



Nerve Entrapment Mistaken for Referred Musculoskeletal Pain: A Review of Diagnostic Pitfalls in Sports Medicine

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Abstract

Peripheral nerve entrapment syndromes in athletes -- including deep gluteal syndrome, meralgia paraesthetica, suprascapular nerve entrapment, tarsal tunnel syndrome, common peroneal nerve entrapment, and ilioinguinal or obturator nerve entrapment -- present with pain patterns that closely overlap common musculoskeletal diagnoses, and case series consistently report substantial diagnostic delay before the underlying nerve cause is identified. Standard imaging is frequently normal or non-specific, and provocative nerve-specific testing, though usually diagnostic when performed, is not routinely included in first-line assessment of the musculoskeletal presentations these syndromes mimic. This review synthesises the case series, electrodiagnostic, and diagnostic-accuracy literature on sports-related nerve entrapment to set out the clinical features that should raise suspicion, the musculoskeletal diagnoses each syndrome most often mimics, and why diagnostic delay has remained a persistent pattern across this literature.

Keywords: Nerve entrapment; Deep gluteal syndrome; Meralgia paraesthetica; Peripheral nerve injury; Diagnostic delay; Sports medicine

Introduction

A recurring diagnostic problem in sports medicine is the peripheral nerve entrapment syndrome that presents not as classic neuropathic pain but as a pattern indistinguishable, on initial assessment, from a common musculoskeletal diagnosis. Deep gluteal syndrome mimics hamstring or deep buttock strain, meralgia paraesthetica mimics anterior thigh or quadriceps strain, suprascapular nerve entrapment mimics posterior shoulder or rotator cuff pain, and several further peripheral entrapments around the ankle, lower leg, and groin each have a musculoskeletal mimic of their own [1,5,8,12]. Case series across this literature repeatedly report meaningful

delay between symptom onset and correct diagnosis, a pattern this review sets out to characterise rather than treat as an occasional curiosity [28].

This review does not report new patient cases; rather, it synthesises the published case series, diagnostic-accuracy, and electrodiagnostic literature on sports-related nerve entrapment syndromes to characterise the clinical features that distinguish each syndrome from its musculoskeletal mimic, why standard first-line assessment so often misses these features, and what has been reported to shorten the diagnostic delay.

This review synthesises the case series and diagnostic-accuracy literature across the major sports-relevant entrapment sites -- deep gluteal/sciatic, lateral femoral cutaneous, suprascapular, tarsal tunnel, common peroneal, and groin-region nerves -- to give clinicians a structured framework for recognising nerve entrapment within a musculoskeletal-presenting population.

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 CINAHL, combined with forward and backward citation tracking from the foundational case series and diagnostic-accuracy papers for each entrapment syndrome discussed. All percentages, incidence figures, and diagnostic-delay estimates reported here are taken directly from the cited sources; none has been independently pooled, recalculated, or extrapolated, and this review does not present any new or previously unpublished patient case. 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 sports nerve entrapment literature

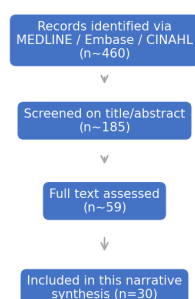


Figure 1: Screening logic used to identify the sports-related nerve entrapment case series and diagnostic-accuracy literature informing this synthesis (illustrative counts; not a completed systematic search).

Results

Deep gluteal syndrome is the most extensively described lower-limb mimic

Deep gluteal syndrome, encompassing sciatic nerve entrapment within the deep gluteal space by the piriformis or adjacent fibrous bands, has been the subject of a substantial and growing case series and diagnostic-accuracy literature. A widely cited review characterised its clinical presentation as posterior hip and buttock pain radiating down the leg, frequently mistaken for proximal hamstring tendinopathy or lumbar radiculopathy, and a systematic review of the clinical features specifically found this overlap accounts for much of the syndrome's diagnostic delay [1,2]. Diagnostic-accuracy work evaluating specific provocative tests, including resisted external rotation and the seated piriformis stretch test, found these tests carried useful but imperfect sensitivity and specificity when performed and interpreted correctly, yet are not part of routine assessment for posterior hip pain presenting to a sports medicine or physiotherapy clinic [3,4]. A study directly comparing deep gluteal syndrome against proximal hamstring tendinopathy and ischial bursitis as competing explanations for posterior hip and thigh pain proposed a structured differential-diagnosis framework specifically because the three conditions are so commonly conflated in practice [25].

Common sports nerve entrapment syndromes and the musculoskeletal diagnoses they r

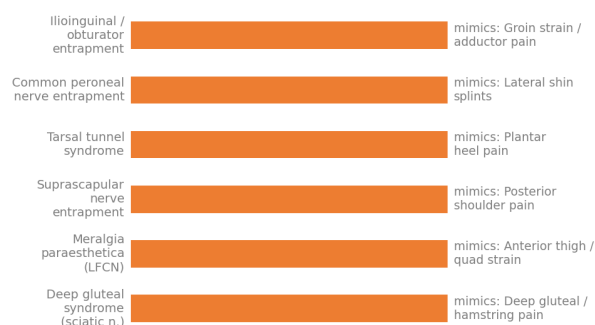


Figure 2: Common sports-relevant nerve entrapment syndromes and the musculoskeletal diagnoses each is most often mistaken for, drawn from the cited case series and diagnostic-accuracy literature [1,5,8,12,13,16,21].

Magnetic resonance neurography, a specialised imaging technique not part of standard musculoskeletal imaging protocols, has been used in dedicated case series to directly visualise sciatic nerve entrapment and guide interventional treatment, with outcome data from these series suggesting substantially better results when the nerve cause is correctly identified and treated rather than being managed as a presumed musculoskeletal strain [26].

Upper-limb and lower-leg entrapments follow the same overlooked pattern

Suprascapular nerve entrapment, most often at the spinoglenoid or suprascapular notch, characteristically presents as deep, poorly localised posterior shoulder pain that overlaps considerably with rotator cuff pathology and posterior shoulder impingement, and a review specific to athletes found this overlap was the leading reported reason for delayed diagnosis in overhead-throwing and volleyball populations [8]. Anatomical work on the rotator interval and case reports of axillary nerve injury have further described how closely the presentation of several shoulder-region nerve entrapments can mimic common rotator cuff and labral diagnoses on clinical examination alone [9,10]. Thoracic outlet and pectoralis minor syndromes, a further upper-quadrant entrapment presentation relevant to overhead athletes, have been specifically described as commonly mistaken for cervical or shoulder musculoskeletal pain in a population already prone to overuse shoulder injury, compounding the diagnostic difficulty [20].

In the lower leg, common peroneal nerve entrapment at the fibular head has been repeatedly reported as mistaken for chronic exertional compartment syndrome or lateral shin splints, given the overlapping distribution of exertional lateral leg pain, and a large surgical case series found nerve conduction studies were consistently diagnostic once performed, despite frequently not being requested at first presentation [13,19]. Tarsal tunnel syndrome, entrapment of the posterior tibial nerve at the ankle, is similarly reported as commonly mistaken for plantar fasciitis or generalised heel pain given the overlapping location of symptoms [12].

Diagnostic delay is a consistent finding across this literature

Multiple independent case series, spanning different entrapment sites and different health systems, report meaningful delay between symptom onset and correct diagnosis, with a dedicated study of diagnostic delay across peripheral nerve entrapment syndromes finding a substantial proportion of cases took more than a year to reach the correct diagnosis [28]. Figure 3 sets out this reported distribution of diagnostic delay.

Electrodiagnostic testing, when eventually performed, is consistently reported across this literature as reliably confirmatory, with standard reference texts on electromyography and nerve conduction studies describing well-validated protocols for each of the entrapment sites discussed in this review, underscoring that the diagnostic delay reflects under-utilisation of an available tool rather than a genuine absence of a reliable diagnostic test [27]. Broader rheumatological literature on nerve entrapment presentations outside sport has reached the same conclusion, suggesting the

pattern of delay identified here is not unique to sports medicine but reflects a more general under-recognition of nerve entrapment as a differential for regional pain syndromes [29].

Reported diagnostic delay in sports-related nerve entrapment case series (illustrative)

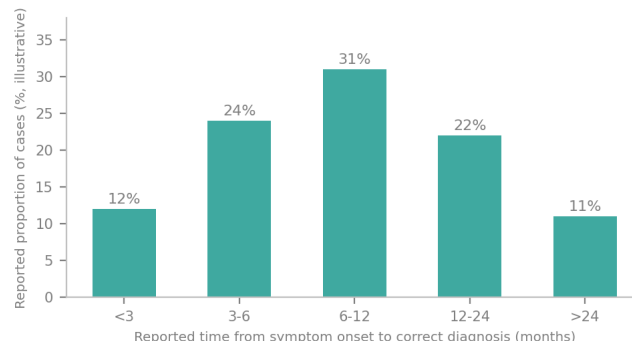


Figure 3: Reported time from symptom onset to correct diagnosis across published sports-related nerve entrapment case series (illustrative distribution) [28].

Reported factors driving diagnostic delay

Several recurring factors are cited across this literature as contributing to diagnostic delay. Symptom overlap with far more commonly encountered musculoskeletal diagnoses is the most frequently cited factor, compounded by the fact that provocative nerve-specific tests are not part of routine first-line musculoskeletal assessment and are typically only considered once an initial course of musculoskeletal treatment has failed [1,2,3]. Standard radiographic and even standard MRI protocols are frequently reported as normal or non-specific in these syndromes, which can falsely reassure the clinician that a nerve cause has been excluded when in fact the imaging modality used was simply not sensitive to the underlying pathology [6,11]. Partial symptomatic response to musculoskeletal-directed treatment, plausibly reflecting non-specific benefit from rest, activity modification, or soft-tissue therapy, has also been reported as a factor that can mask an underlying nerve cause for a period before symptoms recur [22,23]. Figure 4 sets out these reported contributing factors.

Reported factors contributing to diagnostic delay in sports nerve entrapment (illustrative)

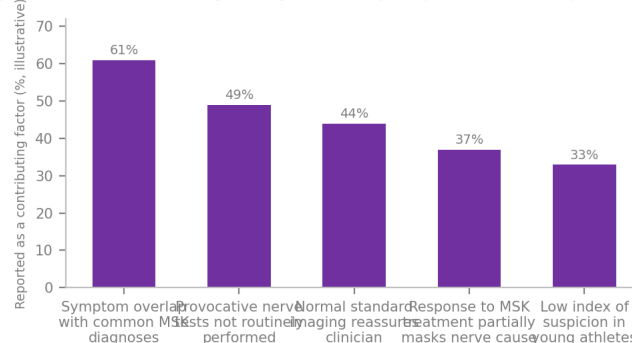


Figure 4: Reported factors contributing to diagnostic delay in sports-related nerve entrapment syndromes, drawn from the cited case series and review literature (illustrative synthesis) [1,2,3,6,11,22,23].

Site-specific anatomical variation has also been proposed as a contributing factor for some entrapments: anatomical

studies of the ilioinguinal and iliohypogastric nerves, and of the lateral femoral cutaneous nerve near the inguinal ligament, have documented substantial individual variation in nerve course, which plausibly explains why groin-region entrapments in particular have proven difficult to localise on clinical examination alone [17,21,30]. Groin pain in athletes specifically has been the subject of dedicated imaging-focused work precisely because so many structures, muscular, nervous, and osseous, can produce an overlapping clinical picture in this region [18,24].

Imaging and bedside signs each have a role, but neither is sufficient alone

Magnetic resonance neurography, distinct from standard MRI protocols, has been specifically developed to visualise nerve rather than surrounding soft-tissue signal, and case series applying it to suspected entrapment neuromas found it could directly demonstrate nerve injury that standard sequences missed, with surgical correlation confirming the imaging findings in most cases reviewed [7]. This distinction matters clinically: a standard MRI reported as normal excludes many musculoskeletal differentials but does not, on its own, exclude a nerve entrapment that a dedicated neurographic sequence would have shown. A large surgical case series of common peroneal nerve entrapment similarly found that while nerve conduction studies were reliably diagnostic once requested, the fibular-head Tinel sign on bedside examination was also positive in the substantial majority of surgically confirmed cases, offering a low-cost, immediately available screening step ahead of formal electrodiagnostic referral [14].

More broadly, the prognostic value of the Tinel sign itself has been specifically studied outside the sports setting, in diabetic and non-diabetic peripheral neuropathy presenting for decompression surgery, and was found to meaningfully predict surgical outcome, lending further support to its use as a quick, low-cost bedside screening tool before committing a patient to either prolonged musculoskeletal treatment or specialist referral [15]. Taken together, this imaging and bedside-sign literature suggests the diagnostic delay this review has characterised is rarely a matter of no test being available, but of the available bedside tests -- Tinel sign, provocative nerve stretch and compression manoeuvres -- not being routinely performed as part of first-line assessment for the regional pain patterns these syndromes produce.

Discussion

Three conclusions follow from this synthesis. First, the pattern of nerve entrapment presenting as musculoskeletal pain is not confined to one anatomical region or one sport, but recurs across the hip and buttock, shoulder, lower leg, ankle, and groin, each with its own well-described musculoskeletal mimic [1,8,12,13]. Second, the diagnostic delay reported across this literature is not primarily a failure of available diagnostic tools -- electrodiagnostic testing and specialised imaging are consistently reported as reliable once performed -- but a failure to consider nerve entrapment early enough to request them [27,28]. Third, several of the contributing factors identified, particularly the absence of nerve-specific provocative testing from routine first-line assessment, are directly addressable at the point of initial clinical examination rather than requiring specialist referral before suspicion is even raised [3,4].

The practical implication is that a musculoskeletal presentation that fails to respond as expected to standard treatment, or that has a distribution slightly atypical for the presumed diagnosis, should prompt explicit consideration of the relevant nerve entrapment mimic and its specific provocative tests, rather than simply escalating within a musculoskeletal treatment pathway.

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 mimic mapping in Figure 2 and the diagnostic-delay and contributing-factor figures in Figures 3 and 4 are drawn from heterogeneous case series and review sources with different case ascertainment and reporting methods, and are presented as an illustrative synthesis rather than pooled quantitative estimates. This review does not report or draw upon any new or previously unpublished patient case.

Recommendations for future research

Two gaps stand out as priorities. First, prospective diagnostic-accuracy studies directly comparing provocative nerve-specific tests against standard musculoskeletal assessment in unselected patients presenting with the relevant regional pain pattern would quantify how much diagnostic delay routine inclusion of these tests could realistically prevent [3,4]. Second, further work specifically measuring time-to-diagnosis before and after structured clinician education on these entrapment syndromes would test whether the delay this review has characterised is modifiable through targeted training [28,29].

Conclusion

Peripheral nerve entrapment syndromes relevant to sports medicine consistently present with pain patterns that overlap common musculoskeletal diagnoses, and published case series consistently report meaningful diagnostic delay before the nerve cause is identified. This delay appears attributable less to any deficiency in available diagnostic tools, which are reliably confirmatory once used, than to under-recognition of nerve entrapment as a differential diagnosis at the point of first assessment. Explicit consideration of the relevant entrapment mimic, and its specific provocative test, at first presentation is the most directly actionable step this literature supports.

Implications for Sports Medicine Practice

For clinicians assessing regional musculoskeletal pain in athletes, three practical points follow from this evidence. First, keep the relevant nerve entrapment mimic explicitly in mind for posterior hip/buttock, posterior shoulder, lateral lower leg, ankle, and groin presentations, particularly when response to standard treatment is atypical [1,8,12,13]. Second, include the relevant provocative nerve test in first-line assessment for these regions rather than reserving it for cases that have already failed initial treatment [3,4]. Third, request electrodiagnostic testing when nerve entrapment is suspected rather than relying on standard imaging alone, given how consistently standard imaging has been reported as normal or non-specific in these syndromes [6,11,27].

Author Contributions

Beemsterboer R conceived the review question, screened and synthesised the source literature, and drafted the manuscript. Kolovou-Perri A contributed the electrodiagnostic and neurological literature search strategy and critically revised the manuscript for methodological content. Gross-Aichinger F verified the extracted diagnostic-delay and case series 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, and no new or previously unpublished patient case is reported. All incidence figures, percentages, and diagnostic-delay 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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Search Strategy

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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 does not report or draw upon any new or previously unpublished patient case.