

Aotearoa New Zealand Physiotherapists' Perspectives of Potential Expanded Roles for Sports-related Concussion Management: A Qualitative Study

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ABSTRACT

Concussions (mild traumatic head injury) have received increasing attention in clinical practice, research, and the public press. A range of healthcare providers engage with patients presenting with concussion, and physiotherapists are often at the front line of these consultations, especially on the sports field. We explored physiotherapists' perspectives of their scope of practice and actual clinical practice within the sports-related concussion diagnosis and return-to-sport context. A qualitative approach with interviews and focus groups was used, including 18 physiotherapists. Three themes were derived: (a) delayed access to concussion-trained general practitioners; (b) navigating concussion care in a strained healthcare system; and (c) proposed expanded role for physiotherapists. Delayed patient access to medical doctors often delayed a formal concussion diagnosis, initiation of specific concussion care, or medical sports clearance. Yet the participants were regularly identifying and managing concussions, and most felt confident to do so. Some participants, particularly those working with high-performance athletes or in multidisciplinary teams, suggested that concussion diagnosis and clearance for return to work or play should remain the medical doctors' responsibilities. Yet participants working at community level suggested that, with relevant training and mentored experience, diagnosis, triaging, and clearance for sport could be within their scope of practice.

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Key Words: Brain Concussion, Diagnosis, Case Management, Physiotherapist

INTRODUCTION

Concussions (mild traumatic brain injuries) have received increasing attention in clinical practice, research, and the public press. Recent 12-month statistics from Aotearoa New Zealand suggest that 28% of all concussion claims accepted by the Accident Compensation Corporation (ACC, New Zealand's no-fault personal injury insurance) across the lifespan were sports-related, with rugby union accounting for 30% of those

injuries (Accident Compensation Corporation, 2022). A New Zealand-based cohort study showed that following a sports-related concussion 45% of individuals recovered within 2 weeks, 32% took up to 4 weeks, 20% up to 8 weeks, and 4% took longer than 8 weeks to recover (Kara et al., 2020). In another cohort study based in the USA, symptom severity in the first few days following concussion was the strongest independent predictor for persistent symptom reporting (> 28 days) (Meehan

et al., 2014). Early assessment is thus critical to determine prognosis for expected recovery timeframes and initiate relevant healthcare (Putukian et al., 2023). Early access to care may also reduce risk of persistent symptoms and long-term impairments (Bunt et al., 2023; Schneider et al., 2014), while delayed access to care may result in prolonged recovery (Patricios, Schneider, et al., 2023). With current general practitioner (GP) shortages in New Zealand (Betty et al., 2023; Salmon et al., 2022), it is critical to explore different models of care to improve access to diagnosis and triaging to minimise the risk of delayed recovery following concussion.

At the time of this study, ACC regulation and the Australasian sports concussion position statement specified that medical doctors (GPs, emergency department doctors, sports physicians) must provide the concussion diagnosis and clear players for return to contact activities (ACC Sportsmart, 2018; Elkington et al., 2019). In New Zealand, only medical doctors could generate an ACC concussion claim, required to access ACC-funded concussion services for individuals with persistent or complex symptoms (Accident Compensation Corporation, 2023). Most elite sports organisations also stipulated that all concussions need to be assessed by a medical doctor (for example, World Rugby, 2023). However, due to work shortages for GPs (Betty et al., 2023) waiting times for appointments appeared to contribute to delayed diagnosis and initiation of healthcare (Davidson, 2023; Salmon et al., 2022; Salmon, Badenhorst, et al., 2023; Solignac, 2022).

Physiotherapists are routinely the only healthcare provider attending sporting events (Reid et al., 2020); they identify suspected concussions, triage immediate emergency department referrals, and provide advice while waiting for medical doctor appointments (Salmon, Badenhorst, et al., 2023). Physiotherapists' expertise in assessment, diagnosis, and rehabilitation for a wide range of injuries and conditions extends across sports, orthopaedics, neurology, cardiopulmonary, paediatrics, and ageing (Schneider & Gagnon, 2017). In New Zealand, they are autonomous practitioners providing evidence-informed care (New Zealand Gazette, 2022), able to initiate ACC claims for a range of injuries. They are thus well-positioned to assist in recognising and managing concussions (Schneider & Gagnon, 2017).

Physiotherapists make provisional concussion-related decisions (Poloai et al., 2023), and often provide reports of their assessment of the patient's diagnosis and return-to-play readiness to GPs (Salmon et al., 2022; Salmon, Badenhorst, et al., 2023). The physiotherapists' perspectives of these intersecting responsibilities (diagnosing concussion and clearance to play) with medical doctors have not been formally explored. As primary healthcare providers, they may have valuable insights as to how early concussion diagnosis and initiating early appropriate rehabilitation, critical for recovery prognosis (Putukian et al., 2023), may be improved. The aim of this study was thus to explore physiotherapists' perspectives of their scope of practice and current actual clinical practice within sports-related concussion diagnosis and return to sports across different contexts in New Zealand.

METHODS

Study design

This was a qualitative study using Interpretive Description (Thorne, 2016). Relativist ontological and emic epistemological approaches were used to analyse viewpoints and opinions of the participants. The University of Otago Human Ethics Committee provided approved the study (reference number D23/046). We used the COnsolidated criteria for REporting Qualitative (COREQ) to report the methods and results (Tong et al., 2007).

Participants

We used purposive sampling and participants were included if they were New Zealand-registered physiotherapists currently working in sports physiotherapy and managing at least six patients with concussions per year. A maximum heterogeneity sampling frame (Table 1) was used and participants were excluded if there were sufficient participants with the similar variables. We aimed to recruit at least 15 participants, which is considered an acceptable sample size to determine conclusions from the research (Teodoro et al., 2018).

Table 1

Variables Included in the Sampling Frame

Ethnicity
Age group
Gender
Years of experience as a physiotherapist
Post-graduate qualifications
Work setting (e.g., private practice, on-the-field, public hospital)
Sports team involvement (and level of competition)
Geographic location

Recruitment

Participants were recruited using advertisements via Physiotherapy New Zealand, social media, and snowballing. The advertisements included a URL link and a QR code to a webpage containing the participant information sheet, consent form and a link to a sampling frame questionnaire (Qualtrics, Provo, UT, USA). If the participant was included, those data were used to describe the sample. Names and contact details of excluded respondents were deleted at the end of the data collection. Respondents were contacted to confirm eligibility and willingness to participate. Included participants provided written informed consent.

Interview or focus group

The research team developed the semi-structured interview guide (Table 2). Focus groups with three to four physiotherapists were preferred as these encouraged the participants to share their views, but individual interviews were also provided, where required. Two members of the research team (MD, GS) were present at each focus group/interview, held via Zoom, with one leading the focus group/interview and the second taking notes. MD is a female BPhy(Hons) student, and GS is a female senior research physiotherapist. Some of the participants were known as past students to GS.

Table 2*Semi-structured Interview Guide*

Experiences as a physiotherapist

Could you describe your current workplace?

On the questionnaire, you indicate that you see about _____ patients with concussion per year. Can you describe where you work with those patients?

What is the most common way people access your physiotherapy care for concussion?

Is there anything else you would like to tell me about your work that we should be aware of?

Current roles, responsibilities, and referral patterns

Can you describe what your current roles are in terms of concussion management?

How does the referral system to the GP work for you and your patients for a concussion diagnosis?

We know that waiting times for a GP can take up to a week or longer; what do you do with those patients?

Talk us through the process you go through when you determine if someone was ready for return to play/learn/work?

At what stage of return to play do you usually refer the patient back to their GP?

How does it work for you to get a GP to clear a patient for return to play?

Barriers to concussion management

What do you feel is your biggest challenge as a physiotherapist in concussion management?

We know that GPs should diagnose the concussion and lodge the ACC claim, but we also know that can be difficult; what do you do in that case?

Can you give us an example of how you manage a person with a concussion who could not see a GP within a week?

Are there any policy, regulation, or process changes that would make it easier for you as a physiotherapist to manage concussions?

What are the concerns we would have to address if physiotherapist were able to make the diagnosis? What argument is there for the process of GPs only making diagnosis to remain best practice?

Do you think physiotherapists could have the responsibility of clearing patients for return to play/return to work?

Recommendations for future formalised roles

What postgraduate training or mentoring have you had for concussion and how has that helped you?

What do you feel the value (benefit) would be in having physiotherapists expanding their roles in concussion management?

What concerns would you have for such a potentially expanded role?

What do you think a physiotherapist's expanded role in concussion management should look like? (If not yet clear in participant's responses)

Recommendations for training of physiotherapy for future expanded roles

Do you think physiotherapists could formally contribute towards, or undertake, making the concussion diagnosis and why?

What further training or mentoring do you think physiotherapists should undertake if they were to be more involved in concussion management?

Is there anything else you would like to share with us about physiotherapists and their roles in concussion management?

Interviews were recorded via Zoom and transcribed via a secure platform (Otter.ai). MD checked each transcript against the recordings and anonymised the participants by giving each a unique code. In conferring with Interpretive Description, reflective memos were written by the interviewer after each interview to assist with data interpretation. Written notes from the focus groups/interviews were included in the data analysis. Participants did not receive compensation or reimbursement for their time.

Data analysis

MD coded each interview/focus group transcript using NVivo® qualitative data analysis software (v12, Lumivero, Denver, USA). A second coder, RB, coded one interview and two focus groups. RB is a part-time female PhD candidate and vestibular physiotherapist working in a concussion clinic. We started the coding and analysis process at the beginning of the study, allowing constant comparative methods and adaptation of the interview guide. The coding initially comprised a broad-based code that secured all potential concepts and ideas (Thorne, 2016). The coding became more refined, identifying specific

categories as the study progressed. The research team met to discuss interpretations and establishment of the themes, agreeing on theme saturation. We considered triangulation by comparing the coding and concepts between the two coders and discussions between the research team, thereby increasing trustworthiness of the findings (Carter et al., 2014).

RESULTS

Eighteen physiotherapists participated across five individual interviews and five focus groups with a median duration of 50 min (range 20 to 56 min). No interview was repeated. Six participants worked in multi-disciplinary practices, in high performance sports, or could refer patients with concussion directly to New Zealand Rugby-funded concussion clinics. One participant worked in secondary schools, and the remaining 12 participants worked in private physiotherapy practices (Table 3).

We defined two inductive themes, each with subthemes: (a) *delayed access to concussion-trained GPs*, and (b) *navigating concussion care in a strained healthcare system*. One deductive theme was a *proposed expanded role for physiotherapists*

Table 3*Participant Characteristics (N = 18)*

Category	n	%
Gender		
Women	12	67
Men	6	33
Ethnicity ^a		
New Zealand European	17	94
Māori	1	6
Chinese	1	6
European	1	6
Years of physiotherapy experience		
Less than 5 years	4	22
5–10 years	4	22
11–20 years	4	22
21–30 years	5	28
More than 30 years	1	6
Main sports involvement		
Rugby	11	61
Football	1	6
Netball	1	6
Cycling	1	6
Not involved with specific teams	5	28
Post-graduate qualification		
None	3	17
Post-graduate certificate	3	17
Post-graduate diploma	6	33
Masters	6	33
Provinces		
Auckland	4	22
Waikato	5	27
Wellington	3	17
Canterbury	1	6
Otago	2	12
Southland	3	17

^a More than one ethnicity could be selected, thus the total is greater than 100%.

(Figure 1). Quotes supporting the themes and subthemes are included in Table 4, consecutively numbered for each theme.

Delayed access to concussion-trained GPs

This theme (with three sub-themes) describes the participants' perspectives of their overall involvement in concussion management, and awareness of the ACC requirements for concussion diagnoses and clearance for return-to-play to be the responsibility of medical doctors. Many described concerns and frustrations of delayed access to or lack of concussion-

knowledgeable medical doctors. Ultimately, they perceived concussion care to be frequently delayed for the patient under the current ACC regulations and system constraints.

Physiotherapists' role for concussion care

Participants described their involvement in concussion across the spectrum from pre-season baseline testing, provision of concussion education to players, coaches, and parents, to recognising suspected concussions, removal, immediate care, and triaging, rehabilitation, and guiding players to a full return to sport. They felt that the education improved players' symptoms reporting and acceptance of the mandatory post-concussion stand-down period, and improved support for them as clinicians from within the teams (Q1–1). They highlighted the need for multi-directional communication with sports team stakeholders and other healthcare providers, in particular, medical doctors (Q1–2). Having a defined health provider, called a "health navigator" (as described for Waikato), to liaise with other health providers and to track individual players, created certainty that the player was receiving appropriate care, and only returned to contact play when cleared by a medical doctor (Q1–3). They noted the barrier of insufficient remuneration for the time they contributed towards concussion management and return to play (Q1–4). Despite that sideline role being extremely important, they felt that the inability of sporting organisations to provide sufficient funding for health professional care challenged their ability to appropriately manage a concussed player (Q1–5).

"The biggest barrier is getting the patient to a GP in a timely manner"

All participants observed the requirement of a medical doctor for concussion diagnosis and return-to-play clearance. However, players' access to and physiotherapists' communication with concussion-trained medical doctors appeared influenced by the level of sport, clinical context, or location. Participants working in high-performance sports environments, in multidisciplinary clinics, or with access to New Zealand Rugby concussion clinics could arrange timely access to appropriately knowledgeable medical doctors (Q1–6). In reality, those working in semi-rural and rural community sports or in stand-alone physiotherapy practices found delayed or lack of patient access to GPs a significant barrier (Q1–7). Such appointments were "quite a wait" (P12), "a five week wait" (P6), or GP clinics were not registering new patients (Q1–8). In semi-rural areas, seasonal workers registered with GP clinics in their hometown were unable to access local GPs (Q1–9). Practices servicing both community-level and high-performance sports felt caught in a two-tiered system: patients from high-performance sports could access medical doctors within a few days, whereas those at community sports often had substantial challenges (Q1–9). Referrals from rural and semi-rural areas to urban-based medical doctors was possible, but it was challenging for people with suspected concussion to travel for up to 2 hours for a clinical examination (Q1–10).

Some GPs were perceived as lacking contemporary concussion knowledge, having less knowledge than physiotherapists, or lacking in time for diagnostic or clearance assessments (Q1–11, Q1–12). Some participants described cases in which GPs had cleared players for return-to-play despite still being symptomatic

Figure 1

Themes and Subthemes Derived from the Qualitative Analysis

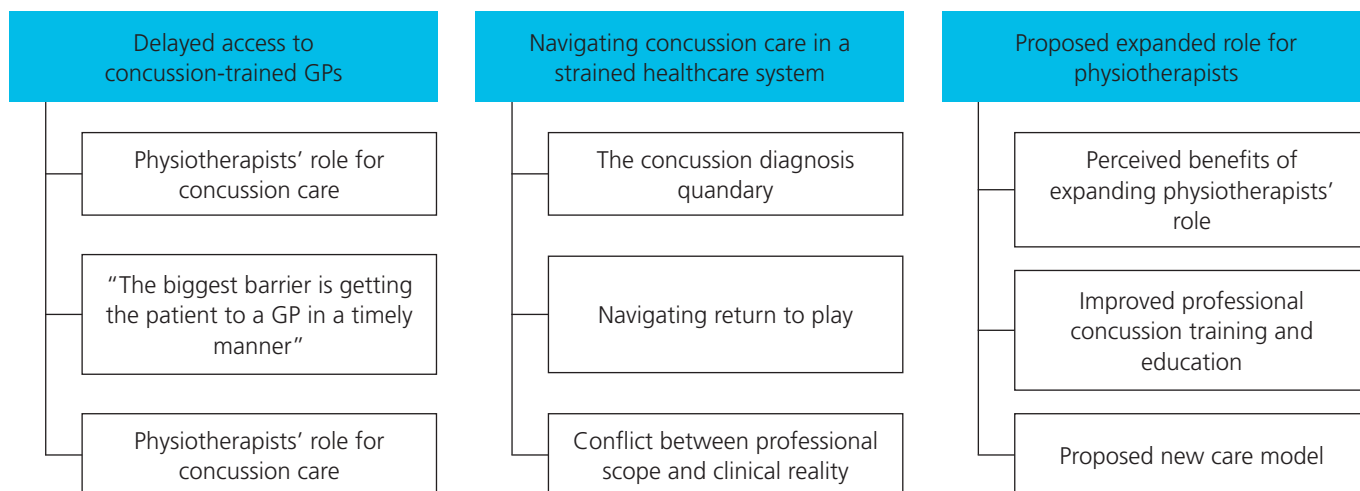


Table 4

Quotes Supporting Themes and Subthemes

Theme, subtheme, quote number	Quote and participant code
1. Delayed concussion-trained GP access	
<i>Physiotherapists' role for concussion care</i>	
1-1	"One good thing (...) [is] there's (...) more education at the start of the season, and they're doing sessions (...) on what to look out for". P10
1-2	"It's all about communication, (...) if you communicate with the health professionals (...) and having good lines of communication (...) [it] does work for us (...) and actually make sure that patient gets (...) managed and gets the acute advice they can". P3
1-3	"What works really well for us is having a Health Navigator, (...) where I liaise with those health professionals (...) to make sure (...) gets the proper rehab and (...) that person can't get back on the rugby field unless they've got the proper clearance". P3
1-4	"It's a hard spot to be in as a physio like taking players through that sort of return-to-play process, because you don't (...) get paid to do it. It's quite a time consuming. It's easy, but it takes a lot of time". P1
1-5	"I think under the funding model for (...) the concussion services (...) [it is] really tricky to do a (...) thorough job, given that you've got eight hours of allied health funding for their entire injury". P4
<i>"The biggest barrier is getting the patient to a GP in a timely manner"</i>	
1-6	"I guess we are spoiled a little bit at work with our access to GPs and that's (...) kind of a cornerstone of our clinic model is that we have (...) early access to medical care (...) [and] we try [to] get the ball rolling really early". P4
1-7	"When you've got a player from [North Island town] who a medical centre does not have (...) there's not much you can do because they don't have anyone to go see and GPs (...) aren't taking new patients, which doesn't help. (...) We're lucky if we can even get a GP to respond to an email, let alone get a patient in to actually see them to even be diagnosed with a concussion officially". P6
1-8	"Unfortunately, [at] the moment (...) they're just so under the pump, that it's really hard to get continuity of care with the GPs". P9
1-9	"A lot of (...) our rugby players in the Southern club competition [are] from other regions, they actually have a GP in, say, Wellington, (...) they don't actually have a GP down here. So that system of requiring them to send them to their own GP is a big barrier. (...) In high performance when we have a team doctor (...) [an appointment] happens almost that day, that night or the next morning, so it's a lot easier and a lot more streamlined". P18

Theme, subtheme, quote number	Quote and participant code
1–10	"We have a concussion service in Queenstown, and they service as a really wide area. So people often travelling for a couple of hours to kind of get in there. (...) Someone's driven 2 hours to see you and then you're trying to do a decent assessment with them, which they generally feel quite provoked afterwards if it's really challenging". P4
1–11	"The feedback from GPs was they don't have time to do a SCAT. You know, they're not going to do a whole SCAT". P4
1–12	"I felt like it was a big waste of time going to the GP sometimes because they wouldn't add anything, or they may not even put the [concussion] read code on there". P5
1–13	"I've had some people who I've thought (...) they're still very symptomatic, they've gone back to their GP, and they say to their GP they're fine and then the GPs cleared them for contact, but I probably wouldn't". P16
1–14	"They (...) have gotten an initial diagnosis from the GP or from A&E but no one feels confident to clear them. So, I'd end up in multiple situations (...) you go back to the GP to clear the player (...) the GP will go well I don't feel comfortable doing that". P13
1–15	"Our GPs are literally like, 'Well you guys are the concussion trained physios, we have no training in it. So whatever you say goes.' And that's what was happening pretty much". P6
1–16	"In [city's name] (...) the GP population is quite an older one and concussions have changed so much in recent times and, nothing against their knowledge, but they don't change with it. (...) When you're just in the community dealing with it and they're [the GPs] not on that concussion contract that, I think the communication between like physio and GP just gets lost most of the time". P17
<i>Consequences for the patient</i>	
1–17	"[The diagnosis] process (...) become(s) longer and (...) more strained both from a player perspective, because the player gets frustrated because they can't see the doctor, and then they can't get cleared per se. And so that entire process takes (...) longer". P13
1–18	"I've just wasted the patient's 20 or 30 dollars to see the doctor, for them to just to say your physio's happy, so I'm signing the piece of paper (...). [That is] very hard, particularly [for] lower socio-economic groups and getting patients to pay co-payments (...), which they struggle to do anyway. By adding in the GP [it] just adds another place to put money". P14
2. Navigating concussion care in a strained health care system	
<i>The concussion diagnosis quandary</i>	
2–1	"Physios are never probably going to be able to [officially] diagnose concussion because I think there's always going to be a proportion of people that (...) need to be cleared medically, to prevent the worst-case scenario". P14
2–2	"When there might be something more serious going on in a concussion and it might need emergency care, or ongoing referrals, just not picking it up early enough potentially". P16
2–3	"We're primary providers, we need to be able to screen for serious pathology and I think physios generally do a good job at that. The fact that we are having these people walk through the door, that we are diagnosing or suspecting a concussion, sort of shows that it's working anyway". P2
2–4	"[Physiotherapists] exclude red flags, look for yellow flags [and] know when it's the time to refer to the multidisciplinary team and start the rehab (...). We could cut a lot of lag time by allowing physios that ability to do that". P10
2–5	"Concussion wise (...) my exposure is even the acute identification on the sideline. I do a lot of (...) pulling someone off immediately when we [are] suspecting a concussion". P6
2–6	"I think we've got the same skills as a doctor has got to look at a broad neurological screen and the same intuition [that] if we feel that something's not right, then I think GPs will just (...) refer to A & E anyway". P2
2–7	"We're making these advanced clinical decisions all the time. And it's just fits into that same mould, something's not right. We can all do reflexes, we can all do cranial nerve testing, we can all do peripheral nerve testing. And if we're concerned about something, we will pick it up surely". P2
2–8	"Almost incidental (...), they'll come because they've got injured (...) then when (...) I ask more questions it sounds (...) like you've possibly got a concussion". P10
2–9	"[Physiotherapists] exclude red flags, look for yellow flags [and] know when it's the time to refer to the MDT team and start the rehab (...). We could cut a lot of lag time by allowing physios that ability to do that". P3

Theme, subtheme, quote number	Quote and participant code
<i>Navigating return to play</i>	
2–10	"My report is mainly based on a symptom-based recovery, like, have they worked out through the stages of return to play without any symptom aggravation. If they've had vestibular stuff that would be based on, a VOM screen (...). But generally speaking, we do the threshold test for all of them when they come in (...) but we don't do it as a discharge criterion, which is just finding time, staffing situation". P5
2–11	"If you haven't seen that acute presentation and you get someone coming to you and [they] go: 'no, I feel fine, haven't been presenting with any symptoms'. I think that's probably when it can get a bit messy". P1
2–12	"In reality (...), particularly with some of our junior doctors (...) it's actually [the physio's] clinical information that guides [the return-to-play decision], rather than them [the doctor] doing any particular things". P4
2–13	"We wrote back [to the GP] saying we're managing this client, they're doing really well, they've gone back to return to training, they've had no exacerbation of symptoms, they got no neck pain (...), symptoms are reducing (...). But (...) whatever we say, if we're pretty sure they can handle (...) [going] back to play, the GP will probably just have a quick chat to the patient and agree". P2
2–14	"The return to play side is a bit trickier, perhaps like there's more of (...) a place for a medical screening from the return to play [aspect] (...) [rather] than the actual diagnosis". P5
2–15	"There's so much (...) stuff medically that GPs encapsulate and have the availability to talk about. I don't feel it appropriate in my scope of practice to go in depth in the (...) psychological readiness to return and if they have any underlying mood disorders or learning disorders". P15
<i>Conflict between professional scope and clinical reality</i>	
2–16	"I can't write concussion [so] all that gets written down (...) [is] contusion of head and neck sprain so they [ACC] probably don't have very true stats on the true number of concussions that are occurring". P9
2–17	"It comes back to a 2001 concussion in sport group guideline that said (...) it should be a medical decision, (...) back in 2001 physios didn't work in this area and (...) GPs were probably the (...) people to make that decision (...). I think we're in a different situation (...) where we actually have physios who (...) have upskilled in it (...) and are now in a position where we can contribute". P3
2–18	"We've got to be careful under ACC because we're not allowed to be (...) treating and managing a concussion if it's not a concussion read code. If ACC reviewed our notes, they'd be like why are you treating concussion, [when] a read code [has not been provided]". P2
2–19	"I get coaches and they'll say: I've had a player cleared by their GP, could you have a look at him please? (...) They've already got the piece of paper and he's like: I'm not confident that this was managed well, could you please see him?" P4
2–20	"You end up in a situation where you can't win (...), the player (...) loses belief in what you're doing because you're (...) being held hostage by a system that doesn't work". P13
3. Proposed expanded role for physiotherapists	
<i>Perceived benefits of expanding physiotherapists' roles</i>	
3–1	"Just taking that load off what is already a very stretched GP system". P1
3–2	"Streamline care, [there would be] no delays [and it would] maximise the recovery". P2
3–3	"From a time perspective, to get into a physiotherapist is a lot quicker in most towns than it is to get into the local GP". P3
3–4	"If ACC would have an idea of what they were dealing with as far as the expectation of spend burden on these patients, they might put more funding towards appropriate ways". P4
3–5	"I see a cost benefit (...) from ACC's perspective, it's cheaper to come to a physio than it is to pay for doctors to do it". P3
3–6	"Most of us that work with sports teams (...) have an existing rapport or relationship with them, so they're probably getting a more accurate assessment (...), we would be more thorough of picking up their (...) symptoms, they probably getting (...) thorough assessment". P18
3–7	"We've got (...) more time to spend with the patient to educate them (...), so if we diagnose, and then spend 10 min getting that early education in to prevent longer concussion symptoms. Doctors don't have that time to spend just educating them". P16

Theme, subtheme, quote number	Quote and participant code
<i>Improved professional concussion training and education</i>	
3–8	"It's not appropriate for new grads in junior physio (...) because it's really hard work (...) you need to have a little bit of life under your belt to (...) be able to have the skills to mitigate that". P4
3–9	"There are plenty of courses that are offered (...) which would more than tick the boxes". P2
3–10	"A hybrid model where there were some online modules (...) then you have a meet up in person for a day". P4
3–11	"Even if you are participating in a forum, (...) if you were actively chatting with people about things you shouldn't need to do the recertification". P4
3–12	"It'd be similar to (...) [name], who's the pelvic health physio doing training, obviously not in pelvic health but concussion but similar (...) [that] you're accredited". P6
3–13	"The disappointing thing is that they've set the minimum as a Master's standard, a lot of us don't have a master's but definitely have the knowledge and the ability to do it". P9
<i>Proposed new role or model of care</i>	
3–14	"If we can have validated tools like the BIST, then that should cut out (...) a lot of the challenges that we face about making a diagnosis and choosing who goes into the concussion service". P7
3–15	"It should be something with ACC where you have the ability to lodge that ACC code and (...) there's some relationship with ACC that they, recognise your expertise so that you can use a particular code that not every physio can". P4

Note. A & E = accident and emergency; ACC = Accident Compensation Corporation; P = participant; SCAT = Sports Concussion Assessment Tool.

(Q1–13), or when the GPs were uncomfortable making decisions about return-to-play readiness due to self-acknowledged lack of expertise (Q1–14). GPs were reportedly often surprised that physiotherapists could not diagnose or provide return-to-play clearance, apparently unclear about their respective professional roles (Q1–15). Most participants described communication challenges, which they ascribed to the GPs' lack of time, often being short-term locums, or older GPs seemingly placing less value on multi-disciplinary approaches (Q1–16).

Consequences for the patient

Delayed medical doctor appointments led to delayed formal concussion diagnosis, clinical recovery, and return to contact training (Q1–17). Participants also perceived that some patients' challenges with GPs included the costs for the GPs' fees (Q1–18). Without the formal diagnosis, patients could not access the fully funded ACC concussion services, if needed, creating further financial tension because "if a concussion services contract was in place straight off, then obviously it's fully funded" (P2).

Navigating concussion care in a strained healthcare system

This theme (with three sub-themes) describes the participants' perceived competence to diagnose concussions and clear players for return-to-play. They felt highly conflicted when their scope limited required care for the individual patient, sharing the impact these limitations had on concussion management.

The concussion diagnosis quandary

Some participants supported that concussion diagnoses should be made only by a medical doctor, in part, due to the requirement for ACC and high-performance sports organisations, and due to potential medicolegal issues (Q2–1). They also had concerns that physiotherapists might miss subtle indications for referral (Q2–2). Yet most participants suggested

that physiotherapists were capable of diagnosing and triaging concussions (Q2–3, Q2–4).

They described that their field sideline observations of acute incidents and presentation were important factors in diagnostic reasoning (Q2–5). They were actively involved in recognising concussions and triaging those with red flags for immediate referral to ED (Q2–6, Q2–7), attributing such competence to clinical experience and continued professional development. Some participants described how some of their suspected concussion diagnoses were incidental, for example when a patient was seeking care for symptoms related to a neck injury in the clinic (Q2–8). All participants strongly agreed that in cases where diagnostic uncertainties or concussion modifiers (for example, repeated concussions, learning difficulties), or significant yellow flags (psychosocial factors) existed, referrals to medical doctors were non-negotiable, as for all other injuries or conditions they managed as physiotherapists (Q2–9).

Navigating return to play

Participants were regularly involved in guiding players through return-to-play processes, and monitoring symptom response to progressive aerobic and, when relevant, musculoskeletal and vestibular ocular exercise programmes (Q2–10). As team physiotherapists, they got to know their players well, and thus felt they were more capable than GPs to track behavioural, emotional, and physical changes (Q2–11). Participants suggested that it was their report (thus judgement for readiness) that commonly guided the GP's return-to-play decision (Q2–12, Q2–13).

Overall, participants suggested that with appropriate training, physiotherapists were competent to clear for return-to-play or to refer to medical doctors for a second opinion when uncertainties

existed. They also explained that patients with underlying psychological or learning disorders, or other medical conditions (concussion modifiers/pre- or post-morbid factors) needed to be referred to a GP for clearance (Q2–14, Q2–15).

Conflict between professional scope and clinical reality

Participants described the challenges navigating the expected care within their scope and the reality of care they provided. Three key issues were raised: limitation to the use of the ACC read code for concussion, some coaches seeking advice from the physiotherapists despite GPs having provided their clearance, and, in contrast, the inability for physiotherapists to clear their players for return-to-play, often leading to players' lack of confidence in their professional ability.

Participants felt very frustrated about the health system restrictions for physiotherapists to lodge ACC concussion claims (Q2–16). Inability to use the read code delayed initiating concussion management and had an unintended consequence of masking the true burden of concussions. Participants perceived that the diagnosis restriction was based on historical reasons, or due to a general concern that physiotherapists might not identify red flags requiring referral (Q2–17). They described the dilemma they faced having to use read codes for secondary injuries, for example a neck sprain or contusion, to implement treatment while waiting for the medical doctors' formal concussion diagnosis (Q2–18).

Participants also suggested that they were often asked by coaches to confirm a GP's decision, possibly reflecting greater confidence in the physiotherapist's decision-making ability (Q2–19). Ultimately, participants felt that they were also at risk of losing players' confidence, particularly when the GP's decision did not support theirs (Q2–20).

Proposed expanded role for physiotherapists

This theme has three subthemes, illustrating the participants' belief in the benefits of expanding their role within concussion management, recommended concussion training, and what they anticipated an expanded role could entail.

Perceived benefits of expanding physiotherapists' roles

Expanding physiotherapists' role to include diagnosis and clearance could reduce medical doctors' burden (Q3–1), provide timely access to multi-disciplinary care (Q3–2, Q2–3), resulting in earlier care and recovery, and minimise waiting time to be cleared for return to contact training. It could potentially save time and cost for ACC (Q3–4) and the patient (Q3–5).

A combination of physiotherapists' existing rapport with the patients (Q3–6) and having more time for patients compared to medical doctors allowed physiotherapists to provide the patient detailed education. Early patient education would potentially "streamline care" and "maximise the recovery" (P2) (Q3–7).

Improved professional concussion training and education

Participants expressed that appropriate concussion training was paramount and that "if you've got the right qualifications, it's within your scope, and you're confident, there should be no reason why we can't diagnose and manage concussion" (P2). Participants agreed that it would not be appropriate for new graduate physiotherapists to independently diagnose concussion or clear players for return to sport (Q3–8). They suggested

a range of professional training, from formal post-graduate study, continuous professional development courses, workplace in-services, peer mentoring, portfolio-based training, to participation in forums (Q3–9, Q3–10, Q3–11). Clinical exposure to concussion management should also be considered.

Some suggested that being recognised as an accredited physiotherapist for concussion diagnosis, management, and clearance would be useful, similar to the possibilities for pelvic health physiotherapists (Q3–12). Others felt that the new registration of advanced practitioners under the Physiotherapy Board of New Zealand would provide such opportunity: "it's a good case for advanced physios" (P2). Others felt that the standards to become an advanced practitioner were too high for this purpose, as these required a Master's degree (Q3–13).

Proposed new role or model of care

Many felt that expanding models of care similar to the current New Zealand Rugby concussion clinics providing early GP access to all individuals with concussion regardless of aetiology would result in better care for patients: "exactly what the concussion clinic in Dunedin is doing at the moment" (P1). In the absence of funding for such clinics, participants suggested that ACC should recognise physiotherapists' concussion-related competence and allow them to use the ACC concussion read codes to initiate immediate care for patients. They also suggested that consistent pathways for physiotherapists using validated tools, such as the Brain Injury Screening Tool (BIST) (Theadom et al., 2021) for concussion diagnosis triaging, would improve efficiency for appropriate referrals to concussion services (Q3–14, Q3–15).

DISCUSSION

The participants of this study reflected commitment and competence for providing healthcare to individuals with sports-related concussions. They worked in different contexts, including multidisciplinary practices, secondary schools, and private practices across the North and South Islands and had a wide range of work experience. Most participants were involved in rugby, with some involved in football, netball, or cycling or a combination of these sports. We generated three themes in our analysis: (a) delayed access to concussion-trained GPs; (b) navigating concussion care in a strained healthcare system; and (c) proposed expanded role for physiotherapists. These themes described the common difficulties encountered by physiotherapists, primarily, players' delayed access to medical doctors in the strained current healthcare environment, yet being restricted by being unable to use concussion read codes while waiting for a medical appointment. They were concerned that such limitations led to delayed diagnosis and initiation of rehabilitation. Such care is particularly important for the 65% of individuals who do not recover within the first 2 weeks of a concussion (Kara et al., 2020). The participants were involved in recognising, triaging, and managing concussion and felt confident in their ability to do so.

Most participants felt that with appropriate training, physiotherapists should be able to diagnose and clear players for return to play. Only a few were against this, stating this field of expertise should remain with medical doctors. Those views came mainly from participants working in high-performance sports, concerned that potential red flags might be missed by

physiotherapists. Such high-performance athletes or players are likely to have direct access to trained medical doctors at short notice.

Most participants were assessing individuals' return-to-play readiness, with some participants having experienced situations where GPs had not been confident to provide such clearance. This is supported by findings of medical doctors' self-reported lack of confidence, particularly in return-to-play decisions within New Zealand and abroad (Salmon et al., 2022; Scully & Falvey, 2021; Stuart et al., 2022). In contrast, a survey across 57 countries and an American survey found that physiotherapists were knowledgeable about the signs, symptoms, and assessment of concussion (Al Attar & Husain, 2021) and have a strong foundational knowledge, believing they should be more involved in concussion management (Yorke et al., 2016).

Concussion diagnosis is based on clinical judgement, considering the purported or observed mechanism of injury and assessment of signs and symptoms (Echemendia, Burma, et al., 2023). There is no specific investigation that can confirm the diagnosis and the severity thereof. Physiotherapists are trained to consider plausible mechanism of injuries, the history and recovery from previous injuries, and to undertake a detailed assessment of physical, psychosocial, neurological, function, and performance-related impairments. They use a person-centred approach to assessment and treatment, differentiating disorders of the autonomic, vestibular, and cervicogenic systems (Schneider, 2019a, 2019b). They are trained to assess red flags or indications for referrals for immediate ED care or other medical and healthcare providers. Physiotherapists can use clinical practice guidelines (Derbyshire et al., 2021; Quatman-Yates et al., 2020), the international cervical framework when assessing head and neck injuries to identify vascular red flags (Rushton et al., 2022), and the Canadian C-spine rules to assess for cervical spine injuries and the need for referral for medical imaging (Stiell et al., 2001). They use the Concussion Recognition Tool 6 (CRT6) (Echemendia, Ahmed, et al., 2023), the Sports Concussion Assessment Tool (SCAT 6), or earlier versions thereof, recommended for the first post-injury 72 hours (Echemendia, Burma, et al., 2023), or the Sport Concussion Office Assessment Tool 6 (SCOAT6) after 3 days post-injury (Patricios, Davis, et al., 2023). Using validated tools such as the BIST could facilitate physiotherapists in triaging concussions (Theadom et al., 2021). They guide sportspeople of all ages and levels through rehabilitation, undertaking regular performance assessments while monitoring symptom responses to physical activity and exercise. Similar to GPs, physiotherapists arguably have the clinical skills required for making concussion diagnoses, and they may be better equipped than GPs to clear contact and non-contact sportspeople for return to play and work.

Most participants of our study felt they could identify red flags that required immediate referral, aligning with similar research (Reid et al., 2020; Salmon, Badenhorst, et al., 2023). Nonetheless, concussions can be complex, thus clinical exposure and training beyond professional entry level programmes would be required to gain confidence and accuracy with the often ambiguous decision-making processes. Indications for medical evaluation remain if a history of cardiovascular or

peripheral vascular diseases existed, or where other concurrent neurological conditions, repeated concussions, behavioural or learning impairments, medication interactions, or other reasons for symptoms such as dizziness, visual, or auditory impairments are suspected (Ahmed et al., 2017; Schneider & Gagnon, 2017).

In reality, physiotherapists are often involved and confident to identify and manage individuals with suspected concussions while waiting for a medical doctor appointment (Frémont et al., 2022; Maxtone et al., 2020; McGrann & Keating, 2012; Salmon, Badenhorst, et al., 2023; Salmon, Chua, et al., 2023). To initiate care under the current ACC restrictions, physiotherapists use other read codes that are within their scope, such as neck sprains or head contusions (Kennedy et al., 2017). This causes inaccuracies in the concussion coding system, masking the true burden of concussions (Poloai et al., 2023).

Expanding physiotherapists' role may improve access to care, reduce financial cost to the patient (particularly saving the direct and indirect costs of a GP visit), and enhance the level of care provided to patients. In rural and semi-rural areas, the patient's travel burden to the closest concussion-knowledgeable medical doctor may be decreased, particularly minimising risk of travelling while having suspected concussion-related signs or symptoms. This is consistent with New Zealand Rugby research suggesting the need to "expand the circle of care" for concussion management from a strong responsibility by GPs to include other healthcare providers (Salmon et al., 2022). Physiotherapists are in a good position and have a strong desire to contribute more towards concussion management in New Zealand (Reid et al., 2020; Salmon et al., 2022). The participants had varied responses for further training required for a potentially expanded role. Most agreed that continued professional development activities such as short courses, case studies and/or portfolio-based work, and peer mentoring would be sufficient. An accreditation system was considered, similar to a pelvic health physiotherapist for birthing injuries (Accident Compensation Corporation, 2024), while others suggested the role for advanced practitioners could be a benchmark (Naik et al., 2023).

Methodological considerations

While this qualitative study included only 18 participants, limiting generalisability to physiotherapists across New Zealand, we gained detailed and contrasting insights of the participants' experiences. The participants were from diverse contexts, including geographical location across New Zealand, rurality, and clinical settings and experiences. The main researchers (MD and GS) undertook reflexivity practice, assessing their beliefs and assumptions and their impact on the research process (Jamieson et al., 2023). Trustworthiness was considered by accounting for credibility, transferability, dependability, and confirmability (Appendix 1A) (Korstjens & Moser, 2018). Two researchers independently coded interviews and focus groups, and the themes were agreed upon by the wider research team that included experienced clinicians. Limitations included the inability to exclude response bias where participants would potentially provide information they believed the interviewers were looking for. However, we suggest that this was minimised as contrasting views were expressed by participants.

Implications

Considering physiotherapists' concussion-related competencies plus the current work-related burden GPs face (Betty et al., 2023), it may be time to reconsider the physiotherapists' role as being able to diagnose concussions, generate the relevant ACC read code, and clear the person for return to sports. Thereby, recovery is likely to be optimised and safe return to sport would not be delayed until a GP may be available. An opportunity exists to optimise multidisciplinary concussion care. At the microlevel, namely the patient–therapist interface, physiotherapists are already informally making diagnoses of suspected concussions and initiate person-centred care while waiting for a GP appointment, particularly at a community sports level (Poloai et al., 2023; Salmon, Badenhorst, et al., 2023; Zhao et al., 2022). Instead of registering non-concussion related codes for secondary injuries such as neck pain, their ability to use the concussion or a “suspected” or provisional concussion code may improve timely access to specific concussion care (Poloai et al., 2023). A formal triage role at the meso-level (across disciplines) for physiotherapists may decrease medical doctors' burden and enhance acute and specific concussion care, particularly at community sport level (Reid et al., 2020). As the early symptom burden predicts duration of symptoms (Meehan et al., 2014; Putukian et al., 2023), perhaps using the BIST, the SCOAT6, or other tools to screen patients could allow individuals with lower level symptoms to be diagnosed and managed by the physiotherapists, freeing up GPs appointments for those with higher BIST scores, or for the ~25% of individuals with concussion who are likely to need more than one month to clinical recovery (Kara et al., 2020). An accreditation process for physiotherapists providing concussion care could be developed, similar to physiotherapists' training for management of birthing injuries (Accident Compensation Corporation, 2024). Support for such a triaging role for physiotherapists would need to be approved at the macro-level, under the auspices of ACC, and potentially with the national sports organisations (Zhao et al., 2022). This would enable a whole systems approach for physiotherapists, GPs, and other providers to work towards a model of care for people with concussion to access appropriate care at the right place, at the right time, and by the right team.

CONCLUSION

Findings from this study indicate that most participants felt competent in diagnosing and managing concussions, and clearing players for return-to-play clearance. Many felt they were already leading concussion management and return-to-play decisions. The physiotherapists suggested that with the relevant training and mentored experience, diagnosis, triaging, and clearance for sport could be within their scope of practice. Such expanded scope would directly benefit their patients by streamlining and decreasing the cost of care, reduce the burden on the healthcare system, and increase accessibility to care, particularly for community sporting levels.

KEY POINTS

1. We explored physiotherapists' perspectives of their scope of practice for individuals with sports-related concussions.
2. Physiotherapists suggested that they were often leading concussion identification, management, and clearance for return to sport.

3. Those working at community sport level suggested that with relevant training, diagnosis, triaging, and clearance for sport could be within their scope of practice in future.

DISCLOSURES

This study received no grant funding. RB was a participant in an early focus group of this study and was thereafter invited to co-code the data (excluding her focus group) as an additional co-author. The themes and sub-themes were discussed and approved within the full research team. The authors declare no other conflict of interest.

PERMISSIONS

This study was approved by the University of Otago Human Ethics Committee (Reference D23/046).

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CONTRIBUTIONS OF AUTHORS

Conceptualisation and methodology, GS, MD, OG, DQ, JC, and DR; formal analysis, MD, RB, and GS; interpretation, GS, MD, RB, OG, DQ, JC, and DR; writing – original draft preparation, MD and GS; writing – review and editing, GS, MD, RB, OG, DQ, JC, and DR; data curation and project administration, GS.

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Appendix A

CRITERIA FOR TRUSTWORTHINESS

Credibility

Allowed for prolonged engagement by asking distinct questions, encouraging the participants to provide their true perspectives, which allowed us to gain a diverse rich set of data.

Two researchers were involved in coding data and the wider research team was involved in the final analysis and interpretation of data. Discussions took place until the most appropriate model was agreed upon.

The data was reread, analysed, theorised, and revised; accordingly the final model provided the intended depth of perspectives of the participants.

Transferability

Provided in-depth description of the context of the study and of the participant characteristics.

Participants included have a diverse range of backgrounds and working contexts.

Dependability and confirmability

Described all research steps using COREQ (COnsolidated criteria for REporting Qualitative research) guidelines.

Detailed theme tree provided.

Reflexivity

The main researchers (MD and GS) engaged in writing reflexivity statements about assumptions, preconceptions, and values, and how that may affect the research.

Note. Criteria based on Korstjens and Moser (2018).