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How do physiotherapists use Cauda Equina Syndrome safety netting techniques and what influences their practice?

John Rice^{a,b}, Liba Sheeran^{b,c,*}

^a Physiotherapy Department, Royal Glamorgan Hospital, Ynysmaerdy, Llantrisant, CF72 8XR, UK

^b School of Healthcare Sciences, College of Biomedical and Life Sciences, Cardiff University, Ty Dewi Sant, Heath Park, Cardiff, CF14 4XN, UK

^c School of Health Sciences, University of Southampton, Highfield Campus University Road, Southampton, SO17 1BJ, UK

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A R T I C L E I N F O <i>Keywords:</i> Cauda Equina Syndrome (CES) Safety netting Musculoskeletal physiotherapists First Contact Practitioners (FCPs)	Background: Cauda Equina Syndrome (CES) is a rare but serious neurological condition requiring urgent intervention to prevent permanent harm. Although safety netting practices are recommended to mitigate risks, they are inconsistently applied, with limited guidance or evidence to inform their use. Existing research has largely overlooked the specific challenges of CES safety netting, particularly in advanced physiotherapy roles like First Contact Practitioners (FCPs) and Extended Scope Practitioners (ESPs), who play a pivotal role in managing suspected cases. Objective: This study aimed to address the research gap by exploring the experiences, beliefs, and practices of MSK physiotherapists regarding CES safety netting, focusing on its impacts on patients and healthcare systems. Methods: A qualitative study was conducted using semi-structured interviews with eight MSK physiotherapists across various roles. Reflexive thematic analysis was employed to identify and interpret key themes. Results: Five themes emerged: (1) perceived anxiety and responsibility, emphasising fear of missed diagnoses; (2) challenges with communication and referral pathways, particularly with Trauma and Orthopaedics (T&O) and Accident and Emergency (A&E) departments; (3) variation in safety netting practices, influenced by individual and contextual factors; (4) the impact of ambiguous CES presentations on decision-making; and (5) systemic barriers, including poorly integrated referral pathways and limited diagnostic resources. Conclusions: This study uniquely highlights the challenges of CES safety netting in advanced physiotherapy roles.		

1. Introduction

Cauda Equina Syndrome (CES) is a rare but potentially devastating neurological condition caused by damage to the cauda equina nerve roots, most commonly due to compression by a herniated intervertebral disc (Barraclough, 2021). It is associated with low back pain (LBP) and sciatica and can rapidly lead to a range of potentially permanent neurological symptoms, including bladder, bowel and sexual dysfunction (Eames, 2020). The British Association of Spinal Surgeons (BASS) state that in cases of suspected acute CES, an emergency MRI must be undertaken in the patient's local hospital to avoid delays (Germon et al., 2015; BASS, 2018). If compression is radiographically confirmed, emergency spinal decompression surgery is indicated, as delays in surgery are associated with ongoing neurological damage and poorer outcomes (Germon et al., 2015). CES patients often experience harm due to delayed treatment (Germon et al., 2015; Todd, 2017). Delays in referral are influenced by multiple factors including the relative rarity and heterogeneity of CES, the difficulty in distinguishing its symptoms from non-emergent conditions, and the low sensitivity and specificity of CES signs and symptoms in diagnosing cauda equina compression (Dionne et al., 2019; Barraclough, 2021). Delays have also often been caused by poor compliance to the BASS guidelines due to a lack of out of hours MRI capacity (Hutton, 2019; HSIB, 2021). Additionally, some patients may face delays in surgery because they present late, unaware that their symptoms required immediate medical attention (Greenhalgh et al., 2015).

Safety netting aims to reduce patient harm from CES by informing patients about the risks of their condition, identifying key warning signs,

* Corresponding author. School of Health Sciences, University of Southampton, Highfield Campus University Road, Southampton, SO17 1BJ, UK. *E-mail addresses:* John.rice@wales.nhs.uk (J. Rice), sheeranL@cardiff.ac.uk (L. Sheeran).

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and advising on appropriate actions and timeframes (Germon et al., 2015; Greenhalgh et al. 2018, 2020; Jones et al., 2019; Finucane et al., 2020; Horler et al., 2024). Current recommendations advocate for selective use of CES safety netting, particularly in patients with herniated disc symptoms such as sciatica or sensory and motor deficits (Greenhalgh et al., 2018; Dionne et al., 2019).

While this approach appears logical, given herniated discs are the most common cause of CES, the evidence supporting it is both limited and inconsistent. When considering CES safety netting practice recommendations, it is critical to differentiate between studies that describe CES patients' symptoms at the point of hospital admission and diagnosis of CES (Angus et al., 2022; Woodfield et al., 2023), and those which also describe the patients' symptoms prior to this (McCarthy et al., 2007). Woodfield et al. (2023) found that 91 % of CES patients presented with either unilateral or bilateral sciatica at the point of admission and subsequent diagnosis of CES. However, McCarthy et al. (2007) found that 49 % of CES patients had a previous history of LBP only, with 29 % having a history of sciatica. Shapiro (2000) argues that motor deficits and bilateral sciatica may occur in the final stages of the development of CES, after the acute cauda equina compression event. If physiotherapists are following common advice and only safety netting patients with sciatica symptoms, then some patients with LBP only who go on to develop CES may be unprepared, not seek care in an appropriate timescale and receive delayed treatment.

The blanket use of CES safety netting seems to be generally discouraged, with only one author recommending CES safety netting for all LBP patients found in this paper's literature review (Torjesen, 2017). There is little discussion about why CES safety netting should be used selectively. Fairbank and Mallen (2014) argue that CES safety netting may 'precipitate inappropriate attendances' to Accident and Emergency (A&E) departments but that a safety-first approach is probably preferable.

The uncertainty surrounding CES safety netting is further highlighted in the management of bilateral sciatica. Some authors suggest providing safety netting advice without emergency referrals (Finucane et al., 2020), whereas others regard bilateral sciatica as a cardinal red flag for CES, recommending an emergency MRI and surgical decompression if compression is confirmed (Sun, 2014; Todd and Dickson, 2016; Long et al., 2020). While the GIRFT CES Pathway (GIRFT, 2023) offers consensus on CES management, variability in how safety netting is applied in practice persists, highlighting the need for further focus on its consistent implementation.

Paling and Hebron (2021) explored physiotherapists' experiences of suspected CES management in broader terms and identified significant challenges, including emotional strain, systemic inefficiencies, and interprofessional communication barriers. However, their study excluded practitioners in advanced roles, such as Extended Scope Practitioners (ESPs) and First Contact Practitioners (FCPs), limiting its applicability to the evolving structure of clinical practice. This gap highlights the need to investigate how newer roles with greater autonomy influence decision-making and confidence, particularly regarding CES safety netting.

This study acknowledges the lack of clarity and the limited research specifically addressing CES safety netting practices. While existing guidance remains inconsistent, little is known about how physiotherapists navigate the complexities of safety netting or the reasoning behind their approaches. Building on the foundational work of Paling and Hebron (2021), this study investigates the management of CES, with reference to the underexplored practice of CES safety netting. It aims to explore the practices of musculoskeletal physiotherapists across a broader range of roles regarding CES safety netting, the reasons behind their approaches, and the experiences and beliefs that inform their practice. It also seeks to examine their views on the impact of safety netting, including potential harms and benefits. The findings may help inform future guidance and training for healthcare professionals and lay the foundation for further research on CES management.

2. Method

2.1. Design

This study employed an interpretative qualitative design to explore the behaviours, beliefs, and experiences of musculoskeletal (MSK) physiotherapists regarding CES safety netting. Reflexive Thematic Analysis (RTA) was chosen as the methodological approach, informed by the pragmatism paradigm, to enable the construction of themes that reflect the nuanced experiences of participants (Braun and Clarke, 2006, 2021). The lead researcher's dual perspective as both an MSK physiotherapist and a CES patient was acknowledged as part of the reflexive process to ensure transparency and rigour.

This study adhered to the principles of ethical research and was conducted in accordance with the XXX Research Ethics Committee guidelines and ethical approval was granted by the committee (REC871). The Consolidated Criteria for Reporting Qualitative Research (COREQ) were used to guide and describe the study (Tong et al., 2007).

2.2. Participants

Musculoskeletal (MSK) physiotherapists were recruited using purposeful sampling to ensure a sample capable of providing in-depth insights into CES safety netting practices (Doyle et al., 2020). The researchers contacted the Musculoskeletal Association of Chartered Physiotherapists (MACP) and the Chartered Society of Physiotherapy (CSP) to display a study advertisement on their websites. Interested participants were provided with a participant information sheet detailing the study's aims and design to enable them to make an informed decision about participation. Consent was obtained via an online form. Eligibility criteria included MSK physiotherapists with at least two years of clinical experience who routinely managed patients with LBP and/or sciatica. These criteria ensured that participants had substantial experience assessing patients for CES symptoms and opportunities to use CES safety netting techniques. All participants met the eligibility criteria and consented to take part.

2.3. Data collection

Eight MSK physiotherapists participated in semi-structured

Table 1

Participant cl	naracteristics.
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Participant Number	Role	MRI referral rights
#1	Band 7	Yes
	Extended scope practitioner and first contact	
	practitioner	
#2	Band 7	Yes
	Extended scope practitioner in Orthopaedic	
	Triage	
#3	Band 8	Yes
	Extended scope practitioner and Clinical	
	Lead	
#4	Band 7	Yes
	Extended scope practitioner and first contact	
	practitioner	
#5	Band 7	Yes
	Extended scope practitioner and first contact	
	practitioner	
#6	Band 7	No
	Musculoskeletal physiotherapist in chronic	
	LBP pain service	
#7	Band 8	Yes
	Extended scope practitioner and Clinical	
	Lead	
#8	Band 8	Yes
	Extended scope practitioner and first contact	
	practitioner	

interviews (Table 1). The interviews took place between January 2022 and April 2022. All recruited participants were interviewed. The sample size was considered appropriate for the purpose of reflexive thematic analysis, as it facilitated the collection of rich and detailed data (Braun and Clarke, 2021).

All interviews were conducted virtually using Zoom and were audio recorded. Interview durations ranged from 45 to 60 min. The lead researcher (JR) conducted the interviews and kept contemporaneous notes as part of a reflexive diary. Transcripts were produced verbatim using Microsoft Office 365 Word, with each transcript manually checked against the recordings to ensure accuracy.

The interview guide (Appendix 1) was developed and refined through piloting with a qualitative researcher and included prompts designed to elicit detailed responses. To promote data immersion, the lead researcher listened to the interview recordings prior to commencing thematic analysis (Braun and Clarke, 2006).

2.4. Data analysis

Verbatim transcripts of the interviews were analysed using NVivo [14] software, ensuring anonymity by replacing participant names with code numbers. Reflexive thematic analysis was conducted in five stages (Braun and Clarke, 2006): (1) Familiarisation with the data was achieved through detailed reading and re-reading of the transcripts and reflexive notes, allowing the lead researcher (JR) to immerse themselves in the data. Initial analytic observations were discussed with the second researcher (LS) after each interview to capture emerging insights. (2) Initial open codes were generated. The first 2 interviews were independently coded by two researchers (JR, LS) to ensure diverse perspectives and reduce bias. Codes were developed inductively and refined collaboratively to enhance analytical rigour. The remaining transcripts were coded by the main researcher (JR) to ensure consistency and reviewed by second researcher (LS) with two iterative rounds of open coding. (3) Broader patterns and meanings were identified, leading to the development of candidate themes. Relevant data were grouped around these themes, with relationships between them explored. This process resulted in the construction of initial five (sub)themes. (4) These candidate themes were reviewed against the coded data and the full dataset to ensure coherence and alignment with the study objectives. Through refinement, the initial (sub)themes were consolidated into five final overarching themes. (5) Each theme was defined and named to reflect its central concept, and the relationships between themes were further clarified. The final themes were reviewed against the dataset, research question, and relevant literature to ensure all perspectives were accounted for and the findings were robust. This iterative and systematic process ensured a thorough understanding of MSK physiotherapists' experiences with CES safety netting.

3. Results

The analysis of MSK physiotherapists' experiences in managing suspected CES revealed five overarching themes: perceived anxiety and responsibility, challenges with communication and referral pathways, variation in CES safety netting practices, impact of ambiguous CES presentation on clinical decision making, and systemic barriers to efficient CES care (Fig. 1). Experiences contributing to each theme and subthemes are presented below.

3.1. Perceived anxiety and responsibility

Physiotherapists reported anxiety related to feeling responsible for a patient coming to harm from CES, which was closely linked to the complexity and uncertainty around CES. The potential severity of delayed treatment and the lifelong implications for patients weighed heavily on participants, many of whom used terms such as "hurt", "mortified", and "permanently paranoid" to describe their feelings. As one participant noted, "*My dread is that I ever miss something and that's my kind of fear*" (#6).

One participant's fear was compounded by a perceived greater potential for legal repercussions working in an FCP role, "I think it's natural that we're going to worry about this and, we do live in a in a time where there is litigation and I think moving into first contact practice, I don't have quite so



Fig. 1. Musculoskeletal physiotherapists' experiences of CES safety netting practices: five relational themes and sub-themes.

many kind of protective layers ahead of me" (#4). However, other participants stated that the well-being of patients was the primary concern ahead of litigation.

Typically, participants felt it was important to remain vigilant, and this was seen as a core tenet of the physiotherapy profession: "I feel that physiotherapists are very vigilant in looking out for Cauda Equina, and I don't think you can ever be too vigilant" (#2). Safety netting helped reduce anxiety related to feeling responsible for harms to patients from CES but caused other concerns of unnecessarily causing fear in patients and worsening their prognosis by inducing anxiety and fear avoidant behaviours, or of inappropriate use of finite healthcare resources.

3.2. Challenges with communication and referral pathways

Unclear or inconsistent referral pathways posed significant challenges. Participants described difficulty in securing emergency care for patients due to inefficiencies and resistance from departments such as Trauma and Orthopaedics (T&O). One participant expressed frustration, stating, "Whenever I've tried to phone Orthopaedics about a possible Cauda Equina patient, I get the cold shoulder" (#2). Others described the lack of trust in A&E care, particularly when A&E doctors chose not to perform an MRI: "I guess there's not that much trust in what happens down in A&E" (#6). Additionally, there were concerns about A&E doctors doubting patients' symptoms: "There are views that patients know what symptoms to describe when they go to A&E because they want a scan" (#7).

3.3. Variation in CES safety netting practices

The approaches to CES safety netting varied among participants, influenced by clinical context, patient presentation, and individual risk thresholds. Some participants used safety netting selectively for patients with specific symptoms, such as bilateral sciatica or neurological compromise, while others applied it universally. This variation often stemmed from personal concerns about missing a diagnosis: "I think it is just selfishness on my part around managing my anxiety and making sure that I haven't missed any" (#4). However, participants also acknowledged the risks of overusing safety netting, as one stated, "You don't want to terrify the patient ... and overburden already massively stretched services" (#7). Several participants also discussed causing anxiety and fear in patients. "We could create a mindset of fragility ... that can sometimes lead to behavioural changes, fear avoidance behaviour.." (#2).

3.4. Impact of ambiguous CES presentation on clinical decision-making

The variability of CES symptoms created uncertainty in assessment and decision-making. While severe, late-stage CES was perceived as straightforward to identify, "for the clear-cut ones, it's quite an easy decision" (#7), subtle or intermittent symptoms, particularly in older patients, were more challenging. As one participant explained, "That's the biggest challenge really, the clinical symptoms are so variable" (#4). Many physiotherapists emphasised the importance of clear communication with patients about symptoms, using specific and explicit language to ensure accurate reporting: "I think you have a better chance that they will answer them honestly ... they might get embarrassed about talking to you about them" (#3).

3.5. Systemic barriers to efficient CES care

Systemic issues, such as poorly embedded CES pathways and limited access to emergency diagnostics, hindered timely care. Participants described making multiple calls to secure urgent care for patients, often facing resistance or delays. One participant highlighted the strain of ineffective pathways: "Before our CES pathway was successfully set up, I would sometimes need to make multiple calls to neurosurgery, spinal surgery, and A&E" (#4). Others noted that trust in the care provided at A&E was lacking, with some doctors reportedly dismissing physiotherapists'

concerns or refusing to perform MRI scans, leaving the physiotherapist " ... trying to reassure them (the patient) in something that I'm not particularly reassured about" (#2).

4. Discussion

This study provides a unique perspective on CES management by focusing on the underexamined practice of safety netting, offering new insights into its practical, emotional, and systemic impacts. Unlike previous research, such as Paling and Hebron (2021), which explored broader challenges in CES management, this study highlights the nuanced decisions and variability in safety netting practices. It also extends understanding by incorporating a wider range of roles, including Extended Scope Practitioners (ESPs) and the recently introduced First Contact Practitioners (FCPs). The FCP role, as the first point of contact for patients, introduces distinct complexities, such as heightened responsibility for identifying high-risk cases and navigating referral pathways without the "protective layers" of traditional hierarchies. These added challenges highlight the intricate and multifaceted nature of managing suspected CES cases.

Participants in this study expressed significant anxiety about CES safety netting, primarily driven by the fear of missing a diagnosis and the potential for patient harm. This anxiety was compounded by the high-stakes consequences of CES, including lifelong disability. While the fear of litigation was less prominent than in Paling and Hebron (2021), participants emphasised the emotional toll of perceived failure. As one participant noted, "*My dread is that I ever miss something*" (#6), encapsulating the profound sense of professional responsibility that physiotherapists bear. This aligns with more recent literature exposing the high level of uncertainty felt by FCPs in primary care (Ingram et al., 2023) and calls for high quality training and experience to mitigate such fears, as they enhance confidence and reduce stress (Paling and Hebron, 2021).

The complexity of CES presentations further exacerbates this anxiety. CES symptoms are notoriously variable and overlap with nonemergent conditions, complicating clinical decision-making. Participants described difficulty differentiating CES from other conditions, particularly when symptoms like bladder dysfunction were subtle or intermittent. These challenges are reflected in previous findings that CES diagnostic criteria lack specificity, necessitating reliance on MRI for confirmation (Greenhalgh et al., 2018; Dionne et al., 2019). Consequently, physiotherapists are often left balancing the risks of underdiagnosing CES against the strain of overburdening emergency services, a tension noted in both this study and previous research (Todd and Dickson, 2016; Paling and Hebron, 2021).

Systemic barriers, such as poorly integrated referral pathways and interprofessional tensions, were a recurring theme. Participants reported friction with T&O colleagues, particularly regarding the threshold for escalation, and were concerned when patients with suspected CES were seen by A&E but no MRI performed. Ensuring that patients are informed about CES red flag symptoms and the urgency of seeking medical attention is fundamental to effective safety netting, however it is also essential that healthcare systems are able to provide timely access to appropriate expertise and diagnostics when symptoms arise.

Some participants felt their concerns were dismissed, reflecting broader issues of trust and communication within healthcare teams. Similar barriers were identified by Paling and Hebron (2021), where T&O reluctance to accept referrals for suspected CES patients was highlighted as a significant obstacle. Such interprofessional conflicts underline the need for improved communication and robust clinical pathways, such as those described in the National Suspected Cauda Equina Syndrome Pathway GIRFT (2023).

Variations in CES safety netting practices further illustrate the complexity of decision-making. Participants employed both targeted and universal safety netting strategies, influenced by individual risk tolerance, patient presentation, and clinical context. While targeted approaches were often logical, participants acknowledged potential drawbacks, such as inducing fear-avoidant behaviours in patients or overburdening A&E services. These findings align with existing guidance discouraging universal safety netting due to resource concerns but highlight the need for more robust evidence to inform these practices (Fairbank and Mallen, 2014).

The findings demonstrate that the identified themes are deeply interwoven, creating a web of challenges for physiotherapists. For instance, the emotional burden of managing CES cases (Theme 1) is exacerbated by systemic barriers and interprofessional tensions (Theme 5), which in turn affect communication and the efficiency of referral pathways (Theme 2). Similarly, the complexity of CES presentations (Theme 4) complicates safety netting decisions (Theme 3), further heightening anxiety and uncertainty. Addressing these interconnected challenges requires a holistic approach, encompassing better training, robust pathways, and a culture of teamwork and mutual support.

4.1. Strengths and weaknesses

This study's strength lies in its qualitative approach, which provided rich insights into physiotherapists' experiences and decision-making processes. The inclusion of participants with diverse clinical backgrounds enhanced the study's depth. However, the small sample size and reliance on UK-based clinicians limit the generalisability of the findings. Additionally, the self-reported nature of the data may introduce recall bias.

4.2. Future research

Future research should investigate the root causes of interprofessional friction in CES management, focusing on tensions between physiotherapists, T&O and A&E teams. A collaborative, interdisciplinary exploration of the barriers and enablers to a more unified approach to CES safety netting is crucial for fostering better teamwork and streamlining referrals. Additionally, assessing the systemic impact of safety netting on A&E resources and patient outcomes could address concerns about overburdening services, providing a clearer foundation for optimising CES pathways and practices.

5. Conclusion

This study provides unique insights into the underexplored practice of CES safety netting among MSK physiotherapists, addressing a critical gap in the literature. It highlights the complexities of safety netting in diverse roles, including First Contact Practitioners (FCPs) and Extended Scope Practitioners (ESPs), who face heightened responsibilities in managing high-risk cases. The findings reveal significant challenges related to anxiety, systemic barriers, interprofessional tensions, and ambiguous CES presentations. The variability in safety netting practices underlines the need for clearer guidance and interdisciplinary collaboration. This study sets a foundation for future research to explore systemic impacts and patient perspectives, aiming to enhance clinical consistency and outcomes.

CRediT authorship contribution statement

John Rice: Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Liba Sheeran:** Writing – review & editing, Writing – original draft, Supervision, Formal analysis, Data curation.

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Appendix A. Supplementary data

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References

- Barraclough, K., 2021. Cauda equina syndrome. Br. Med. J. 372. https://doi.org/ 10.1136/bmj.n32.
- BASS, 2018. Standards of care for investigation and management of cauda equina syndrome (CES). https://spinesurgeons.ac.uk/News/7773476, 17th March 2025.
- Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. Qual. Res. Psychol. 3 (2), 77–101. https://doi.org/10.1191/1478088706qp063oa.
- Braun, V., Clarke, V., 2021. One size fits all? What counts as quality practice in (reflexive) thematic analysis? Qual. Res. Psychol. 18 (3), 328–352.
- Dionne, N., et al., 2019. What is the diagnostic accuracy of red flags related to cauda equina syndrome (CES), when compared to Magnetic Resonance Imaging (MRI)? A systematic review. Musculoskeletal Sci. Pract. 42, 125–133.
- Doyle, L., McCabe, C., Keogh, B., Brady, A., McCann, M., 2020. An overview of the qualitative descriptive design within nursing research. J. Res. Nurs. 25 (5), 443–455. https://doi.org/10.1177/1744987119880234.
- Eames, N., 2020. Cauda equina syndrome: principles of management. Orthop. Traumatol. 34 (5), 248–254. https://doi.org/10.1016/j.mporth.2020.06.001.
- Fairbank, J., Mallen, C., 2014. Cauda equina syndrome: implications for primary care. Br. J. Gen. Pract. 64 (619), 67–68. https://doi.org/10.3399/bjpp14x676988.
- Finucane, L.M., et al., 2020. International Framework for red flags for potential serious spinal pathologies. J. Orthop. Sports Phys. Ther. 50 (7), 350–372.
- Germon, T., Ahuja, S., Casey, A.T., Todd, N.V., Rai, A., 2015. British Association of Spine Surgeons standards of care for cauda equina syndrome. Spine J. 15 (3), S2–S4.
- GIRFT, 2023. Spinal surgery: national suspected cauda equina syndrome (CES) pathway. https://gettingitrightfirsttime.co.uk/wp-content/uploads/2023/03/National -Suspected-Cauda-Equina-Pathway-February-2023-FINAL-V2.pdf. Accessed: 1st May 2023.
- Greenhalgh, S., Finucane, L., Mercer, C., Selfe, J., 2018. Assessment and management of cauda equina syndrome. Musculoskelet. Sci. Pract. 37, 69–74. https://doi.org/ 10.1016/j.msksp.2018.06.002.
- Greenhalgh, S., Finucane, L.M., Mercer, C., Selfe, J., 2020. Safety netting; best practice in the face of uncertainty. Musculoskeletal Sci. Pract. 48, 102179.
- Greenhalgh, S., Truman, C., Webster, V., Selfe, J., 2015. An investigation into the patient experience of Cauda Equina Syndrome: a qualitative study. Physiother. Pract. Res. 36 (1), 23–31. https://doi.org/10.3233/PPR-140047.
- Horler, C., Leydon, G., Roberts, L., 2024. Communicating safety-netting information in primary care physiotherapy consultations for people with low back pain. Musculoskeletal Sci. Pract. 74, 103192. https://doi.org/10.1016/j. ms/ssp.2024.103192.
- HSIB, 2021. Timely detection and treatment of cauda equina syndrome. Farnbourgh: Healthcare Safety Investigation Branch. Available at: https://www.hssib.org.uk/p atient-safety-investigations/timely-detection-and-treatment-of-spinal-nerve-compre ssion-cauda-equina-syndrome-in-patients-with-back-pain/investigation-report/#1 3-management-of-suspected-ces, 17th March 2025.
- Hutton, M., 2019. Spinal services: GIRFT programme national speciality report. http s://gettingitrightfirsttime.co.uk/wp-content/uploads/2022/09/Spinal-Services-Rep ort-July19-N.pdf, 10th March 2025.
- Ingram, S., Stenner, R., May, S., 2023. The experiences of uncertainty amongst musculoskeletal physiotherapists in first contact practitioner roles within primary care. Muscoskel. Care 21 (3), 644–654. https://doi.org/10.1002/msc.1735.
- Jones, D., Dunn, L., Watt, I., Macleod, U., 2019. Safety netting for primary care: evidence from a literature review. Br. J. Gen. Pract. 69 (678), e70–e79. https://doi.org/ 10.3399/bjgp18x700193.
- Long, B., Koyfman, A., Gottlieb, M., 2020. Evaluation and management of cauda equina syndrome in the emergency department. Am. J. Emerg. Med. 38 (1), 143–148. https://doi.org/10.1016/j.ajem.2019.158402.
- McCarthy, M.J.H., Aylott, C.E.W., Grevitt, M.P., Hegarty, J., 2007. Cauda equina syndrome: factors affecting long-term functional and sphincteric outcome. Spine 32 (2), 207–216. https://doi.org/10.1097/01.brs.0000251750.20508.84.
- Paling, C., Hebron, C., 2021. Physiotherapists' experiences of managing persons with suspected cauda equina syndrome: overcoming the challenges. Muscoskel. Care 19 (1), 28–37.
- Shapiro, S., 2000. Medical realities of cauda equina syndrome secondary to lumbar disc herniation. Spine 25 (3).
- Sun, J.-C., et al., 2014. Assessment of cauda equina syndrome progression pattern to improve diagnosis. Spine 39 (7), 596–602. https://doi.org/10.1097/ brs.000000000000079.
- Todd, N., Dickson, R., 2016. Standards of care in cauda equina syndrome. Br. J. Neurosurg. 30 (5), 518–522.
- Todd, N.V., 2017. Guidelines for cauda equina syndrome. Red flags and white flags. Systematic review and implications for triage. Br. J. Neurosurg. 31 (3), 336–339. https://doi.org/10.1080/02688697.2017.1297364.

Angus, M., Curtis-Lopez, C.M., Carrasco, R., Currie, V., Siddique, I., Horner, D.E., 2022. Determination of potential risk characteristics for cauda equina compression in emergency department patients presenting with atraumatic back pain: a 4-year retrospective cohort analysis within a tertiary referral neurosciences centre. Emerg. Med. J. 39 (10), 740–746. https://doi.org/10.1136/emermed-2020-210540.

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- Tong, A., Sainsbury, P., Craig, J., 2007. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int. J. Qual. Health Care 19 (6), 349–357.
- Torjesen, I., 2017. GPs are warned of costs of missing "red flags" for spinal condition. Br. Med. J., j1427 https://doi.org/10.1136/bmj.j1427.
- Woodfield, J., et al., 2023. Presentation, management, and outcomes of cauda equina syndrome up to one year after surgery, using clinician and participant reporting: a multi-centre prospective cohort study. The Lancet Regional Health Europe 24, 100545. https://doi.org/10.1016/j.lanepe.2022.100545.