Pain Medicine, 22(1), 2021, 41–48
doi: 10.1093/pm/pnaa383
Original Research Article

OXFORD

SPINE SECTION

The Prevalence of "Pure" Lumbar Zygapophysial Joint Pain in Patients with Chronic Low Back Pain

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Abstract

Background. Estimates of the prevalence of lumbar zygapophysial joint (Z joint) pain differ in the literature, as do case definitions for this condition. No studies have determined the prevalence of "pure" lumbar Z joint pain, defined as complete relief of pain following placebo-controlled diagnostic blocks. **Objective.** The objective of this study was to estimate the prevalence of "pure" lumbar Z joint pain. **Methods.** In a private practice setting, 206 patients with possible lumbar Z joint pain underwent controlled diagnostic blocks using one of two protocols: placebo-controlled comparative blocks and fully randomized, placebo-controlled, triple blocks. **Results.** In the combined sample, the prevalence of "pure" lumbar Z joint pain was 15% (10–20%). **Conclusions.** The prevalence of "pure" lumbar Z joint pain is substantially and significantly less than most of the prevalence estimates of lumbar Z joint pain reported in the literature.

Introduction

An unresolved, contentious issue in pain medicine is the prevalence of lumbar zygapophysial joint (Z joint) pain in patients suffering from chronic low back pain. Prevalence estimates have ranged from 5% or less [1, 2] to 11% [3, 4], 15% [5], 25% [3, 4], 27% [6], 37% [7], and 45% [8–10]. Several reasons underlie this disparity.

The condition is diagnosed by anesthetizing the putatively painful joint or joints using intra-articular local anesthetic blocks or blocks of the medial branches that innervate the suspected joint or joints. However, studies of prevalence have used different operational criteria for case definition. These criteria include whether 50% relief, 80% relief, or complete relief of pain after a diagnostic block is required to declare the presence of the condition and whether relief occurs in response to single diagnostic blocks or to controlled blocks. Studies that have required complete relief of pain typically report very low prevalence rates [3, 7]. Prevalence rates are higher when partial relief of pain is used as the diagnostic criterion, with a tendency for rates to be lower when higher grades of relief are required for diagnosis, and when controlled blocks are not used to make the diagnosis [3, 7, 8].

Another possible factor is age. According to one source [11, 12], it seems that the prevalence of lumbar Z joint pain is low (2%) in patients aged 20–35 years but rises to between 5% and 10% in patients aged 35–50 and 20% in patients aged 50–65 years [11, 12]. In patients over the age of 65, the prevalence rises to between 30% and 40% [11, 12]. Other studies, however, have found age not to have a bearing on prevalence [6].

A conspicuous feature of the literature on lumbar Z joint pain is that no study has based its prevalence estimate on complete relief of pain following placebo-controlled diagnostic blocks. These stringent operational criteria provide compelling data. Completely relieving pain establishes a singular diagnosis and eliminates confounding concerns about other concurrent—but undiagnosed—sources of pain. Furthermore, using placebo controls eliminates concerns about false-positive responses, which occur in 25% to 45% of patients when uncontrolled blocks are used [8, 10, 13–15].

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The present study, therefore, was undertaken to fill this gap in knowledge by estimating the prevalence of lumbar Z joint pain using stringent operational criteria. Two hypotheses were tested: 1) that "pure" lumbar Z joint pain has a nonzero prevalence and 2) that that prevalence is significantly less than current estimates of the prevalence of lumbar Z joint pain.

Methods

Patients for the present study were drawn from the population of patients with chronic back pain referred to the practice of the senior author (John MacVicar). The practice is run by a sole practitioner who sees patients referred by primary care physicians, a multidisciplinary rehabilitation clinic, and specialists, for the assessment of a variety of pain problems and for assistance with rehabilitation planning. The practice also provides diagnostic blocks and radiofrequency neurotomy for patients with spinal pain in whom these procedures might be indicated. It serves a regional city with a population of approximately 400,000. The procedures performed for the present study constituted the routine practice of the senior author. All patients eligible for inclusion in the study were managed in the same way. Ethics approval for the study was not sought because no experimental procedures were performed. All procedures were standard in the practice of the senior author and in the national administrative system in which he operated. All data were reported in a de-identified manner.

To be eligible for inclusion, patients had to have back pain that had been present for longer than 3 months whose clinical features were compatible with a potential diagnosis of lumbar Z joint pain. Those features were constant, dull, aching pain, unilateral or bilateral, in the lumbar spinal region [16] or lumbosacral region [16], without or without somatic referred pain into the buttock or lower limb [16, 17].

Exclusion criteria were serious causes of back pain evident on imaging, such as tumors or infections. Patients with lancinating pain into the lower limb or neurological signs suggestive of radicular pain or radiculopathy were also excluded. Patients who were pregnant were not included because of the risks imposed by the radiation exposure necessary to perform diagnostic blocks. Use of anticoagulants was not a contraindication for inclusion because these have been shown to pose no significant risk for conducting lumbar medial branch blocks [18].

Before commencing investigations, all patients were informed that it was not possible to establish a diagnosis on the basis of a single block. Any positive response to the first block would need to be tested with a second and third block using different agents. Initial blocks were performed only on patients who agreed to proceed to control blocks.

With respect to technique, lumbar medial branch blocks were performed in accordance with the practice guidelines published by the International Spine Intervention Society [19]. With respect to protocol, the operational criteria for diagnostic blocks detailed by Engel et al. [20] were followed. The blocks had to be target specific; patients had to have complete relief of pain; that response had to be repeated when second local anesthetic blocks were performed; and the patient had to be able to distinguish the effects of the local anesthetic from those of the placebo.

The decision about where to initiate blocks was based on the distribution of the patient's pain and on previously published data on the location of commonly painful joints. Those data indicate that joints are most often painful at the L4–L5 and L5–S1 levels and far less commonly so at the L3–L4 level or above [5, 7]. If patients had bilateral pain, blocks were performed on both sides.

In patients whose pain was located over the lower lumbar spine, the segments at which to initiate screening blocks were chosen in one of two ways. In some cases, medial branch blocks were performed at L3, L4 (for the L4–L5 joint) or at L4, L5 (for the L5–S1 joint) if the patient's history provided cause for targeting one particular segment. Reasons included sacralization of L5, compression fracture at a particular segment, and previous intra-articular blocks at the hands of others that ruled out or implicated a particular segment. Otherwise, screening blocks were performed at L3, L4, L5.

If initial blocks at L3, L4 or L4, L5 did not relieve the patient's pain, a second screening block was performed at L4, L5 or L3, L4, respectively. If the second screening block provided no relief, no further investigations were performed. Likewise, if initial blocks at L3, L4, L5 did not relieve the patient's pain, no further investigations were undertaken.

If initial blocks at L3, L4 or L4, L5 completely relieved the patient of their pain, control blocks were performed at those levels. If initial blocks at L3, L4, L5 provided complete relief of pain, subsequent blocks were continued at L3, L4, L5. During the study, blocks were not performed in order to further pinpoint if the joints at L4–L5 or at L5–S1 alone were painful or if both were painful. Those steps were reserved for a later stage if and when treatment with radiofrequency neurotomy was to be undertaken.

In patients whose pain was located higher in the lumbar spine, blocks were initiated at segmental levels that appeared to correlate with the centroid of the distribution of their pain. Thus, for pain over midlumbar levels, the joint at L3–L4 was targeted with L2, L3 medial branch blocks. For pain high in the lumbar spine, the L1–L2 and L2–L3 joints were targeted with T12, L1, L2, or L1, L2, L3 medial branch blocks.

If initial screening blocks completely relieved the patient's pain, control blocks were performed to test the first response. Two protocols for control blocks were followed. One was used prior to 2011. A modified protocol was implemented from 2011 to 2019.

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The earlier protocol was the classical protocol of placebo-controlled comparative local anesthetic blocks [21, 22]. For the first block, a local anesthetic agent—lidocaine (2%) or bupivacaine (0.5%)—was used to provide prima facie evidence that the patient's pain could be completely relieved. For the second block, the patient was randomly assigned to receive either normal saline or the local anesthetic agent that they did not receive for the first block. For the third block, the patient received the agent that they did not receive for the second block. For each target nerve, a tiny test dose of contrast medium was injected to check for vascular uptake or aberrant flow; then, 0.3 mL of the allocated agent was injected.

Under this protocol, each patient received a local anesthetic on two occasions and normal saline on one occasion. Using two local anesthetics tested for consistency of response [20] (i.e., that whenever an active agent was used, the patient's pain was consistently, completely relieved). Using normal saline as a placebo control tested whether the patient could distinguish an active control from an inactive control. Patients were deemed to have Z joint pain if and when on each occasion that they received a local anesthetic they obtained complete relief of their pain, provided that they had no relief when the placebo was used.

The patients were informed that either an active or an inactive agent would be used for one or other of the control blocks. Under these conditions, they could expect to experience complete relief or no relief from any particular block. The patients were also informed that the results of the diagnostic test would not be complete—and the results would not be evident—until all three blocks had been conducted. An independent observer who was blind to the agents administered assessed and recorded the patient's response to each block.

The second protocol followed the principles later expressed in a theoretical study [23]. This study showed that classical, placebo-controlled, comparative blocks provided only 75% confidence in responses being valid (in worst-case analysis). The study also showed that confidence could be increased to 95% if fully randomized placebo-controlled blocks were used, such that the chances included not getting a placebo. The second protocol followed in the present study introduced the possibility of not getting a placebo.

For the initial screening block, patients received either lidocaine or bupivacaine to show prima facie if their pain could be completely relieved. For the second block, the patient was randomly assigned to receive either lidocaine or bupivacaine or normal saline. For the third block, the patient was randomly assigned to receive either lidocaine or bupivacaine or normal saline if the latter had not already been used.

Under this protocol, a given patient could receive the same or a different local anesthetic on two or three occasions and normal saline on one or no occasion. Using a local anesthetic tested for consistency of response. Using normal saline, if administered, would test if the patient could distinguish between an active or inactive agent. However, fully randomizing the agents for each of the two control blocks stringently controlled for guessing. The patients would not know if complete relief or no relief was the "correct" response for a positive diagnosis for each of the control blocks. Patients could not successfully guess that for the third block they should report the opposite of what they reported for the second block, which they could do under the conditions of the classical protocol.

Patients were deemed to have Z joint pain if they obtained complete relief of their pain three times when a local anesthetic was used, if they obtained complete relief of their pain two times when a local anesthetic was used, and if they obtained no relief when normal saline was used.

Results

All patients who were eligible for screening blocks agreed to undergo both the screening block and the subsequent control blocks. No patient declined before commencing blocks. This provided a sample of 67 patients in the first cohort and 139 patients in the second cohort. This sample represents all consecutive patients who underwent lumbar medial branch blocks during the period of study. No patients who underwent blocks were excluded from the sample. Responses to blocks were recorded prospectively, and no patient was lost to follow-up.

There were no statistically significant differences between the two cohorts studied with respect to gender and age distribution (Table 1). Both cohorts had an almost uniform distribution of ages, mostly between 30 and 70 years. All patients attributed their back pain to some form of injury.

Of the 67 patients in cohort 1, 47 were not relieved of their pain by initial blocks. Only 20 (30%) reported complete relief and underwent control blocks (Table 2). After control blocks, nine of these patients (45%) had no relief both after placebo blocks and after a second local anesthetic block. Four patients (20%) had relief from placebo but not from a second local anesthetic block. No patient had relief from both the local anesthetic block and placebo. Seven patients (35%) were completely relieved of pain after the second local anesthetic block but not after placebo. These latter patients constituted 10% of the initial sample, with 95% confidence intervals of 3% to 17%.

Of the 139 patients in cohort 2, 88 had no relief from their initial screening blocks, leaving 51 who were eligible to proceed to control blocks (Table 3). Of these, 12 did not proceed for a variety of reasons, such as the insurer declined to pay, insufficient pain returned, the patient considered the procedure too painful, the patient preferred to pursue surgery, or the patient traveled overseas.

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Table 1. Demographic features of two cohorts of patients for whom the prevalence of lumbar zygapophysial joint pain was estimated

		Age					
	Gender	<30	30–39	40–49	50–59	60–69	>70
Cohort 1	Male	5	7	9	4	8	3
	Female	1	4	7	11	6	2
	Total	6	11	16	15	14	5
Cohort 2	Male	9	14	21	20	8	11
	Female	5	13	14	13	9	2
	Total	14	27	35	33	17	13

Chi-squared analysis shows no significant differences, within or between cohorts, in the distribution of ages by gender or combined.

Table 2. Responses of 65 patients who underwent initial lumbar medial branch blocks and 20 patients who proceeded to control blocks

Initial Block		Control Block			
				Placebo	
No relief	47	0			
Relief	20	20		No relief	Relief
			Local anesthetic	No relief	9	4
				Relief	7	0

Table 3. Responses of 139 patients who underwent initial lumbar medial branch blocks and 51 patients who were eligible for fully randomized, placebo-controlled, comparative local anesthetic blocks

First Block		Control Block						
No relief	88	0						
Relief	51	51	12	Did not proceed				
			9	Did not complete				
			30	Completed all blocks				
					LA	NS	LA	NS
					Relief	No relief	No relief	Relief
			LA	Relief	5	13	4	1
				No relief	0	3	3	1

LA=local anesthetic; NS=normal saline.

For a variety of reasons, another nine patients completed one of the control blocks but not the other. Four older patients had consistent positive responses to their first two blocks and were spared a third procedure on compassionate grounds. Another patient was spared a third procedure because their positive responses to two medial branch blocks were consistent with their response to a previously performed intra-articular block. The other four patients had positive responses to their first two blocks, but no reason was recorded for their not proceeding to the third block. Technically, these patients did not complete the intended protocol. Therefore, their positive responses were not counted in the determination of the worst-case prevalence of positive responses, but they were later considered with respect to a best-case analysis.

Table 4. The number of patients who satisfied the diagnostic criteria for lumbar zygapophysial joint pain and its prevalence, in different age groups, along with the segments that were positive

	Prevalence				
	All	Age			
		<35	35–50	50–65	>65
No.	25	9	9	7	0
Prevalence	12%	22%	13%	11%	0%
95% CI	8–16%	8–35%	4–22%	3–17%	0–13%
Painful segments		L2–L3 L2, L3, L4 L3–L4 L3, L4, L5 L4–L5	L1–L2 L1, L2, L3 L3–L4 L3, L4, L5 L4–L5	L1–L2 L2–L3 L3, L4, L5 L4–L5	

CI = confidence interval.

Segments are expressed in terms of the medial branches that were blocked, not the joints that were anesthetized.

95% CI=95% confidence intervals of the prevalence estimates.

The 30 patients who completed all three blocks exhibited a variety of responses (Table 3). One was completely relieved by their second local anesthetic but also by normal saline. One was relieved by normal saline but not by their second local anesthetic. Four patients who were randomly assigned to receive local anesthetics for each of their two control blocks were relieved of their pain by one of the blocks but not by the other. Three other patients who were also randomly assigned to receive local anesthetics for each of their two control blocks had no relief on both occasions. Three patients had no relief from normal saline but also no relief from a second local anesthetic block.

Of the remaining 18 patients, five had complete relief on both occasions when a local anesthetic was repeated, amounting to complete relief after each of a total of three local anesthetic blocks. Thirteen patients were again relieved by their second local anesthetic block but not when normal saline was used. These 18 patients satisfied the a priori criteria for a positive response. They constituted 13% of the inception cohort, with 95% confidence intervals of 7% to 19%.

Combining the seven cases from cohort 1 with the 18 cases of cohort 2 yields a mean-weighted prevalence of 12%, with 95% confidence intervals of 8% to 16%. The segments affected were most often the lower two lumbar segments, either alone or in combination (Table 4). When stratified by age, all age groups were affected except the older adults (Table 4) but, as indicated by the wide confidence intervals, the sample sizes for individual age groups were too small to permit the comparison of prevalences in any valid manner.

Figure 1 represents a survival analysis according to response to blocks. Screening blocks were positive in 30% of cohort 1, 37% of cohort 2, and 34% of the combined sample. After control blocks, these proportions fell to

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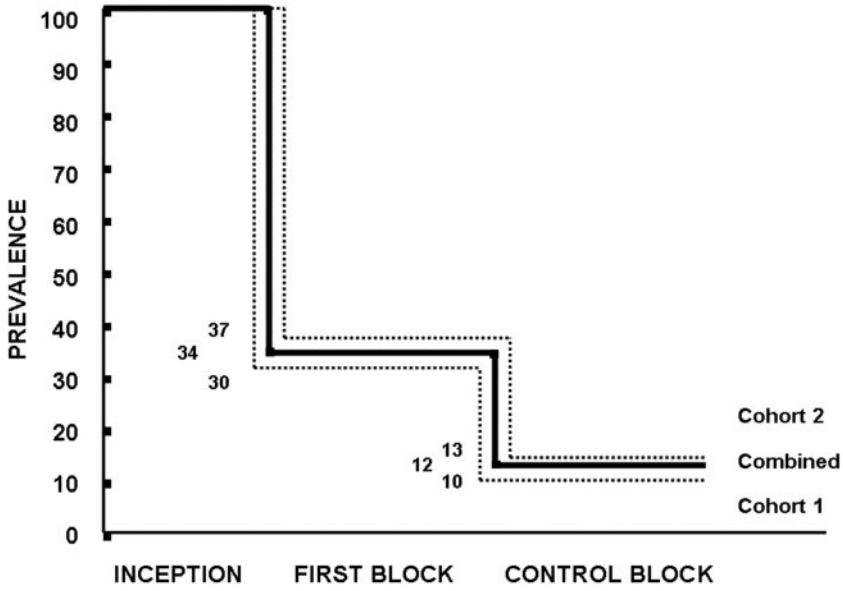

Figure 1. A survival plot of the rate of positive responses to initial screening blocks and subsequent control blocks of patients investigated for lumbar zygapophysial joint pain. The graphs depict the responses of cohort 1, cohort 2, and the combined sample of 206 patients investigated. Only 34% of patients had positive responses to initial screening blocks. This prevalence decreased to 12% after control blocks. This reduction represents a false-positive rate of 65% for the initial blocks.

10%, 13%, and 12%, respectively. This reduction reflects a false-positive rate of 65% for the initial screening blocks.

Discussion

The majority of patients in each of the two cohorts in the present study did not respond to screening blocks for lumbar Z joint pain and therefore did not satisfy the diagnostic criteria for this condition. These patients did not report partial or ambiguous degrees of relief; they clearly had no relief from their pain. Therefore, they were deemed to not have lumbar Z joint pain and underwent no further investigations for this condition.

Only patients who had complete relief of pain from their initial block became eligible for controlled blocks. Several of these patients exhibited spurious but intriguing patterns of responses to diagnostic blocks that have not been reported in previous studies. These responses arose because patients were subjected to a double bind. Not only did they have to identify whether local anesthetic relieved their pain, but they also had to identify if placebo did not relieve their pain. Therefore, for patients who were wishing for a positive diagnosis but were uncertain of the effects of the blocks, *no relief* could be as much the "correct" response as *relief*, depending on the agent administered. This constituted the double bind.

The most common spurious pattern of response was no relief after either the placebo or the second local anesthetic block. This type of response calls into question the positive response to the initial block for lack of consistency. In their operational criteria for diagnostic blocks, Engel et al. [20] emphasized the importance of consistency. For diagnostic blocks to be valid, pain should be abolished whenever an active agent is administered. Repeat blocks look for consistency. When the response does occur, it is concordant with the source of pain having been correctly found. When it fails to occur, the response is questionable. The response to either the first or second local anesthetic block must be wrong. The reason for the lack of consistency is a matter of speculation. The first response may have been a false positive; the second block may have incurred a technical error (false negative). To determine the actual reason would require multiple additional investigations. The patient may or may not actually have lumbar Z joint pain, but without additional testing, the lack of consistency precludes calling the response positive.

Other studies have shown that approximately 30% or more of patients undergoing controlled diagnostic blocks fail to get relief from a second block, regardless of their response to placebo controls [21, 22]. In the present study, the corresponding figures were 45% in cohort 1 and 30% in cohort 2. This high prevalence highlights the frailty, if not futility, of relying on single blocks to make a diagnosis and not checking for consistency of response.

Less common were classical paradoxical responses, in which patients had no relief from the second local anesthetic but were completely relieved by the placebo. This occurred in four patients (20%) in cohort 1 and in one patient (3%) in cohort 2. This pattern suggests that patients were uncertain of the effects of the agents administered and were probably guessing the effects. Whatever the actual explanation may be, this response to controlled blocks indicates that the patients were not clearly able to distinguish active from inactive agents,

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which at worst invalidates their response to the initial blocks and at best calls it into question.

When the response of patients to their first block was subsequently invalidated or called into question by controlled blocks, the reason was far more often for lack of consistency than failure to recognize placebo. Indeed, nearly twice as many patients lacked consistency than responded to placebo. This observation underscores the importance of consistency of response in the diagnosis of lumbar Z joint pain.

In this vein, the present study encountered a high rate of false-positive responses to screening blocks. The false-positive rate of 65% is substantially higher than that reported in other studies [8, 10, 13–15] and is most likely attributable to the stringency of the criteria for case definition in the present study (i.e., complete relief of pain following placebo-controlled blocks).

Conspicuously absent among the responses in cohort 1 was relief from both the second local anesthetic and the placebo. Such a response would be irrational. Patients who had been informed that either an active or inactive agent would be used would know to expect one episode of relief and one of no relief and rationally would not report relief twice. It is perhaps a reflection of the nature of the sample studied, and the population from which it was drawn, that no patient behaved irrationally. Concerns about irrational responses do not apply to cohort 2 because the randomization of agents for each control block allowed for seemingly irrational responses to possibly be correct.

Of cardinal interest in the present study are those patients who again obtained complete relief of pain following the second local anesthetic block but no relief from placebo. These patients unequivocally satisfy the diagnostic criteria for lumbar Z joint pain. Their pain was completely relieved when the putative source was anesthetized. Their responses were consistent—whenever the source was blocked, their pain was fully relieved. They could distinguish the effects of an active agent from those of an inactive agent. There being no concurrent cues for which agent was used, such as numbness, only patients with a genuine source of pain would be able to distinguish between a local anesthetic and a placebo having been used.

These patients constituted 10% (3–17%) of cohort 1 and 9% (4–14%) of cohort 2. These figures represent the prevalence of what, colloquially, might be called "pure" lumbar Z joint pain (i.e., a singular source of pain not confounded by concurrent other sources of pain). The five patients who were not randomly assigned to receive normal saline but who had three local anesthetic blocks and were completely relieved on each occasion can be added to the prevalence in cohort 2. This consistency of response is consonant with "pure" lumbar Z joint pain on the grounds that the patients were aware that they could be assigned a placebo for either or both of their control blocks, but nevertheless confidently reported complete relief despite the possibility of theoretically being "wrong." These patients raise the prevalence estimate in cohort 2 from 9% (4–14%) to 13% (7–19%).

A minor flaw of the present study was the decision not to complete placebo-controlled blocks in nine patients in cohort 2. Each of these patients underwent two blocks with a local anesthetic and reported complete relief on each occasion. Not counting these patients in the primary determination of prevalence might underestimate that prevalence. However, that underestimate is neither large nor statistically significant.

Among the patients who did complete three blocks, there were those who had complete relief from their first two blocks using local anesthetic. Of these patients, two-thirds correctly identified placebo when this was used for their third block, and one-third failed to do so. Therefore, the likelihood of correctly identifying placebo after two consecutive positive responses to local anesthetic is 2:1. If this likelihood is applied to the nine patients who did not complete controlled blocks, the chances are that six of them would have satisfied the placebo challenge had it been applied. Therefore, the worst-case estimate of 13% (7–19%) for cohort 2 could be raised to a best-case estimate of 17% (11–23%), and the weighted-mean prevalence in both cohorts combined could be raised from 12% (8–16%) to 15% (10–20%).

A similar correction could be entertained for the 12 patients in cohort 2 who only underwent initial screening blocks and did not proceed to any control blocks. The 65% false-positive rate for initial blocks encountered in the present study predicts that eight of these 12 patients are likely not to have responded correctly to control blocks, but four might have done so. Consequently, had these 12 patients completed control blocks, the best-case prevalence for the combined sample might have increased marginally from 15% to 17% (12–22%).

With respect to the hypotheses for the present study, the results obtained show that the prevalence of "pure" lumbar Z joint pain is low but not zero and that it is substantially lower than the prevalence estimates reported for 50%, 75%, and 80% relief of pain (and significantly so statistically in many instances). In effect, "pure" lumbar Z joint pain is only approximately one-third as common as lumbar Z joint pain diagnosed according to less stringent criteria.

When compared with previously published prevalence estimates, that of the present study is distinctly lower than most other estimates and significantly so statistically in most cases (Figure 2). The comparison also shows that estimates seem to be governed more by the degree of relief required from diagnostic blocks than by whether controlled blocks are used. There is a distinct central tendency for prevalence estimates to be lower when high degrees of relief are required from diagnostic blocks. All studies that required 90%, 95%, or 100% relief agreed on a prevalence between 10% and 15%. This agreement strongly suggests that the true prevalence of "pure"

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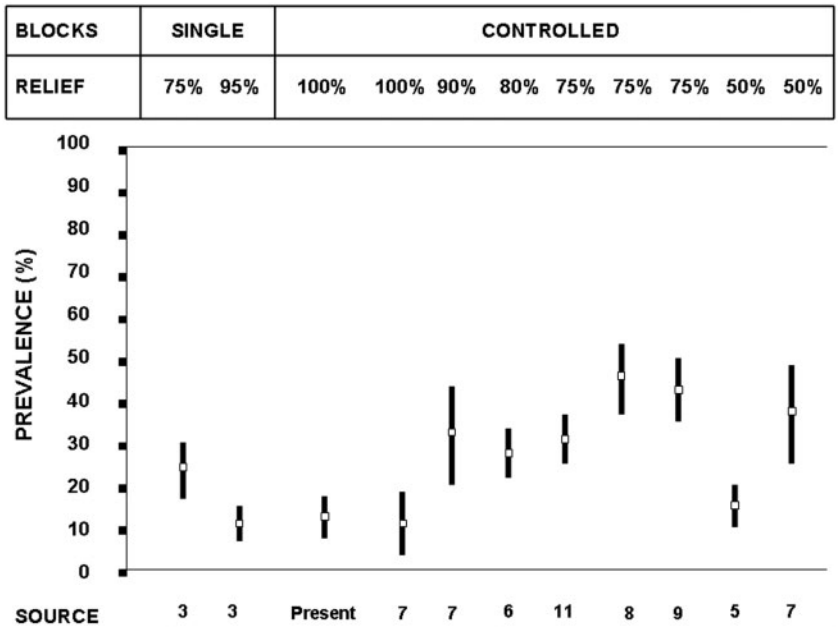

Figure 2. A comparison of the prevalence of lumbar zygapophysial joint pain, as reported in the literature, stratified according to whether single or controlled diagnostic blocks were used and the degree of relief required from blocks in order to establish the diagnosis. The data of the present study have been plotted for comparison. The bars indicate the prevalence estimates and 95% confidence intervals from each study. The source indicates the number in the reference list for the study graphed.

lumbar Z joint pain is of this magnitude. The comparison indicates, with one exception [5], that this prevalence is significantly less than that of lumbar Z joint pain diagnosed according to less stringent criteria.

With respect to age distribution, the data of the present study lacked sufficient resolution to corroborate or refute the prevalence of "pure" lumbar Z joint pain being higher or lower in any particular age group. However, differences by age have been reported in only one study [11], whereas other studies have not found any differences [6].

Whether physicians wish to pursue "pure" lumbar Z joint pain or other varieties of it is a matter of choice and debate. What the results of the present study call for, however, is recognition that what is referred to as lumbar Z joint pain, in the literature and in practice, is not all the same. The diagnostic criteria of other versions of the condition differ, and their prevalence differs. The risk arises that what one physician calls Z joint pain may not be the same as what other physicians call it.

To avoid confusion and misrepresentation, a diplomatic resolution simply requires a change of terminology that invokes subscripts. Z joint pain that is diagnosed on the basis of consistent, complete relief of pain can be referred to as ZJP_{100}. Diagnoses made on the basis of 50%, 75%, or 80% relief can be referred to as ZJP_{50}, ZJP_{75}, and ZJP_{80}, respectively. The diagnosis can be further elaborated with postscripts, such as those based on "single blocks," "dual blocks," or "placebo controlled."

Using such terminology allows for an honest, transparent reporting of results and experience. Most importantly, it avoids sophistry, such that consumers are not led to believe that a physician who diagnoses and treats ZJP_{50} is the same as one who diagnoses and treats ZJP_{100}. This recommendation assumes clinical significance once it is recognized that the outcomes of lumbar radiofrequency neurotomy are significantly better in patients with ZJP_{100} than in patients with ZJP_{50} [24].

Of possible concern to some readers is the generalizability of the results of the present study. They were drawn from a single small practice that does not see as many patients with back pain as do other practices that perform lumbar medial branch blocks. Notionally, a study that drew a sample from a larger, more diverse population might find prevalence rates significantly higher than those found in the present study. However, such a study would need to apply the same stringent operational criteria to vindicate a higher prevalence of ZJP_{100}. In the meantime, the present study constitutes a sentinel warning that the prevalence of lumbar ZJP_{100} may not be high.

Conclusion

When stringent criteria for case definition are applied to define "pure" lumbar Z joint pain as complete relief of pain following randomized placebo-controlled medial branch blocks, the prevalence of this condition is substantially less than that reported in the literature for other definitions of lumbar Z joint pain. This difference has significant implications—statistically and clinically—for the success that can be expected from treating lumbar Z joint pain.

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