Physiotherapist-led triage within orthopaedic spine consultation: evaluation of a novel secondary care model of care

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ABSTRACT

AIM: Timely access for orthopaedic spine consultation remains a challenge due to increasing demand and workforce constraints. Integrating advanced physiotherapy consultation models within orthopaedic services is an emerging strategy to streamline care. While common in New Zealand's tertiary care sector, comparable models in secondary care are lacking. This study evaluated the outcomes of a novel physiotherapist-integrated orthopaedic consultation model in secondary care.

METHODS: A retrospective review of patients seen from March to July 2023 was conducted using a five-step physiotherapist-integrated orthopaedic consultation model to assess management decisions, patient satisfaction, impact on consultation wait times and service capacity, and diagnostic concordance.

RESULTS: Among 233 patients (mean age 46.8 years; 53.6% male), 73.4% presented with lower back and associated lower limb symptoms. Most (74.7%) were managed non-operatively, 25.3% underwent surgical workup and 10.7% proceeded to surgery. Patient satisfaction was high (overall mean 91.3%), with highest scores for *quality of care* (92.3%) and *explanation of treatment/expected outcomes* (91.7%). While mean consultation wait times were longer than the 2021 pre-model cohort (63 vs 47.4 days), service capacity increased by 32%. Across three magnetic resonance imaging variables, diagnostic concordance was substantial (overall agreement: 78.1%; mean kappa: 0.65 [0.63–0.68]).

CONCLUSION: A physiotherapist-integrated orthopaedic consultation model in secondary care is highly accepted by patients, increases service capacity and broadens multidisciplinary decision-making capacity. While a model as such is theoretically positioned to reduce consultation wait times, this was not observed in the present analysis—reflecting a growing unmet need for orthopaedic consultation in secondary care.

Timely access to specialist orthopaedic consultation remains a significant challenge in many healthcare systems, contributing to prolonged wait times and delayed management, and it can impact patient outcomes. These delays also have broader implications for healthcare resource utilisation, exacerbating system inefficiencies.[1,2] In New Zealand, limited workforce capacity within both secondary and tertiary orthopaedic services further compounds these challenges, necessitating alternative models of care to enhance service delivery and triage efficiency.[3]

To address these constraints, there has been increasing interest in integrating non-surgical clinicians, including physiotherapists, nurse specialists and general practitioners with special interests, into orthopaedic and musculoskeletal care pathways.[4] Advanced practice models have demonstrated efficacy in reducing consultation waiting time, managing waiting lists, optimising resource allocation and streamlining patient management, particularly within tertiary healthcare settings.[4]

Despite these successes, structured implementation of physiotherapy-led triage or independent first specialist assessment remains limited in the Southern Hemisphere. In New Zealand, physiotherapy-led roles in orthopaedics have largely emerged within tertiary care settings in an *ad hoc* manner, driven by local service needs rather than formalised pathways.[5] The potential for collaborative consultation models, where physiotherapists work alongside orthopaedic surgeons, has not yet been evaluated within the private secondary care setting.

This study examines the implementation of a physiotherapist-integrated consultation model within a private orthopaedic spine service in New Zealand. Specifically, it assesses consultation wait

times, service capacity, diagnostic imaging concordance and patient satisfaction.

Methods

Study design

A retrospective cohort study was conducted to evaluate outcomes of a physiotherapy triage assessment model alongside orthopaedic consultation in a secondary care orthopaedic spine centre in Auckland, New Zealand. Data were extracted from electronic medical records of consecutive patients referred for specialist orthopaedic spine consultation over a 5-month period. This study was conducted in accordance with the Declaration of Helsinki (Brazil 2013). It was a retrospective review of anonymised patient records; all patients had provided routine clinical consent for the use of their data in audit and service evaluation. In line with New Zealand guidelines (National Ethics Advisory Committee, 2012), formal ethics committee approval was not required. The study protocol was not prospectively registered.

Establishment of the model of care

The physiotherapist-integrated consultation model was introduced in 2022 at the orthopaedic spine centre to enhance timely access, optimise surgeon time utilisation and integrate a holistic approach to assessments. The model functioned as a joint consultation framework, wherein assessment, diagnosis and triage were primarily conducted by the orthopaedic physiotherapy practitioner (OPP), with multidisciplinary treatment decision making with the consulting orthopaedic spine surgeon. This approach facilitated a comprehensive evaluation of functional capacity, prior rehabilitation engagement and non-surgical management options, thereby complementing standard orthopaedic consultation.

At the time of implementation, structured physiotherapy-led triage roles as such in New Zealand remained in infancy, largely emerging in response to service-specific demands. While conceptually aligning with advanced practice physiotherapist (APP) models observed internationally, the APP designation is formally recognised by the Physiotherapy Board of New Zealand, requiring defined professional prerequisites.[6]

To ensure clarity in terminology, this study refers to the physiotherapist performing triage assessments as an *orthopaedic physiotherapy practitioner (OPP)* within the *physiotherapist-integrated consultation model*.

Participant recruitment and eligibility criteria

Consecutive patients consulted with under the physiotherapist-integrated orthopaedic consultation model and who completed a post-consultation satisfaction questionnaire between March and July 2023 were included. All patients underwent

Table 1: Key terminology and definitions.

Term	Definition
Physiotherapist-integrated orthopaedic consultation model	A collaborative care model where a physiotherapist and orthopaedic surgeon jointly assess patients. This involves a physiotherapist-led assessment consisting of a comprehensive patient history, examination and review of available imaging, prior to handover and orthopaedic review. The consultation components are summarised in Figure 1.
Orthopaedic physiotherapy practitioner (OPP)	A physiotherapist working in an orthopaedic care setting performing assessment and diagnostic insight. The scope is typically context-specific, but may include referral for high-tech medical imaging, investigations or further medical specialist evaluation.
Secondary care	Health services provided by medical specialists (including orthopaedic surgeons) in the private sector upon referral from primary care.

magnetic resonance imaging (MRI) corresponding to the presenting complaint prior to consultation.

Data collection

A trained research assistant (AK) systematically reviewed electronic medical records to extract relevant demographic and clinical data. Extracted variables included patient age, gender, ethnicity, comorbidities, presenting complaints and consultation outcomes. Consultation outcomes were classified as two primary management pathways: non-operative management or surgical workup. Non-operative management was further categorised into referral for physiotherapy-led rehabilitation, referral to a musculoskeletal medicine specialist for consideration of interventional pain management, or continued existing conservative therapies +/− additional investigations for differential diagnosis. Surgical workup included cases where patients underwent interventional procedures for diagnostic or therapeutic purposes or were referred for further investigations as part of surgical evaluation.

OPP

The OPP conducting triage assessments (RVC) was a New Zealand-registered physiotherapist with 6 years of clinical experience in musculoskeletal physiotherapy and a relevant postgraduate diploma. At the time of data collection, the OPP had not obtained the formal APP designation under the Physiotherapy Board of New Zealand. To facilitate the transition into this role, a structured competency development process was implemented, incorporating supervised clinical training through direct observation of an orthopaedic spine surgeon (AHS), clinical case discussions and progressive responsibility in patient assessment.

A key component of this training was undertaken in the first 4 months of establishing this model, which included supervised review of 300 spinal MRIs. This process emphasised the identification of key radiological features, correlation with clinical presentations and differentiation between surgical and non-surgical cases. Additional professional development was undertaken through online modules and webinars focussed on spine orthopaedics, interventional pain management and radiology. The structured training ensured the OPP developed the diagnostic proficiency required for triage consultations, with a sufficient level of concordance with the consulting orthopaedic spine surgeon.

Physiotherapist-integrated consultation

Patients assigned to this service were provided with a detailed explanation of the model of care and, upon agreement, provided signed informed consent before participation. The consultation followed a structured five-step process (Figure 1): physiotherapist-led 1) history taking, 2) physical examination and 3) medical imaging review, followed by 4) a multidisciplinary diagnostic case discussion for diagnostic validation and treatment planning and 5) confirmation of a patient-centric management plan adopting a shared decision-making approach.

Effect on consultation wait times and service capacity

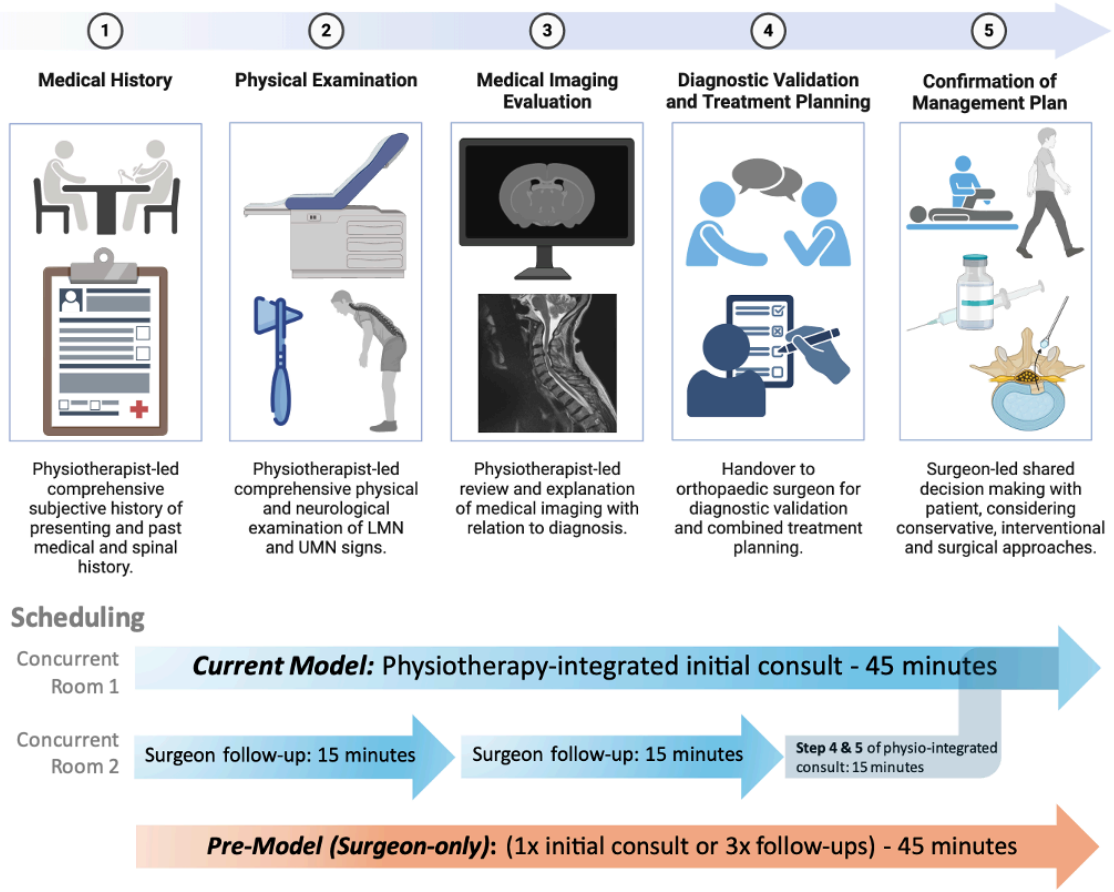
The duration from referral to consultation was calculated in days for patients assessed between March and July 2023. To evaluate the impact of the consultation model, these wait times were compared with those of an equivalent cohort of patients seen by the orthopaedic spine surgeon in 2021, prior to the model's implementation. The mean consultation wait time for each period was calculated, and differences between the two cohorts were analysed. Further analysis of service capacity was performed by calculating the percentage change in the number of new patient consults performed during the pre-model period (2021) compared with the study period.

Diagnostic concordance

Inter-rater reliability for the interpretation of spinal MRI findings was assessed between the OPP and the orthopaedic spine surgeon, specifically in relation to the primary presenting complaint. This was performed using a nested reliability study sample of 35 randomly selected patients, based on expert statistical advice from an academic statistician, comprising 17 patients with lumbar-related complaints and 18 patients with cervical-related complaints.[7] Prior to independent assessment, a structured 30-minute meeting was held to establish standardised radiological parameters and grading methods for evaluating MRI scans.

Blinded to the initial diagnosis, the OPP and spine surgeon independently reviewed MRI images, focussing on key diagnostic markers, including the involved nerve roots, degree of compression and location of neural compression. The degree of agreement between the two assessors was subsequently analysed to determine the degree of diagnostic concordance.

Figure 1: Components of the physiotherapist-integrated consultation.



Note: The scheduling component of this figure demonstrates the ability for the orthopaedic surgeon to conduct concurrent follow-up consultations while the physiotherapist conducts the physiotherapist-led components of the physio-integrated consultation (blue arrows). The transposing arrows (blue versus orange) demonstrate one way in which the current model increases capacity and service efficiency; i.e., the current model allows for an initial consult and two follow-ups to be seen during the same 45 minutes, compared with a single initial or three follow-ups in the pre-model period.
LMN = lower motor neuron; UMN = upper motor neuron.

Patient satisfaction

Participants were invited to complete a satisfaction questionnaire by the clinical administrator immediately after the completed consultation. This questionnaire was voluntary and participants had the option to opt out of completing the questionnaire. The questionnaire was developed based on the validated Visit-Specific Satisfaction Instrument (VSQ-9), with modifications to align with the specific characteristics of the model of care. To ensure clarity and relevance, the questionnaire underwent pilot testing with three independent laypersons unaffiliated with the study cohort or clinical setting. Feedback from pilot participants and the orthopaedic spine surgeon was incorporated into the final version.

The final questionnaire was comprised of six items: five items were scored on a five-point Likert scale and one item allowed for open-ended feedback. Likert scale responses ranged from "strongly agree" (+2) to "strongly disagree" (−2), evaluating the following domains: 1) patient experience, including communication, 2) involvement in decision making, 3) explanation of treatment plans, 4) coordination of care, and 5) overall satisfaction.

Data analysis

Descriptive statistics were used to summarise participant characteristics, consultation outcomes, wait times and service capacity, with results reported as means and standard deviations (SD).

Given the observational nature of the study, no statistical testing was conducted to assess associations between independent and dependent variables.

Diagnostic concordance between the OPP and the spine surgeon was evaluated using Cohen's kappa coefficient (κ) to calculate inter-rater agreement. The interpretation of kappa values followed standard classification criteria as per Landis and Koch.[8]

Average percentiles were calculated for individual and overall domains of patient satisfaction by converting Likert responses (−2 to +2) to a 0–100 scale using linear transformation, such that −2 corresponded to 0%, 0 (neutral) to 50% and +2 to 100%. Due to variability in qualitative responses from the satisfaction questionnaire, open-ended feedback was excluded from this quantitative analysis but was systematically reviewed by the clinical team. Insights from patient comments were considered in ongoing service improvements to optimise the consultation model and enhance patient-centred care.

Results

Participant characteristics

Between March and July 2023, 233 participants were seen at the orthopaedic spine centre and included in this analysis. The average age

Table 2: Participant characteristics and referral information.

Category	Subcategory	N (%)
Mean age		46.8 years (SD 15)
Gender	Male	125 (53.6%)
Ethnicity	New Zealand/Other European	72 (30.9%)
	Asian	59 (25.3%)
	Māori	19 (8.2%)
	Pacific peoples	14 (6.0%)
	Other ethnicities	12 (5.2%)
	Unspecified	57 (24.5%)
Primary complaint	Lower back pain with associated lower limb symptoms	145 (62.2%)
	Isolated lower limb symptoms	26 (11.2%)
	Neck pain with associated upper limb symptoms	24 (10.3%)
	Isolated lower back pain	21 (9.0%)
	Isolated upper limb symptoms	8 (3.4%)
	Isolated neck pain	6 (2.6%)
	Other	3 (1.3%)
Referral source	General practitioner	208 (89.3%)
	Physiotherapist	22 (9.4%)
	Other (chiropractor, osteopath, medical specialist)	3 (1.2%)

SD = standard deviation.

of participants was 46.8 years (SD 15 years) and 46.2% were female. There was significant ethnic spread, with 29.6% NZ European, 26.2% Asian, 6.9% Pacific and 8.2% Māori participants. Some of the common comorbidities in the population included hypertension (18.9%), hyperlipidaemia (19.3%), asthma (8.2%) and thyroid-related disorders (3.4%).

The majority of patients (89.3%) were referred by their general practitioners, followed by physiotherapists (9.4%). The primary complaint and referral indication in the majority of cases was lower back pain with associated lower limb symptoms (62.2%, n=145), followed by isolated lower limb symptoms (11.2%, n=26). Table 2 details all the participant characteristics and referral indications.

Consultation outcomes

The majority of patients were managed non-operatively (74.7%, n=174), of which 51.1% were referred for physiotherapy-led rehabilitation, followed by 44.8% referred to a musculoskeletal medicine specialist for medical or interventional pain management, while 24.1% required further investigations including region-specific or repeat MRI alongside non-operative management, nerve conduction studies or nuclear medicine bone scan/single photon emission computed tomography (CT SPECT) (Figure 2).

The remaining 25.3% (n=59) of the 233 total patients underwent further surgical workup, which included an epidural nerve root steroid injection and scheduled 6-week follow-up to review response. Only 25 patients (10.7%) proceeded to have surgery.

Effect on consultation wait times and service capacity

Mean wait times for initial consultation during the 2021 period for 233 patients was 43 days (SD 47.4). With the implementation of the physiotherapist-integrated consultation model, the wait times were incidentally longer (mean 63 days, SD 36.3) for various reasons discussed in the limitations section. However, service capacity, defined by the capacity for new patient consults, increased by 32.3% with the implementation of this model, allowing a greater capacity for initial consultations.

Diagnostic concordance

Inter-rater diagnostic agreement was evaluated across 35 patients (15% of the total cohort). There was an overall agreement of 78.1% (82 out of 105 ratings), with a composite mean kappa score of 0.7, indicating substantial agreement. Table 3 details the percent agreement and kappa

Figure 2: Non-surgical management pathways following consultation.

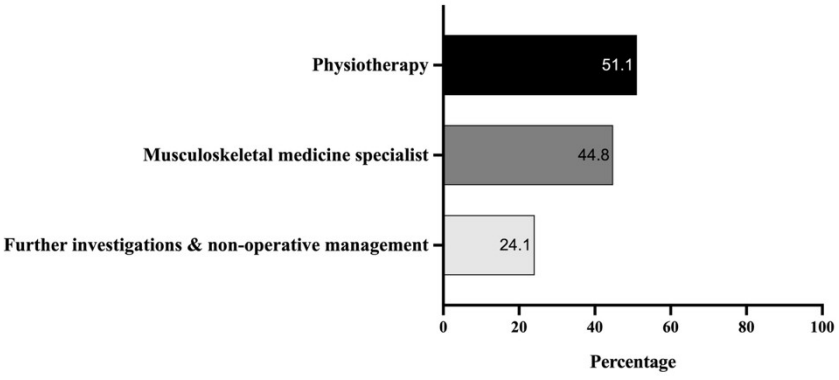
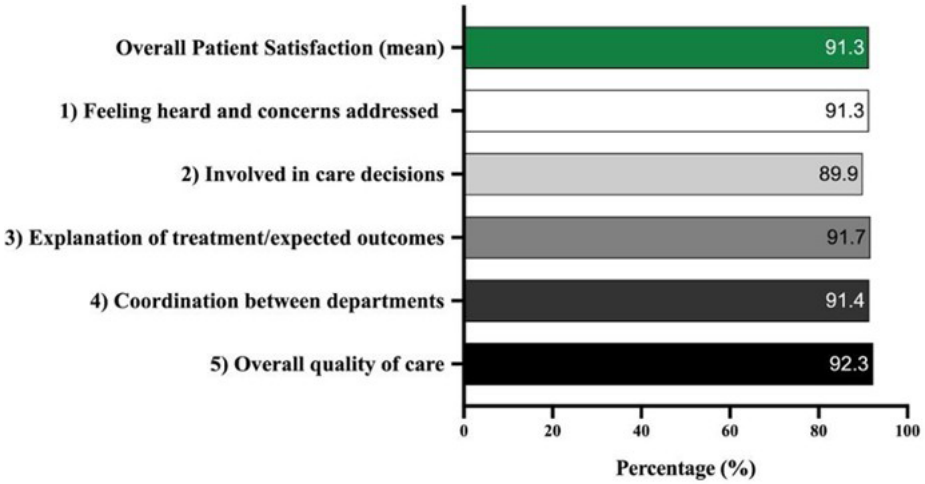


Table 3: Diagnostic concordance between physiotherapist and orthopaedic spine surgeon.

Variable	Agreement (%)	Cohen's kappa
Nerve root selection	74.3	0.7
Compression degree	80	0.7
Zone of compression	77.1	0.6

Figure 3: Patient satisfaction scores by domain.



Note: Overall patient satisfaction (green bar) represents the average satisfaction across all domains. Corresponding mean percentages are reported within the bars. Questionnaire items: 1) Did you feel that the healthcare provider listened to and addressed your concerns during the appointment? 2) Did you feel involved in decisions about your care? 3) How well did the healthcare provider explain your treatment plan and expected outcomes? 4) How would you rate the coordination between different departments? (e.g., referrer, admin, radiology and/or other specialists.) 5) How satisfied were you with the overall quality of care you received during your visit?

scores for agreement of nerve root selection, degree of nerve root compression and the zone of compression.

Patient satisfaction

The overall level of patient satisfaction among the 233 patients was 91.3% (Figure 3). For the five domains, the highest scores were obtained for domain five—which assessed quality of care—yielding an average percentage of 92.3%. All other domains, as shown in Figure 3, yielded scores between 89.9% and 91.7%.

Discussion

To the authors' knowledge, this is the first study to propose and evaluate a physiotherapist-integrated triage assessment in orthopaedic spine consultation within New Zealand's secondary care. The model demonstrated several favourable outcomes, including high patient satisfaction (mean score >90%) and substantial diagnostic imaging concordance between the spine-trained OPP and the consulting orthopaedic spine surgeon. While consultation wait times did not reduce compared to the pre-implementation cohort as anticipated, largely owing to a rapid service growth during the study period, service capacity for new patient consults increased by 32%. With increasing demand for specialist orthopaedic services and ongoing workforce constraints, such interdisciplinary models offer a pragmatic solution to streamline musculoskeletal care delivery.

Physiotherapists are trained with comprehensive musculoskeletal assessment skills, which can support orthopaedic practice.[4] A 2021 systematic review performed by Vedanayagam et al. found that APPs working in these settings consistently demonstrate high levels of diagnostic agreement and appropriate decision making, and improve treatment outcomes and access to care.[4] The role of physiotherapists in non-operative management and alongside surgical management in the pre- and post-operative phases is already well established.[9–11] With further development of service-specific training, such as medical imaging interpretation, physiotherapists can play a complimentary and adjunctive role in the diagnostic and triage components of orthopaedic consultation, as demonstrated in the present analysis.

While such an approach is conceptually positioned to reduce consultation wait times, this was not observed in the present analysis for several reasons. The comparison time period (2021) reflected the early establishment period for

the practice, which was also the post-COVID period where virtual telehealth consultations facilitated expedited consultations. Further, the present consultation model was observed to improve clinic capacity by 32%, allowing for a greater number of patients to be consulted with on a given clinic day, thereby increasing the capacity to accept a greater volume of referrals. The unmet need for timely consultation is substantial. As referrers become aware of increased service capacity and structured triage, referral volumes increase, particularly given the challenges of evaluating persistent spinal complaints in primary care. This growth has been observed in the practice, which receives an average of 45 incoming referrals per week, resulting in expansion of the present model by hiring a second physiotherapist.

Comparable models of care have been successfully implemented internationally.[4] These models have demonstrated outcomes comparable to the present study, with high levels of diagnostic concordance, albeit categorical and non-imaging based, between APPs and orthopaedic surgeons,[12–15] as well as patient satisfaction.[15,16] The level of diagnostic concordance demonstrated between the OPP and the orthopaedic surgeon in this study mirrors that documented both among surgeons[17,18] and between radiologists.[19] The United Kingdom's National Health Service model utilises APPs to independently conduct first specialist assessments for patients on musculoskeletal and orthopaedic wait lists, arrange advanced diagnostic investigations and prescribe medications.[20,21] Such autonomy is contingent on clearly defined competency and training frameworks, stakeholder support and validated outcomes that demonstrate clinical safety, cost effectiveness and service-level benefit.[22]

In New Zealand, formalisation of advanced practice remains in its early stages. The recent Entrustable Professional Activity framework published by Cadogan et al. represents a key development, outlining five core competency domains informed by international models.[23] These included *referral triage and management*, *clinical assessment*, *referring for diagnostic investigations*, *treatment planning and management* and *referring for interventional procedures*.[23] These broad items represent domains of clinical practice embedded within existing APP models of care, informed by existing international frameworks. While this provides a foundation to develop the skillsets of physiotherapists within subspecialty practice settings, the translation of these competencies into clinical practice requires alignment with stakeholders and targeted implementation strategies.[5,24]

The model presented in this study differs from traditional APP roles in that the physiotherapist does not function as an independent first specialist assessor. Rather, the physiotherapist operates in a collaborative capacity, providing structured assessment, clinical interpretation and rehabilitative input that complements orthopaedic decision making. This integrated model does not replace orthopaedic assessment but augments the consultation by enhancing evaluation efficiency and facilitating shared care planning. The dual input also enables effective use of specialist time while providing patients with a broader, multidisciplinary perspective on their management options. A comparable approach exists in the physician associate/assistant (PA) model widely utilised in the United States of America across secondary and tertiary care, where PAs contribute to pre-operative patient evaluation and triage under physician oversight.[25,26] However, in New Zealand, where PA roles are not yet established and are currently under regulatory consideration, the musculoskeletal expertise of physiotherapists offers a readily available workforce. Leveraging this existing capability avoids the delays of introducing new professional groups and provides a pragmatic pathway to address current service pressures.

The potential to evolve towards an independent physiotherapy-led triage model in secondary care, where physiotherapists conduct initial consultations autonomously, remains conceptually promising. Physiotherapists in New Zealand are first-contact clinicians, already working autonomously in primary care with referral rights for medical imaging, including plain radiographs and musculoskeletal ultrasound imaging.[27] Formalised advancement of this scope necessitates broader engagement across multiple stakeholders.[5] Additionally, structured on-the-job training is essential to ensure physiotherapists can meet specific service demands and align their practice with the expectations of consulting surgeons.[24]

This study provides a foundational proof-of-concept supporting a co-consultation model that may be more adaptable to private secondary care compared to fully independent APP frameworks. Unlike APP models implemented in tertiary care, this approach offers a pragmatic middle ground that acknowledges context-specific barriers while leveraging physiotherapist expertise within

collaborative care. The possibility to expand towards multiple physiotherapists performing triage alongside a single orthopaedic surgeon, which has already been implemented at the spine centre being evaluated in the present study, could further increase service capacity.

Limitations

The limitations of retrospective data review are acknowledged, including variability in documentation quality and completeness. Recruitment metrics, including participant acceptance and declination rates, were not prospectively collected and therefore not reported. Only participants who completed satisfaction questionnaires were included, which may lead to non-response bias. Future prospective analyses should record recruitment information to enhance transparency.

The absence of patient-reported outcome measures limits the ability to assess outcomes such as disability, psychosocial distress and other contributory variables. Finally, the lack of a direct comparator model (e.g., standard care) does not allow for stronger inferences regarding the impact of this model. This limitation is particularly relevant given that consultations in 2021 were predominantly conducted via telehealth, which minimised barriers to access and may have influenced wait time comparisons, thereby limiting the observed improvements in the current analysis.

Further prospective evaluation of this model in broader and more varied clinical settings is warranted, with evaluation of timeliness to implement treatment and follow-up outcome data to assess downstream impact, as well as economic evaluation. Assessment of qualitative patient experiences may provide important insights into the acceptability of multidisciplinary assessment models and identify areas for role refinement.

Conclusion

This study presents the first implementation of a physiotherapist-integrated consultation model within a secondary care orthopaedic spine service in New Zealand. Most patients were managed conservatively, with high levels of patient satisfaction, substantial diagnostic imaging agreement between the physiotherapist and orthopaedic surgeon and structured multidisciplinary input into shared decision making. While this model does not replace orthopaedic surgical assessment, it provides a pragmatic framework for clinical triage, multidisciplinary care delivery and expanding first consultation capacity within routine orthopaedic practice. As a proof-of-concept, these findings provide a transferable model and foundational evidence supporting further development of integrated consultation approaches to enhance musculoskeletal and orthopaedic service delivery.

COMPETING INTERESTS
AHS serves as a consultant for ATEC Spine and receives unrelated research support from the company. ATEC Spine did not have any role in the conceptualisation, methodology, analysis or conclusions of this study. The views and interpretations presented in this paper are solely those of the authors. All other authors declare no other financial or subject-related conflicts of interest.

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Figure 1 was created in BioRender.

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