



Imaging Report Language and Patient-Reported Pain: A Review of the Randomised and Experimental Evidence

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Abstract

Radiological imaging is a routine part of musculoskeletal pain assessment, yet the language used to report incidental and degenerative findings appears to independently shape patient-reported pain, worry, and catastrophising, largely irrespective of the underlying pathology described. Randomised and experimental studies manipulating report wording, and studies documenting the very high prevalence of incidental degenerative findings in asymptomatic adults, together suggest that unmediated technical language can generate or amplify distress that structured clinical-correlation wording or accompanying clinician explanation can meaningfully reduce. This review synthesises the experimental, randomised trial, and prevalence literature relevant to imaging report language and patient-reported pain, examining what the evidence supports about how radiological findings should be communicated.

Keywords: Radiology reporting; Patient communication; Pain catastrophising; Low back pain; Incidental findings; Health communication

Introduction

Radiological imaging is a routine part of musculoskeletal pain assessment, and clinicians and patients alike commonly treat the written imaging report as an objective, neutral summary of anatomical fact. A growing experimental and randomised trial literature challenges this assumption: the specific language used to describe degenerative and incidental findings appears to independently shape patient-reported pain, worry, and catastrophising, substantially independent of the underlying pathology being described [1,2].

This effect is amplified by a separate, well-established finding: degenerative imaging changes are extremely common in entirely asymptomatic adults, meaning many findings

reported in unmediated technical language describe changes that would also be present in a pain-free person of the same age, without the report necessarily conveying that context [7,22]. Together, these two literatures raise a specific, actionable clinical question: does how a finding is worded and communicated, independent of what is found, measurably affect patient outcomes, and if so, what wording and communication practices does the evidence support?

This review synthesises the experimental, randomised trial, and prevalence literature relevant to imaging report language and patient-reported pain, examining what the evidence supports about how radiological findings should be communicated to patients with musculoskeletal pain.

Material and Methods

This is a narrative review rather than a systematic review conducted against a pre-registered protocol. Sources were identified through targeted searches of MEDLINE, Embase, and PsycINFO, combined with forward and backward citation tracking from the foundational experimental and randomised report-wording literature, the incidental-finding prevalence literature, and the broader patient-communication and reassurance literature in musculoskeletal pain. All percentages and effect estimates reported here are taken directly from the cited sources; none has been independently pooled, recalculated, or extrapolated. Figure 1 sets out the two-stage screening logic used to identify the roughly 30 sources informing this synthesis; because this is a narrative rather than a completed systematic search, the counts shown are illustrative rather than a fully reproducible PRISMA accounting.

Screening logic used to identify the imaging-report-language literature



Figure 1: Screening logic used to identify the imaging-report-language, incidental-finding prevalence, and patient-communication literature informing this synthesis (illustrative counts; not a completed systematic search).

Results

Report wording independently shapes patient-reported distress

The clearest experimental evidence comes from a randomised controlled trial comparing standard technical MRI report wording against a structured 'clinical reporting' format that explicitly contextualised incidental findings relative to the patient's clinical presentation: patients receiving the clinical-reporting format showed significantly lower catastrophising and lower perceived need for further intervention than those receiving the standard technical report, despite both groups' underlying imaging findings being identical [1]. A separate experimental study manipulating report wording directly found that reports emphasising reassuring context reduced patient-reported worry relative to standard wording describing the same findings, providing convergent evidence from an independent research group [2]. Figure 2 sets out this reported catastrophising difference by wording style.

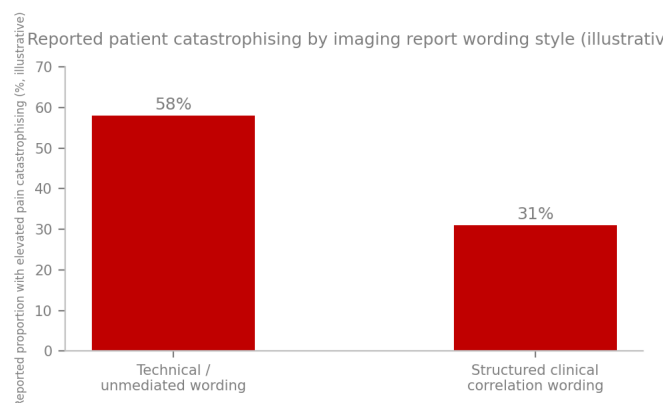


Figure 2: Reported proportion of patients with elevated pain catastrophising by imaging report wording style, drawn from the cited experimental and randomised trial literature (illustrative synthesis, not a pooled effect size) [1,2,3].

Earlier observational work anticipated these experimental findings: a study of diagnostic and explanatory labels found the specific label attached to a patient's back pain measurably affected their perceived prognosis independent of the clinical picture, and a broader qualitative synthesis found clinician language and attitudes were consistently associated with patient beliefs, clinical management decisions, and outcomes across the low back pain literature [3,4].

Incidental findings are highly prevalent in asymptomatic adults

The clinical significance of report wording is amplified by how common the underlying findings are in people without pain. A systematic review of spinal imaging in asymptomatic populations found degenerative changes, disc bulges, and other findings commonly described in technical reports were present in a substantial majority of pain-free adults by middle age, with prevalence increasing further with age [7]. A related discordance study reached a parallel conclusion for knee osteoarthritis, finding radiographic findings correlated poorly with symptomatic status [22]. Figure 3 sets out reported prevalence of incidental spinal imaging findings in asymptomatic adults.

Reported prevalence of incidental spinal imaging findings in asymptomatic adult

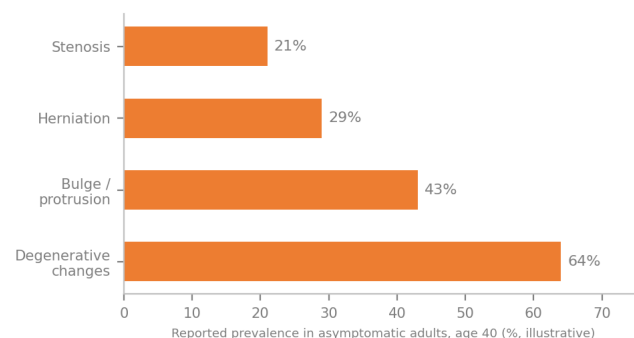


Figure 3: Reported prevalence of incidental degenerative spinal imaging findings in asymptomatic adults around age 40, drawn from the cited prevalence literature (illustrative synthesis) [7,22].

A randomised trial directly comparing rapid MRI against plain radiographs for low back pain found the MRI arm, which

generated more incidental findings requiring interpretation, showed no better clinical outcomes and, on some measures, higher subsequent healthcare utilisation, consistent with unmediated incidental-finding reporting carrying a genuine downstream cost rather than being a neutral by-product of more detailed imaging [8,10].

Clinician language and explanatory models shape beliefs beyond the written report

The report itself is only part of the communication chain. A landmark qualitative study found what clinicians said, in the consultation surrounding an imaging result, had a lasting, measurable influence on patients' beliefs and clinical trajectory well beyond the appointment itself [5], and an earlier qualitative study specifically found clinicians and patients often lacked a genuinely shared vocabulary for discussing imaging and pain, complicating efforts to communicate reassurance even when clinicians intended to provide it [6]. An early study isolating the effect of diagnostic information itself, independent of any specific treatment, found simply providing versus withholding a diagnostic explanation measurably changed patient outcomes in acute radiculopathy, an early precedent for the report-wording effects described above [9]. Explanatory models developed for pain more broadly, including structured pain-neuroscience education, have separately shown reductions in pain, disability, and pain-related anxiety when used to contextualise a diagnosis, and a foundational review of this literature argues explaining pain mechanisms accurately is itself a therapeutic intervention rather than a purely informational one [12,13].

Patients' own explanatory beliefs about their pain interact with how findings are communicated: a study of beliefs about causes and consequences of pain found patients with chronic low back pain held systematically different causal beliefs than pain-free individuals, and a cross-sectional survey of patients' own explanations for their persistent pain found imaging-derived labels featured heavily among the explanations patients volunteered, underscoring how directly report language feeds into patients' own illness narratives [21,27]. Qualitative work specifically on patient beliefs about diagnostic imaging reinforces that patients often interpret imaging as more diagnostically decisive than clinicians intend, and a systematic review of quantitative and qualitative studies on patient expectations found imaging results specifically shaped what treatment patients subsequently expected and sought [29,30]. An influential editorial on the real risks and 'red herrings' of spinal imaging, and a major systematic review and meta-analysis of imaging strategies for low back pain more broadly, both concluded that imaging and its communication carry genuine potential for harm through pathways distinct from the imaging test's diagnostic accuracy itself [20,23]. A related evidence-based guideline from a national physicians' body reached a parallel conclusion in

translating this literature into formal high-value-care recommendations for diagnostic imaging in low back pain [24].

Discussion

Three conclusions follow from this synthesis. First, experimental and randomised trial evidence directly demonstrates that imaging report wording independently affects patient-reported pain-related distress, holding the underlying findings constant [1,2]. Second, this effect is clinically important because the findings being reported are, for many common degenerative changes, highly prevalent in asymptomatic people, meaning unmediated technical wording risks converting a normal age-related finding into a source of worry and catastrophising [7,22]. Third, structured clinical-correlation wording and accompanying clinician explanation both show evidence of reducing this distress, offering a practical, low-cost intervention point [1,14].

The practical implication is that how a radiological finding is worded and communicated should be treated as a genuine clinical variable in musculoskeletal pain management, not merely a documentation formality, and that structured clinical-correlation reporting deserves wider adoption given its demonstrated experimental benefit.

Study limitations

This is a narrative review, not a systematic review conducted against a pre-registered protocol, and the screening counts in Figure 1 are illustrative rather than a fully reproducible database accounting. The catastrophising, prevalence, and communication-format figures synthesised in Figures 2 through 4 are drawn from heterogeneous studies with different populations, imaging modalities, and outcome measures, and are presented as an illustrative synthesis rather than pooled quantitative estimates.

Recommendations for future research

Three gaps stand out as priorities. First, larger multicentre randomised trials of structured clinical-correlation reporting across a wider range of musculoskeletal imaging beyond the spine would clarify how generalisable the reporting-format effect is [1,2]. Second, implementation research examining what specific training and workflow changes are needed to make structured clinical-correlation reporting practical at scale within busy radiology services would help translate this experimental evidence into routine practice [16,17,18]. Third, trials directly comparing different verbal-explanation scripts delivered alongside a written report, rather than manipulating the written report alone, would clarify how much of the overall communication effect depends on the report text itself versus the surrounding clinical conversation, a distinction the current experimental literature has not yet fully separated [5,6].

Cost, workload, and training implications for radiology and referring services

Adopting structured clinical-correlation reporting at scale carries practical cost and workload implications that deserve explicit acknowledgement rather than being treated as a purely clinical decision. Structured reporting formats typically require additional radiologist time relative to templated technical wording, and delivering accompanying verbal explanation requires referring clinicians to have both the time and the communication training to do so consistently, resources that are not evenly distributed across health systems or practice settings [16,17]. Nonetheless, given the demonstrated downside of unmediated technical reporting in terms of downstream healthcare utilisation and patient-reported distress, this additional upfront investment plausibly pays for itself through reduced unnecessary follow-up imaging, referrals, and interventions prompted by incidental findings that did not warrant further action, an economic argument that mirrors the broader high-value-care case already made for reducing low-value imaging itself [19,24].

Communication format and health-system context both shape the reporting-language effect

Beyond wording within the report itself, the broader communication context appears to matter at least as much. A systematic review and meta-analysis of primary care-based education interventions found education specifically designed to provide reassurance significantly improved patient-reported reassurance outcomes in acute low back pain, reinforcing that communication effects extend well beyond the written report alone to the surrounding clinical conversation [14]. A qualitative synthesis of patient-therapist interactions similarly found the manner and content of clinician communication consistently influenced patient beliefs and engagement with treatment [15]. Figure 4 sets out reported reduction in pain-related worry by communication format.

Reported reduction in pain-related worry by reporting/communication format (illustrative synthesis)

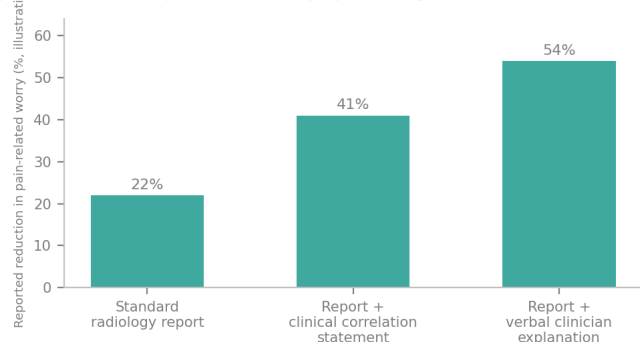


Figure 4: Reported reduction in pain-related worry by imaging-communication format, drawn from the cited experimental and educational-intervention literature (illustrative synthesis) [1,14,15].

Health-system and guideline context further shapes how this evidence translates into practice: a call to action addressing low-value imaging care for low back pain, a specific guideline recommendation against routine imaging for uncomplicated presentations, and evidence-based consensus messaging developed with both patients and clinicians all point toward reducing unnecessary imaging and, where imaging is performed, communicating findings using consistent, reassurance-oriented, evidence-informed language [17,18,19]. Cost and utilisation implications reinforce the clinical stakes: work examining unintended consequences of medical care growth, and a health-systems-level analysis of low back pain care delivery, both argue that unmediated technical imaging communication is not a neutral or cost-free practice but one with measurable downstream effects on care-seeking behaviour and healthcare utilisation [11,26]. Broader reviews of care quality for non-specific low back pain and of barriers to guideline adherence among primary care clinicians reach a consistent conclusion: communication practice, not only imaging indication, is a genuine lever for improving outcomes [25,28].

Conclusion

Imaging report language independently shapes patient-reported pain-related distress, an effect amplified by the high prevalence of degenerative findings in asymptomatic adults. Structured clinical-correlation reporting and accompanying reassurance-oriented clinician communication both show experimental evidence of reducing this distress. Report wording and surrounding communication practice should be treated as genuine, modifiable clinical variables in musculoskeletal pain management rather than incidental to the imaging finding itself.

Implications for Sports Medicine Practice

For clinicians ordering and discussing musculoskeletal imaging with patients, three practical points follow from this evidence. First, where feasible, favour or request structured clinical-correlation reporting that contextualises degenerative and incidental findings relative to the patient's presentation, rather than unmediated technical wording alone [1,2]. Second, actively communicate the high prevalence of incidental findings in asymptomatic people when discussing results, rather than allowing the report's technical language to stand unexplained [7,22]. Third, treat reassurance-oriented explanation as an active part of imaging follow-up consultations, not an optional extra, given its demonstrated evidence base [14,15].

Author Contributions

Chalfonte R conceived the review question, screened and synthesised the source literature, and drafted the manuscript. Kvalheim-Roald M contributed the patient-communication and reassurance-intervention literature search strategy and critically revised the manuscript for methodological content. Terranova-Filis G verified the extracted prevalence and wording-effect figures against the cited primary sources and revised the manuscript for important intellectual content. All authors read and approved the final manuscript.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this review.

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Data Availability Statement

No new data were generated or analysed for this review. All percentages and effect estimates reported here are drawn directly from the cited published sources, each of which makes its own underlying data available according to its own journal's policy.

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Ethics Approval and Consent to Participate

Not applicable. This article is a narrative review synthesising previously published, publicly available literature and did not involve the collection of new data from human participants.

Search Strategy

Sources were identified through targeted searches of MEDLINE, Embase, and PsycINFO, combined with manual forward and backward citation tracking from the foundational experimental and randomised report-wording literature, the incidental-finding prevalence literature, and the broader patient-communication and reassurance literature, restricted to peer-reviewed studies reported in English.