femoral components in hip surgery, even when using a hip gauge to measure length and offset. He notes that this is not foolproof, which is why X-rays are used to make more informed assessments.

31. Dr McKie noted that the immediate postoperative X-ray clearly demonstrated the high-riding malposition of the implant and an obvious LLD and considered that Dr B should have conducted an early revision within the first few days or weeks to correct the discrepancy caused by the implant.

32. Dr McKie accepted Dr D's and Dr E's comments on the risk of revision surgery at an early stage and that a conservative approach is favoured in patients with a modest LLD where there is genuine uncertainty as to whether symptoms will persist in the long term. However, Dr McKie reiterated that Mrs A's LLD was more than modest, and the clear malposition of the implant meant that the symptoms would not be resolved over time and required revisionist surgery to become functional. Dr McKie was of the view that there would need to be compelling reasons *not* to re-operate (e.g., the consumer is frail, elderly, or in ill health) and to justify leaving it in the position it was in.

33. On the basis that the malposition of the implant was identified on the postoperative X-ray and it was clear it would not become functional in time, Dr McKie considered that Dr B's decision to manage Mrs A's LLD with a 'wait-and-see' approach was a severe departure from standard practice.

[9] A misalignment where the pelvis tilts, causing one hip to sit higher than the other.
[10] A fixed flexion deformity of the hip means the hip joint is stuck in a bent position, unable to fully straighten (extend), often due to tight muscles/capsule, leading to poor posture (like increased lower back arch) and gait problems.

Provisional decision – Dr B – breach

The right to have services provided with reasonable care and skill

34. It is not in dispute by any parties that Mrs A experienced a real LLD due to the hip replacement performed by Dr B. Further, I find that Mrs A was not advised of this, and this is discussed in the next section of the report.

35. LLD is a known complication arising from hip replacement surgery, and the records indicate that Mrs A was given information about this in advance of the operation. However, I note that the written information outlined that the operated leg may be 'slightly' longer. Mrs A's 'real' LLD, as measured on X-ray, ranged between 1.06cm and 2.00cm, placing it in the range of a modest-severe LLD. On this basis, I consider that the real LLD sat outside the expected complications for the procedure.

Surgery

36. Dr McKie noted that the shoulder of the hip implant was above the level of the great trochanter and considered that this should have indicated to Dr B at the time that the component was not appropriately placed in the femur.

37. However, having considered Dr B's responses, including the reports from Dr D and E, I accept that – at the time of the surgery – he took appropriate measures to assess leg length and offset and that these measures were acceptable and were the basis for his initial view that the positioning and leg length were appropriate.

Postoperative care

38. Dr McKie told HDC that intraoperative measures of length are not foolproof, which is why surgeons use postoperative X-rays to make more informed assessments.

39. In the circumstances of this case, the postoperative X-ray clearly identified a real LLD ranging between modest (1.06; Dr B's measure) and severe (2.00; Dr C's measure). The postoperative X-ray also identified that the implant could not be inserted any further into the femur without likely damage and that the implant clearly sat proud of the bone and consequently was the direct cause of the discrepancy.

40. The above is not in dispute; Dr B acknowledges the high-riding position of the implant and that he did not seat the stem as well as he had hoped during the surgery. Dr B also appears to have held concerns about the component used, as he subsequently considered revision surgery to swap the femoral head for a shorter one if Mrs A's symptoms persisted.

41. Having considered all the information, I do not accept that the information provided by Drs B, D, or E as outlined in paragraphs 14-22 represent mitigating factors in this case.

42. Dr D suggested that a slightly high stem does not automatically equal an abnormal reconstruction, if other variables had been adjusted to restore functional length and offset. Mrs A's clinical history did not demonstrate any preoperative complexities such as muscle contracture, pelvic obliquity, or significant fixed flexion deformity that would result in a requirement for intentional leg lengthening to adjust the body back to 'true anatomical positioning'. In Mrs A's case, the intraoperative record does not indicate that any such

adjustments were made. Consequently, I do not consider this to be a mitigating factor relevant to Mrs A's circumstances or a rationale for the LLD.

43. Nor do I consider it reasonable that on review of the postoperative X-ray Dr B considered that a conservative approach of 'wait and see' was appropriate.

44. I accept the opinion of Dr McKie and his colleagues (see paragraph 27) that the clear malposition of the implant meant that it was not going to be functional and could not be expected to 'settle' in time as an LLD with proper placement might be expected to. Acknowledging the inherent risk with any further surgery outlined by Dr D, I consider that, on balance, the benefit and risks of further surgery to correct the issue should have been put to Mrs A for consideration because unilaterally deciding to take the 'wait-and-see' approach was, in my view, inappropriate and resulted in further pain and discomfort for Mrs A.

45. I am also critical that Dr B did not request further imaging to obtain a more accurate picture of the real LLD to better inform his approach. Mrs A immediately reported feeling a large difference, with this view repeated at almost every follow-up. Dr B was aware that there was a real LLD of at least 1.06cm; however, in October 2021, the clinical records indicate that Mrs A reported still feeling a difference of 2cm, with Dr B acknowledging that 'it certainly looks like it'. I consider it inadequate that, at this point, Dr B did not conduct further investigations and instead continued to approach Mrs A's care with a 'wait-and-see' approach, advising her to return in three months.

46. In the circumstances of this case, independent expert Dr McKie has identified two key departures from the standards of care.

1. The implanted femoral component was too large, causing the prothesis to sit proud, resulting in a real LLD.

2. A conservative approach of 'wait and see' was inappropriate once the LLD and malposition of the implant was identified on the postoperative X-ray.

47. Having reviewed all the information and considered the conflicting opinions, I accept the view as presented by Dr McKie for the reasons outlined above and have formed the opinion that Dr B breached Right 4(1) of the Code.

The right to be fully informed

48. Having reviewed all the information, there is no evidence to indicate that Dr B advised Mrs A of the real LLD identified on the X-ray or provided her with options to address the LLD, other than 'wait and see', although he told HDC he was considering the option of revision surgery if her symptoms persisted.

49. Between June and October 2021, Mrs A consistently and repeatedly raised the LLD issue with Dr B. I consider that Dr B had multiple opportunities to be clearly transparent regarding the specific cause of the LLD. I am critical that Dr B did not clearly disclose the real LLD to Mrs A at any stage after the operation or explain that the implant was the direct cause of the discrepancy. Instead, Mrs A was left to believe that her feeling of lengthened leg was

simply a matter of her pelvic muscles needing to adjust to the new 'corrected' alignment and that the component had been placed appropriately.

50. Dr B told HDC that he hoped Mrs A's sensation of LLD would lessen over time and that, if it persisted, he was contemplating surgery to swap the femoral head for a shorter one. There is no record to indicate that he discussed with Mrs A that he either considered a component may not be correct or that further surgery to correct it may be required.

51. I consider that a reasonable consumer in Mrs A's circumstances would expect to receive an explanation that she had a real LLD at the point that it was identified postoperatively and that it was the direct result of the positioning of the implant. At this stage, a reasonable consumer would expect to receive information on what options were available to address the issue, including surgical revision.

52. In the circumstances of this case, this did not occur. Consequently, I have formed the opinion that Dr B breached Right 6(1) of the Code – the right to be fully informed.

Follow-up actions

53. A copy of the sections of this report that relate to Dr B will be sent to the Medical Council of New Zealand – Te Kaunihera Rata o Aotearoa.

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

Dr Vanessa Caldwell
Deputy Health and Disability Commissioner

Appendix A: Independent clinical advice to the Commissioner

The following independent advice was initially obtained from Dr John McKie Orthopaedic Surgeon. Dr McKie's response to Drs [D] and [E] is contained in **Appendix D**.

'Thanks very much for asking me to review the complaint of [Mrs A], BWC7128 regarding her hip replacement surgery carried out by [Dr B] on the 9th of June 2021.

My name is John Stuart McKie. I am a vocationally registered Orthopaedic Surgeon and have been in practice in Christchurch since 1994 and work in both private and public capacities.

I am formerly a President of the New Zealand Orthopaedic Association and am currently the Senior New Zealand Examiner in Orthopaedic Surgery for the Australasian College of Surgeons.

[Mrs A] underwent a left hip replacement performed by [Dr B] on the 9th of June 2021. She had a history of left hip dysplasia that was no longer responding satisfactorily to nonoperative management and, accordingly, she was recommended to proceed for hip replacement.

In her complaint, she says she felt like her leg was 10 cm longer after the operation but was told that this was because her pelvis had been twisted with the arthritic degeneration of her hip, was reassured this sensation was likely to settle to some extent, and was ultimately offered a shoe build-up to help equalise her leg lengths.

In December 2021, approximately 6 months following her index procedure, she sought a second opinion from Dr [C], who suggested the situation was unlikely to be satisfactorily resolved without further surgery and ultimately undertook a revision procedure.

In his letter of 18 April 2022, [Dr B] discusses the difference between real and apparent leg length discrepancies. In particular, in relation to fixed flexion deformities of the hip. He also comments that surgeons normally attempt to correct the limbs back to the normal anatomical length at surgery and noted that [Mrs A] had been made 1.06 cm long. He has also commented that the majority of individuals have at least ½ cm leg length discrepancy.

He offers the reason for delaying any further active surgical intervention as to see whether the clinical symptoms would tend to abate, but if they didn't whether simply putting a shorter neck length head on the existing implant would be possible rather than having to exchange the whole femoral component.

He acknowledges that he used the hip leg length gauge during the surgery and points out that he had discussed the potential complications, including leg length variation with [Mrs A] pre-operatively. In his clinical letter to the general practitioner on 28 October 2021, he acknowledges that her leg feels like it's 2 cm longer and at that stage offers her a shoe raise.

While most people have comparable leg lengths, some variation is common, but up to 10% of the population may have a leg length variation of a centimetre or more. Apparent leg length discrepancies are very common in patients with hip arthritis and most commonly this relates to an adduction contracture of the arthritic hip resulting in some obligatory obliquity of the pelvis making the leg seem shorter.

Significant leg length differences are not common when there is fixed flexion of the hip in isolation as the fixed flexion tends to have an effect on the whole of the pelvis and thus affects the apparent leg length of both hips. [Dr B] correctly points out that leg length variation (usually being made slightly longer) is a recognized and relatively common complication in hip replacement surgery.

If patients' legs have been made genuinely longer, they are often very aware of it immediately postoperatively, and it is common practice to allow the hip a period of time to settle to see whether the symptoms are going to be both ongoing and troubling. While most surgeons use a hip gauge to measure length and offset during hip replacement surgery, this is by no means a foolproof device. Surgeons tend to make assessments regarding leg length variation with x-rays of the pelvis, although this always assumes that the remainder of the legs are comparable and this is not always the case.

The most accurate and repeatable means of assessing leg length variation is with some form of scanogram x-ray normally done by CT. In addition to the copies of X-rays of [Mrs A] you have sent me, I have also sourced the original films at the X-ray provider and reviewed them directly.

[Mrs A]'s preoperative films show evidence of some dysplasia; however, her hip cartilage height on plain radiographs is generally well preserved. There is no evidence of any pelvic obliquity or significant fixed flexion deformity on her initial X-ray. There is a slight asymmetry of leg lengths preoperatively, and it appears that her operated left leg is approximately 5 mm longer than the right on her preoperative X-ray.

Her subsequent X-ray from 6 November 2021 shows a measured difference of 22 mm. Standard X-rays have a parallax magnification error in the order of 15%, so the real leg length difference post-surgery is more likely in the order of about 18 mm.

With respect to the specific questions you've asked:

1. ***The adequacy of the initial procedure (surgical skill). Please specifically comment on the following:***
    a. ***Was the correct size of femoral component used.***
    b. ***Was the prosthesis inserted properly.***

[Dr B] notes in his operative record that he used a size 2 stem. The postoperative X-ray shows a relatively high femoral neck cut with significant calcar remaining above the lesser trochanter.

The component is looking to be very snugly fitting within the femoral canal but is clearly very proud, with the shoulder of the prosthesis well above the level of the tip of the

greater trochanter. Any attempt to insert this component further would likely have fractured the femoral shaft.

Most appropriately, the component would have been removed at the time, the femur broached further and possibly a slightly lower neck cut be undertaken to allow a smaller component to be advanced further down the femoral shaft.

The component in effect was too large; therefore, it was left sitting proud and despite having the shortest neck length head available, still resulted in significant lengthening of the limb.

2. ***The adequacy of follow-up care, including:***
    a. ***Whether the length discrepancy was appropriately assessed on X-ray.***
    b. ***Whether it was reasonable to wait and see if the discrepancy would resolve or whether revision surgery should have been offered.***
    c. ***When should issues have been identified and comment on what impact any delay in actioning them have.***

The immediate plain postoperative films confirmed the high riding malposition of the implant and obvious increase in leg length. The hip is also noted to be sitting in abduction, which would further magnify the patient's impression of her leg being very long. Because of concern about an obvious iatrogenic lengthening of the leg where there is a high degree of patient concern, most surgeons would consider doing a scanogram to accurately document what the real variation in the leg length was. This investigation would have given greater accuracy in terms of quantifying the leg length difference; however, an obvious significant leg length difference is clearly apparent on the plain radiograph. As noted above, there is often a minor increase in leg length following hip surgery, and this is often most keenly appreciated by the patient in the initial few weeks. For this reason, if the variation is small, it is reasonable to wait and see how the patient adapts over time.

I think [Dr B]'s remark that he wished to wait and see whether the femoral head could be changed in isolation rather than the stem was probably ill considered. He had used the shortest available neck length head at operation, so there was no shorter head that he could use, and the change that any variation in the head length would make would only be very modest.

With an uncemented femoral component in place, had the significance of the over-lengthening been appreciated in the early postoperative period, it would have been relatively easy to have surgically removed the component and prepared for a smaller or different more suitable implant.

Waiting the number of months to see if things settled unfortunately enabled the uncemented component to be progressively more ingrown by the bone and made a much more difficult surgical revision procedure.

While it is sometimes possible to be deceived regarding the leg length intraoperatively, the problem in this case was apparent both clinically and on review of the postoperative radiograph the next day. This would then be most easily and effectively remedied by

reoperating within the next few days. Having waited over six months, removal of the implant was always going to be a major revision undertaking.

3. ***If revision surgery should have been offered, at what stage should this have been done?***

As noted above, I think with the quantum of lengthening it was inevitable that revision surgery was going to be required and this would have been most easily done within a short number of days to weeks before the implant was firmly ingrown.

4. ***What are the reasonable/expected limits for leg length discrepancy for this type of surgery, noting it is a known risk and whether the discrepancy in this case was within these limits?***

It would be seen as exceptional to create a leg length discrepancy in excess of a centimetre in a patient who had unremarkable preoperative morphology, as was the case in this lady. In patients who have significant morphological abnormalities of their hip preoperatively, they are often lengthened, usually by choice, to restore natural anatomy at the hip. The degree of lengthening in this case would be well outside the expected variances of regular hip surgery.

With respect to variation from expected standards of practice, I would suggest:

Question 1. The adequacy of the initial procedure represents a moderate departure from standards of expected care. As noted above, it is possible for surgeons to become deceived or to some extent disorientated regarding the position of femoral components at hip surgery.

Question 2. With respect to the adequacy of follow-up care, I would suggest this is in fact a severe departure from the expected standard of care.

While there may be reasons for a surgeon not to appreciate the significance of factors intraoperatively, the end result and the implications in this case are inescapable postoperatively. With the clear vision of hindsight, had [Dr B] been unsure whether early revision was necessary and indicated, I believe both he and the patient would have been well served had he sought an early independent second opinion, which would have undoubtedly been the same as the one the patient ultimately got from [Dr C].

JOHN MCKIE, MB ChB, FRACS

Orthopaedic Surgeon

Med Council No: 13530’

Appendix B: Dr [D]

The following report was provided to HDC after [Dr B] was provided Dr McKie's report for comment.

Introduction and role

I am a New Zealand-trained orthopaedic surgeon, vocationally registered in orthopaedic surgery. I have vocationally registered for eight years, five of which since returning from fellowships. My subspecialty interests are muscle-sparing total hip arthroplasty and paediatric orthopaedics. My adult practice includes hip replacement surgery, including those in younger patients for a range of conditions beyond primary osteoarthritis, including post-paediatric hip disease deformity, avascular necrosis, and inflammatory arthropathies. In my paediatric work, I am trained in the assessment and management of leg length discrepancy (LLD) and related deformity.

I am a member of [Dr B]'s morbidity and mortality audit meeting group. The case that is the subject of this complaint, together with the expert opinion provided by Mr John McKie, was discussed in detail at one of these meetings. At audit, the group disagreed with many aspects of the written submission, and I was asked to provide an independent written opinion addressing the biomechanical and reconstructive issues raised, particularly in relation to LLD and the timing and indication for revision surgery.

In preparing this report, I have reviewed the patients' clinical notes, including the operation note, the pre- and postoperative records, the X-rays, and the report from Mr McKie.

LLD is a well-recognised and relatively common consequence of total hip arthroplasty, with contemporary studies reporting postoperative LLD in 3–30% of patients, depending on measurement technique and threshold used. Systematic reviews describe mean discrepancies typically in the 5–10 mm range, with 10–20 mm (1–2 cm) differences occurring in a substantial minority of otherwise uncomplicated primary hip replacements. International classifications generally grade LLD as mild (<10 mm), moderate (10–20 mm), and severe (>20 mm), and emphasise that moderate discrepancies are not rare and must be interpreted in the context of patient size, soft-tissue tensioning, surgical approach, and the need to ensure prosthetic stability.

LLD after total hip replacement is most commonly managed using a graded, evidence-based approach that begins with conservative measures. In the early postoperative period, the distinction between apparent and true LLD is explained to patients, as soft-tissue tensioning, pelvic obliquity, and lumbar compensation frequently exaggerate perceived differences. Physiotherapy, gait retraining, and temporary contralateral shoe or heel lifts are standard first-line strategies, allowing time for pelvic realignment and soft-tissue adaptation. Most mild and moderate discrepancies improve or become functionally tolerable within the first few months, and the majority of patients do not require surgical intervention. Revision surgery is generally reserved for cases where a persistent, function-limiting anatomical discrepancy is clearly demonstrated, typically in the moderate to severe range, and only after conservative measures have failed. Importantly, early revision within the first weeks is not recommended for isolated LLD due to the substantially

elevated risk of deep infection and wound complications. Elective revision, performed once tissues have matured and symptoms remain disabling, is the accepted and safest surgical pathway when intervention is required.

Purpose and scope of this opinion

The purpose of this letter is not to repeat the entire clinical history, which is already well documented, but to address three specific questions:

- Whether the index reconstruction and immediate postoperative radiographs are correctly characterised as "abnormal" in a way that mandated immediate or very early revision surgery.
- Whether the magnitude of leg lengthening in this case is properly described as "exceptional" in contemporary hip arthroplasty practice.
- Whether the criticism that earlier revision should have been undertaken, and that a second opinion was effectively mandatory, is supported by current evidence and usual practice.

My comments are confined to these technical and practice-related matters.

At the time of the index left total hip replacement, the patient was a relatively young adult with dysplastic hip pathology and without end-stage bone-on-bone osteoarthritis. A posterior approach was used. A leg length device was employed intra-operatively, and the operative note records that leg length and offset were felt to be satisfactory at the conclusion of the procedure. The immediate postoperative radiology report described the components as in normal position with no adverse features identified.

The patient reported a very large perceived LLD in the early postoperative period. Subsequent follow-up reviews documented that the leg "felt long", with the patient's subjective assessment gradually reducing over time but remaining functionally troubling to her. Radiographic templating undertaken by [Dr B] suggested a true anatomical lengthening of approximately 10–11 mm. When the patient was later seen by [Dr C], he estimated a discrepancy of approximately 2 cm on standard pelvic radiographs and proceeded to an elective revision femoral procedure several months after the index surgery, by which time the stem was osseointegrated and required an extended trochanteric osteotomy for removal.

This sequence of events, and the imaging, were reviewed at our group morbidity and mortality meeting, which included five orthopaedic surgeons with arthroplasty experience. The consensus at that meeting was that the true leg lengthening lay in the range of 1–2 cm, that the components were otherwise appropriately positioned, and that there was no radiographic or clinical indication for immediate or urgent revision in the early postoperative period.

Interpretation of the postoperative X-rays

In my view, the postoperative radiographs cannot be fairly assessed in isolation from the intraoperative leg length and stability assessments. In modern uncemented hip arthroplasty, leg length and offset are determined by the interaction of neck cut height, stem size and geometry, head length, stem seating, femoral morphology, acetabular component depth and superior to inferior position alongside soft-tissue tensioning.

In New Zealand, this is commonly supported by intraoperative leg-length gauges and the standard direct comparison with the contralateral limb. A slightly "high" stem or femoral cut on a pelvic radiograph does not automatically equate to abnormal reconstruction if other variables have been adjusted to restore functional length and offset. It is important to note that, frequently, length and offset are increased to compensate for laxity and achieve stability with hip replacement through the posterior approach, as hip instability is a much more significant complication compared to leg length or increased offset after hip replacement surgery.

The operation note records the use of a leg length device and satisfactory intraoperative assessment of leg length and offset. This is consistent with standard practice. It is also relevant that the immediate postoperative radiology report did not identify gross malposition, dislocation, periprosthetic fracture or any acute technical catastrophe.

In New Zealand, practice radiologists do not usually comment on LLD on routine day-one postoperative films after primary hip replacement. Radiologists will usually comment on LLD only when specifically asked to do so, typically in the context of specific long-leg alignment views or scanograms being requested for that purpose. This reflects the fact that small leg length differences are common after arthroplasty and that routine reporting of these on day-one films risks unnecessary anxiety and complaint in circumstances where minor discrepancy is a recognised and often unavoidable trade-off.

The principal purposes of the immediate postoperative radiographs are to confirm that the hip is reduced, that no periprosthetic fracture or obvious hardware problem is present, and that the acetabular component lies within an acceptable range of position. On those key parameters, the early imaging in this case was reassuring and within those limits. Against that backdrop, it is difficult to support the assertion that the day-one films in this case demonstrated an "abnormal" reconstruction such that immediate revision was mandated.

Magnitude and nature of LLD

On the measurements available, I consider the most defensible estimate of true anatomical lengthening after the index procedure to be in the order of 1.5–2 cm. [Dr B]'s templating gave a value just over 1 cm; [Dr C]'s later estimate was approximately 2 cm on standard pelvic views, without a CT scanogram. Mr McKie's measurement was 1.8cm, and a repeat assessment at audit gave a measurement of 1.5cm. This range is well within the inter-observer and methodological variation documented for different radiographic techniques.

From my paediatric and arthroplasty practice, I am very familiar with both clinical and radiographic assessment of LLD. It is a consistent finding in the literature, and in my

experience, that perceived LLD in the early postoperative period frequently exceeds the measured anatomical difference. Factors can include pre-existing pelvic obliquity, lumbar scoliosis or compensation, capsular release during surgery and change in hip centre and therefore abductor and flexor muscle tension. The early subjective report in this case of a discrepancy in the order of many centimetres is physiologically implausible and, in my opinion, reflects a large apparent discrepancy on a background of a more modest true lengthening. The fact that the patient's own perception improved over time, though her symptoms remained functionally significant, is consistent with that interpretation. It is also consistent with the adjustment most patients have to the increased length.

Is lengthening >1 cm "exceptional" in hip replacement practice?

I do not agree with characterising limb lengthening of more than 1 cm after total hip replacement as "exceptional." Contemporary literature reports postoperative leg length discrepancy in a substantial proportion of patients (3–30%), with the most common differences falling within the 5–10 mm range. Importantly, published series consistently show that between 10% and 20% of patients experience a discrepancy greater than 10 mm, and approximately 5–10% experience discrepancies exceeding 15 mm, confirming that such magnitudes are not rare outliers but a recognised part of routine arthroplasty practice. These figures demonstrate that such discrepancies are not "exceptional," and this is precisely why leg length discrepancy is routinely discussed as a potential complication during the informed consent process for hip replacement surgery.

While surgeons strive to minimise LLD, it is particularly easy to lengthen small-framed patients, women, patients with residual capsular laxity and those undergoing posterior approach arthroplasty where the posterior capsule and short external rotators have been taken down. In such patients, a degree of lengthening is often accepted in order to achieve a stable construct and reduce the risk of dislocation. This is a well-recognised and frequently taught balance in arthroplasty practice.

It is also consistent with my own experience that LLD is one of the most common sources of dissatisfaction and medico-legal complaint after total hip arthroplasty internationally. That pattern is more consistent with LLD being relatively common and easily produced than with it being a rare or exceptional occurrence. The statement that this is an "exceptional" occurrence or deviation in practice is not reconcilable with the extent of the issue in both clinical practice, international litigation and the scientific literature.

Risk profile of early revision surgery

A key question is not whether revision surgery might technically have been easier if undertaken earlier but whether immediate or very early revision was clinically indicated and safe in the circumstances. The patient in this case had a modest true LLD, a stable prosthesis, no nerve deficit, no dislocation, no periprosthetic fracture and no radiological evidence of gross malposition. Her main issue was distressing subjective perception of a long leg which, as noted, gradually improved.

The orthopaedic literature consistently shows that unplanned reoperation on a hip within the early postoperative window is associated with a substantially increased risk of deep

infection. Large series literature examining reoperation within the first six weeks to three months after primary total hip arthroplasty report deep periprosthetic infection in roughly one-third to one-half of hips that return to theatre in that period, compared with infection rates in the order of 0.5–1% after uncomplicated primary arthroplasty. For that reason, early reoperation is generally reserved for clear indications such as dislocation, gross component malposition, acute nerve palsy due to extreme lengthening, periprosthetic fracture or early deep infection.

There is emerging evidence that if a significant technical issue (including excessive lengthening) is recognised intra-operatively and corrected immediately in the same anaesthetic, before the wound is closed and haematoma has formed, this may not carry the same infection risk. That scenario is fundamentally different from bringing a patient back to theatre days or weeks later to revise a well- fixed, healing construct. Once the stem has begun to integrate and the wound is in the acute phase of healing, a revision femoral procedure for LLD alone exposes the patient to the very real possibility of excessive bleeding and deep infection and further complex surgery in circumstances where the perception of the discrepancy usually proves self-limiting with time.

In this context, I consider it was reasonable and consistent with good practice for [Dr B] to favour conservative management in the early postoperative period, including explanation of the distinction between apparent and real leg length difference, time for pelvic and soft-tissue adaptation, and the option of shoe or heel raises. Proceeding directly to revision in the first weeks, for a 1–2 cm LLD in a stable hip, would in my view have represented a significant escalation of risk for uncertain benefit. That view was shared by all members present at the morbidity and mortality audit. By the time [Dr C] assessed the patient, the stem was osseointegrated and revision was necessarily elective and technically more demanding; that is a recognised consequence of any late revision, not evidence that the initial decision to avoid very early revision was unsound.

Surgeon experience and second opinion

Finally, I note the implication that a second opinion should have been obtained early and that not doing so represented a departure from expected standards. In my view, that criticism does not sufficiently account for the experience and scope of practice of the primary surgeon. [Dr B] has over two decades of experience in arthroplasty and revision hip surgery. In such a context, it is usual and appropriate for an experienced arthroplasty surgeon to manage a moderate LLD themselves, using established nonoperative and operative options, and to consider referral when they lack the requisite skill set. The threshold for seeking a second opinion is different for a newly practising surgeon without revision expertise than for a senior surgeon with a substantial hip practice. In this case, a second opinion was in fact sought from another experienced arthroplasty surgeon, who elected to proceed with planned elective revision. I note that many surgeons would not have proceeded to revision surgery within the time frame [Dr C] elected to, as many would continue to counsel patience and time for this level of discrepancy. That most certainly would have been my advice to this patient at six months [after] surgery if they were presenting to me for that second opinion. That reinforces, rather than undermines, the reasonableness of the initial conservative course.

Overall opinion

In conclusion, having considered the clinical documentation, imaging, the subsequent revision, the MDM discussion and the relevant literature, my opinion is that:

- The postoperative radiographs and the measured LLD are not accurately characterised as "abnormal" in a way that mandated immediate or very early revision.
- A true LLD in the range of 1–2 cm is not exceptional in contemporary total hip arthroplasty practice, particularly in the patient groups described, although it is clearly undesirable when symptomatic.
- Immediate or early revision in the first weeks, for a moderate LLD in an otherwise stable, well-fixed construct, would have exposed the patient to a substantially increased risk of deep infection and further re-revision without certainty that such surgery was necessary. The later complications are far more disastrous than an LLD.
- The staged approach adopted with early recognition and explanation of the issue, conservative management, and later elective revision when symptoms remained severe, falls within the spectrum of reasonable, defensible practice for an experienced hip surgeon.
- These comments are provided to assist the Commissioner in evaluating the technical issues in this case. It is the considered opinion of both myself and the group that the criticisms articulated in the expert review are not substantiated by current arthroplasty practice standards or by the relevant peer-reviewed literature.

Dr [D]

Adult and Paediatric Orthopaedic Surgeon

MBChB, FRACS Ortho, PG CertC LINED

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Appendix C: Dr. [E]

The following report was provided to HDC after [Dr B] was given Dr McKie's report for comment:

'[Dr B] has discussed an HDC complaint regarding [Mrs A] (case number 22HDC00308) regarding a leg length inequality post total hip joint replacement. She was discussed in our Audit Meeting today, 19 November 2025, with five orthopaedic consultants present. It is agreed that she does have a leg length inequality of over 1cm post-left total hip joint replacement, but it is felt that both operative and nonoperative management for this is reasonable, and that there is not an indication for imminent or immediate surgical input, and that conservative management with time and potentially a shoe-raise with rehabilitation are considered reasonable initial steps, and that surgical intervention in itself carries risk, which would need to be considered prior to proposing that the only solution is further surgical intervention.

Kind regards,

DR [E]

Appendix D: Further independent clinical advice to the Commissioner

The following further independent advice was obtained from Dr John McKie, Orthopaedic Surgeon, after he was given the reports by Dr [D] and Dr [E].

> 'With respect to the case specifically and supporting discussion by Drs [D] and [E], I am very happy to make the following comments.
>
> Leg length discrepancy following hip replacement surgery is the leading reason for litigation against orthopaedic surgeons by patients in the USA who have undergone hip replacement surgery. This has led to a plethora of publications and opinions regarding the incidence and management of modest leg length discrepancies. All surgeons inform (or should inform) their patients of the potential risk of this when discussing proposed surgery, and the College of Surgeons information sheet on hip replacement, which [Dr B] gave to his patient and presented in his report, appropriately raises these issues.
>
> All surgeons who do a significant volume of hip arthroplasty will have from time to time had the occasional patient when there has been an unexpected modest variation in the length of the leg following surgery, which is at least initially of concern to the patient. As mentioned previously, when a patient who has had an arthritic hip operated on ends up with the operated leg longer following the surgery, this is often very obvious and unpleasant for them in the initial weeks following surgery. As has previously been discussed, issues of pre-operative contractures around the joint and the practicality of mobilising on crutches and swinging through the operated leg, which is longer and often sorer, are often very obvious to the patient initially but will often settle as they get more mobile and in some cases can be simply managed with a modest shoe raise if symptoms persist.
>
> The comments the Drs [E] and [D] made about the risks of early follow-up surgery are true to the extent that any additional operation carries risk, and this is the reason for the UK programme of "get it right first time" to avoid the risk of further surgery, morbidity, and mortality in this patient group. These comments are all relevant and appropriate in the case of a patient with a modest leg length discrepancy where there is genuine uncertainty as to whether symptoms will persist in a significant fashion in the longer term.
>
> Unfortunately, this case is not in the group of a modest leg length discrepancy, rather it was bordering on extreme. As I stated in my initial report, I believe an independent observer seeing the postoperative X-ray would deduce that the hip replacement was never going to be acceptable and was always going to require revision.
>
> The only situation where a contrary opinion might have been entertained is if the patient was frail and/or elderly with significant other comorbidities that would potentially further increase the risk of repeat surgery. This was not the case here; this was a relatively young woman in the arthroplasty cohort.
>
> As noted above, all arthroplasty surgeons have had the occasional cases where the leg length has been unexpectedly altered during surgery, or they had inadvertently

undersized the femoral component (usually due to it being aligned in a more varus than expected orientation) despite taking care with the operative procedure.

In this case, however, the shoulder of the hip implant was above the level of the greater trochanter, which should have been an intra-operative clue to the fact the component was far from being appropriately seated in the femur.

As noted in my previous report, early revision within the first few days or weeks, while necessitating reopening and washing out the wound, is technically very easily achieved, and knocking the femoral component out and revising it is relatively straight forward. After a number of months have gone by, as was the case for this lady, the implant becomes completely ingrown and more scar tissue develops, which necessitates a much more destructive operation to remove it, as was indeed the case here as well.

Since receiving your most recent email, I have shown the patient's postoperative X-rays to the management committee of the National Joint Registry in an anonymised way. None of the surgeons in this group work in Christchurch or have any awareness of the case, and they were not made known the surgeon's identity. All acknowledged that this hip replacement was unacceptable and, with the femoral component so far out of the femur, it was never going to be functionally satisfactory and was always going to require revision. They also echoed my comments that recognising and acknowledging the error and expeditiously revising it early, whilst it was relatively straight forward, was the most appropriate management option.

I stand by the observations and findings in my original report and don't wish to make any changes. I also note that Drs [D] and [E] are surgeons in [Dr B]'s full-time private audit group and, as such, are not truly independent.

Kind regards

John McKie

Orthopaedic Surgeon