



# Comparison of referrals for lumbar spine magnetic resonance imaging from physiotherapists, primary care and secondary care: how should referral pathways be optimised?

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## Abstract

**Objective** To compare sensitivity of pathology on imaging between referrals from primary care, physiotherapists, spinal surgeons and other secondary care providers.

**Design and setting** A retrospective review of 200 consecutive magnetic resonance imaging (MRI) scans of patients' first presentations to radiology for MR lumbar scanning at a tertiary orthopaedic centre. A scan report was defined as positive if there was any evidence of neural compromise. Fisher's exact  $2 \times 2$  contingency analyses were performed.

**Results** Eighty-seven (44%) scans were positive and 113 (57%) were negative. Forty-four percent of scans requested by general practitioners (GPs) were reported as positive compared with 57% of scans requested by physiotherapists. Only 40% and 20% of scans requested by specialist spinal surgeons and non-spinal team secondary care providers were positive, respectively. Physiotherapist referrals for MRI lumbar spine scans were significantly more likely to be positive compared with GPs ( $P=0.05$ ), spinal surgeons ( $P=0.03$ ) and others ( $P=0.004$ ).

**Conclusion** When appropriate, referrals via the extended physiotherapy service should be encouraged, rather than referrals directly from GPs. With appropriate training and in the appropriate clinical context, extended physiotherapy services could include inpatients and could accept outpatient referrals from other secondary care providers and not just from GPs; this would improve efficiency and reduce the workload of the radiology department and the spinal surgical unit.

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## Introduction

Lumbar disc disease was first described in 1934 [1]. In 1991, it was postulated that disease compressing the spinal root nerves is correlated with pain and neural dysfunction of that specific neural region [2]. Lower back pain is very common, with 80% of people experiencing back pain at least once in their lifetime [3].

Neurological symptoms and lower back pain are frequently investigated by magnetic resonance imaging (MRI). This is the preferred method for investigating many types of clinical problems involving disc pathology [4]. MRI is of value to primary care clinicians by assisting in patient management decisions. It has been recommended that all primary care clinicians should have direct access to MRI [5]. Evidence has shown a similar diagnostic yield between spinal MRI scans performed at the request of primary care clinicians compared with secondary care hospital clinicians [6]. Additionally, there has been a greater emphasis on treating patients directly from primary care to improve cost efficiency, preserving the use of specialist spinal units for more complex spinal care.

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The drawback of providing primary care clinicians with direct access to lumbar spine MRI is that they may be more likely to request inappropriate lumbar spine imaging than other physicians [7]. The overuse of MRI has become an increasingly recognised problem, as demonstrated by Emery [8].

Physiotherapists have been shown to be as effective as post-Fellowship junior staff and clinical assistant orthopaedic surgeons in the initial assessment and management of new referrals to outpatient orthopaedic departments [8]. This generates lower initial direct hospital costs [8]. Additionally, greater interaction of physiotherapists in the management of patients in primary care has been shown to be beneficial for management of the orthopaedic caseload [9–11]. Interaction of physiotherapists in managing patients in primary care has been considered feasible and acceptable [9–11]. Inman evaluated the extended role of physiotherapists in referring for MRI, and found that physiotherapists' practice was comparable to that of orthopaedic surgeons in a centre without a spinal service [12].

At the authors' institute, an extended physiotherapy service [musculoskeletal assessment service (MCAS)] was introduced in 2007 to reduce the pressures on spinal services and reduce waiting times. MCAS is a primary care triage service that aims to exclude serious pathology, identify surgical need and determine non-surgical management.

Four clinical physiotherapists work within the spinal MCAS team and refer patients for MRI, non-surgical intervention or spinal surgical consultation. The clinical physiotherapists have access to spinal surgical and musculoskeletal radiology opinion at a weekly spinal surgical multidisciplinary team (MDT) meeting, which also gives insight into the appropriateness of referrals. Their work solely consists of managing spinal patients, both within physiotherapy clinics and in clinics alongside spinal surgeons' outpatient clinics. There are currently five MCAS clinics per week.

MCAS physiotherapists accept referrals from primary care if patients have had pain of spinal origin for more than 4 weeks. Following appropriate clinical assessment of patients, patients are either discharged, referred for physiotherapy, referred for an orthopaedic consultation, or, if there are clinical concerns or if patients' symptoms do not improve with physiotherapy, referred for MRI (alongside radiographs and nerve conduction studies if indicated).

All the clinical physiotherapists have completed Master's level training in spinal assessment, that included learning the inclusion and exclusion criteria for spinal MRI and interpretation of spinal MRI results. The physiotherapists regularly undertake ionising radiation medical exposure regulations training, and can identify if radiographs or computed tomography are indicated. All patients that have been referred for MRI by MCAS are reviewed in the physiotherapy clinic following the patient's scan. During this time, patients are given the results of the scan and management options are discussed. This also provides the opportunity for physiotherapists to evaluate the suitability of each referral for spinal MRI.

An internal departmental study of MCAS demonstrated that over a 5-month period, 194 (9%) out of 2191 patients referred to MCAS for spinal assessment were referred for an MRI scan; of these, 81 (42%) were subsequently referred to a spinal consultant. The study validated the role of extended physiotherapists in referring for MRI given the high proportion of patients who were subsequently referred to a spinal consultant based on the MRI result. The results suggested that MCAS was a good discriminator to distinguish which patients would benefit from an MRI scan and subsequent spinal consultant opinion. The study also demonstrated that MCAS plays an important role in managing a large number of spinal referrals [13]. The attendance of physiotherapists at the weekly spinal MDT meeting enables physiotherapists to discuss patients directly with spinal surgeons and musculoskeletal radiologists, with the options of referring patients for image-guided nerve root injections when clinically appropriate, or to a specialist spinal surgery outpatient appointment.

Although a previous study has validated the role of physiotherapists in referring for spinal imaging [12], to the authors' knowledge, no studies have compared the referral patterns of the increasing volume of MRI workload from primary care clinicians for lumbar spine imaging with those from established physiotherapist services such as MCAS.

It is important to appreciate that a negative result from an MRI scan can still provide useful information for patients' future medical and physiotherapy management. The goal of MRI is sometimes not to obtain a positive result, but to exclude a pathology. This study focused on reducing the number of negative results in patients with specific clinical concerns for neural compression, rather than including patients who had been scanned to exclude a pathology.

The aim of this study was to compare sensitivity of pathology on imaging between different referral groups, with the ultimate aim of improving efficiency of the MRI service and avoiding overuse.

It was hypothesised that the diagnostic yield from MRI requests from physiotherapists would be higher than that from referrals from primary care clinicians.

The null hypothesis was that there would be no statistical difference between the sensitivity of neural compromise (and therefore diagnostic yield) between scans requested by physiotherapists and those requested by primary care clinicians (in patients with neurological symptoms clinically thought to arise from the lumbar spine).

If this hypothesis were true, this study would agree with previous studies that there is an overuse of imaging from primary care clinicians [7]. The authors' radiological experience of reporting MRI scans suggests that there is a disproportionately higher proportion of negative scans from primary care clinicians, and this is most likely a national trend rather than regional. Other than the study performed by Emery, there are no further studies to validate this observation [7]. These requests comprise a significant proportion of the MRI workload in a radiology department. The information could help in

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