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Original Article

Evaluation of the Relative Contributions of Various Structures in Chronic Low Back Pain

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An attempt was made to determine the relative contribution of various structures to chronic low back pain, including facet joint(s), disc(s), and sacroiliac joint(s) in a prospective evaluation.

Precision diagnostic blocks, including disc injections, facet joint blocks, and sacroiliac joint injections, are frequently used. In contrast, selective nerve root blocks or transforaminal epidural injections are used occasionally to evaluate persistent or recurrent low back pain in patients without appropriate radiologic or neurophysiologic diagnosis.

One hundred and twenty patients with a chief complaint of low back pain were evaluated with precision diagnostic injections, which included medial branch blocks, provocative discography and sacroiliac joint injections. In 40% (95% CL, 31%, 49%), of the patients, facet joint pain was diagnosed; and in 26% (95% CL, 18%, 34%) of the patients discogenic pain was diagnosed; and 2% of the patients were diagnosed with sacroiliac joint pain.

Keywords: Chronic low back pain, medial branch blocks, provocative discography, sacroiliac joint injections, transforaminal epidural injections, selective nerve root blocks

Kuslich et al (1) identified ligaments, fascia, muscles, intervertebral discs, facet joints, and nerve root dura as tissues capable of transmitting pain in the low back. Bogduk (2) postulated that for any structure to be deemed a cause of back pain, it should have a nerve supply; should be capable of causing pain similar to that seen clinically, ideally in normal volunteers; should be susceptible to diseases or injuries that are known to be painful; and should have been shown to be a source of pain in patients, using diagnostic techniques of known reliability and validity. Schwarzer et al (3-8) in their pioneering work, attributed origins of chronic low back pain to intervertebral discs in 39% of patients, to facet joints in 15% to 40%, and to sacroiliac joints in 30%. Bogduk (9) postulated that precision diagnostic injections could assist in arriving at a definite diagnosis in low back pain in approximately 70% to 80% of patients based on Schwarzer et al's (3-8) studies. Traditionally, clinical features and imaging or neurophysiologic studies do not permit the accurate diagnosis of causation of low back pain in 85% of patients in the absence of disc herniation and neurological deficit (3-12). Second generation studies of precision diagnostic injections showed facet joint pain in 32% to 45% of patients (13-17), and sacroiliac joint mediated pain in 19% of the patients (18) with chronic low back pain.

Diagnostic blockade of a structure with a nerve supply with ability to generate pain, can be performed to test the hypothesis that the target structure is a source of the patient's pain (12). Thus, precision diagnostic injections are potentially powerful tools for diagnosis of chronic spinal pain. True positive responses are secured by performing controlled blocks. Ideally, these should be in the form of placebo injections of normal saline; but logistical and/or ethical considerations prohibit the use of normal saline in conventional practice (12).

Muscle pain, ligament pain, and trigger points have attracted greatest popularity in clinical practice (2). Yet they are supported by very little scientific evidence. In contrast, facet joint pain, discogenic pain and sacroiliac joint pain have been studied with controlled diagnostic techniques, withstanding scientific scrutiny (2). The facet joints of the spine can be anesthetized by fluoroscopically guided injections of local anesthetic, either into the target joint or

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onto the medial branches of the dorsal rami that supply them (2, 5, 7, 9, 10, 13-17, 19-23). In contrast to facet joint blocks, discography is a controversial issue, largely because its place has been misunderstood and misinterpreted (3, 9, 10, 24-27). Discography is considered as a physiological test that explicitly determines whether a disc is painful or not, and the specificity of discography was clearly established (28). Sacroiliac joint injections have been described as the only direct method of distinguishing symptomatic from asymptomatic joints (8, 18, 29-31). Schwarzer et al (3-8) pioneered the concept of controlled diagnostic blocks in the lumbar spine, publishing results separately for facet joints, intervertebral discs and sacroiliac joints.

The present study attempted to bring together various polarized convictions and to test various structures responsible for chronic low back pain, using controlled, comparative local anesthetic medial branch blocks, provocative disc injections, and comparative local anesthetic sacroiliac joint injections in one single study. The objective of the present study was to determine the frequency of the involvement of the disc, facet joint, and sacroiliac joint in chronic low back pain, by precision diagnostic injections. In addition, patients in whom neither discogenic, facet joint, nor sacroiliac joint pain was diagnosed were also evaluated with transforaminal epidural injections to assess segmental dural/nerve root pain.

METHODS

The study was designed to evaluate 120 randomly allocated patients presenting with the chief complaint of chronic low back pain, in a nonuniversity setting, in one private comprehensive interventional pain management practice. Patients were allocated by a computerized randomization to one physician, from a group of 300 patients presenting with a chief complaint of low back pain. Randomization was for 150 patients. The study was stopped after 120 patients were enrolled. There were a total of 14 exclusions due to lack of interest in undergoing blocks or disapproval by the insurer. Patients younger than 18 years or older than 90 years, those who exhibited neurological deficits, those who had pain for less than 6 months, and those who presented with a definite diagnosis based on findings of radiologic or neurophysiologic testing were excluded. There were no exclusions based on requirement of any type of diagnostic blocks. None of the patients bypassed medial branch blocks. Evaluation of patients included comprehensive evaluation with completion of a standard, comprehensive pain management questionnaire; history, physical examination, and evaluation of the results of all procedures and investigations. All patients underwent conservative management, (i.e. physical therapy, chiropractic, exercises, drug therapy, bedrest, etc.) which failed to provide significant improvement. All consented and participated in the study after the nature of the study and the potential hazards of the procedures were explained to them.

Initially, all patients underwent diagnostic facet joint nerve blocks with lidocaine to test the presence of facet joint pain. Lidocaine-positive patients underwent a confirmatory block with bupivacaine. Lidocaine-negative and bupivacaine-negative patients underwent either provocative discography or sacroiliac joint injections based on the symptomatology. Sacroiliac joint injections were performed only in patients with a clinical presentation of pain in the sacral region, tenderness over the sacroiliac joint, and positive provocative maneuvers (31, 32). All patients negative for facet joint and sacroiliac joint pain underwent provocative discography. Patients who were shown to be negative to facet joint blocks and provocative discography and were not suspected to have sacroiliac joint pain or be negative for sacroiliac joint injections underwent transforaminal epidural injections.

Facet joints were investigated with diagnostic blocks using lidocaine 1%, initially followed by bupivacaine 0.25% on separate occasions, usually 3 to 4 weeks apart. The blocks were performed on the ipsilateral side in patients with unilateral pain or bilaterally in patients with bilateral or axial pain. Blocks were performed at two levels at least to block a single joint. They were mainly performed at L3 to L5, but various other levels up to L1 were included if pain description and tenderness pointed to a different level. Blocks were performed with a 22-gauge, 3.5-inch spinal needle under intermittent fluoroscopic visualization at each of the medial branches at the L1 through L4 and L5 dorsal ramus. Each nerve was infiltrated with 0.3 to 0.6 mL of either 1% lidocaine or 0.25% bupivacaine. A definite response was defined as relief of at least 80% in the symptomatic area. Following each block, the patient was examined and previously painful movements were performed. In order to be considered positive, the response to a block had to last longer than 2 hours when lidocaine was used; and either longer than the duration of effect from lidocaine, or at least 3 hours, when bupivacaine was used.

Provocative discography was carried out at the suspected levels. The diagnostic criteria adopted included that, for a disc to be deemed the source of pain, provocation of that disc should reproduce the patient's usual and customary pain; and an adjacent disc should be negative (33). Any

other response was considered negative. Discography was performed with a double-needle technique, starting with a symptomatic disc. During the provocative discography, all patients were assessed for pain response, with slow injection of 0.5 mL to 2.0 mL of contrast into the disc. No pressure measurements were carried out; however, excessive pressures were avoided. Pain was graded as concordant pain, which is described as exact pain reproduction; whereas other categories included no pain, similar pain, and unfamiliar or nonconcordant pain.

Sacroiliac joint injections were performed under fluoroscopy using a 22-gauge 2.5-inch needle utilizing 0.5 to 1 mL of contrast, followed by injection of either 2% lidocaine hydrochloride or 0.5% bupivacaine in the same volume as contrast, 3 to 4 weeks apart.

Transforaminal epidural injections were performed by injection of 0.3 to 1.0 mL of contrast followed by the same volume of 2% preservative free lidocaine hydrochloride. The technique described by Tajima et al (34) was utilized. Caution was exercised by injecting small volumes of contrast and observing the outline of the nerve root, to prevent leakage and anesthetization of other structures.

All blocks were performed under fluoroscopic visualization by one investigator, with the patient in a prone position in an operating room. Intravenous access and mild sedation with midazolam were carried out in 118 of 120 cases.

Data were recorded on a database using Microsoft® Access®. The SPSS Version 9.0 statistical package was used to generate frequency tables. Results were considered statistically significant if the *P* value was less than 0.05.

RESULTS

Table 1 illustrates demographic features of the patients studied and salient characteristics of low back pain with duration, mode of onset, pain ratio and intensity.

Facet Joint Pain

Table 2 describes evaluation of facet joint pain. All 120

Table 1. *Demographic features and salient characteristics*

		Number	Percent
Gender	Men	41	34%
	Women	79	66%
Age	< 65 years	107	89%
	> 65 years	13	11%
	Mean + SEM	47.5 + 1.16	
Previous surgical history		30	25%
Duration of pain in years	< 1 year	19	16%
	1-4 years	36	31%
	> 4 years	61	53%
	Mean + SEM	9.1 + 3.48	
Mode of onset	Without incident or gradual onset	59	49%
	Following an incident	61	51%
Pain ratio	Only back pain	16	13%
	Back = leg	49	41%
	Back > leg	40	33%
	Leg > back	15	13%
Average pain intensity	Mean + SEM	7.54 + 0.13	

Table 2. *Evaluation of facet joint mediated pain: Comparison of the results of facet joint nerve blocks (single blocks with lidocaine and double blocks with lidocaine and bupivacaine)*

	Double blocks	
Single blocks	Positive	Negative
Positive	48	34
Negative	0	38

Prevalence 40%: False-positive Rate 47%

patients underwent single blocks with lidocaine. Eighty-two, or 68% (95% CL, 58%, 78%), of the patients were positive for facet joint pain, with a single block reporting a definite response. Confirmatory blocks with bupivacaine were performed in all patients who were lidocaine-positive, with 40% (95% CL, 31%, 49%), of the total sample, or 59% (95% CL, 48%, 70%), of the lidocaine-positive group, reporting a definite response, with improvement in their pain. Thus, the double blocks showed the prevalence of facet joint pain to be 40%. Single blocks carry a false-positive rate of 47% (95% CL, 35%, 59%).

Discogenic Pain

As shown in Table 3, 72 patients negative for facet joint pain underwent discography. Thirty-one, or 43% (95% CL, 32%, 44%), of the patients showed positive results with discography with elicitation of concordant pain; whereas the remaining 41 patients, or 57% (95% CL, 46%, 68%), were negative for discography. The prevalence of discogenic pain was 43% in patients undergoing discography; however, the prevalence of discogenic pain from the total sample of 120 patients was 26% (95% CL, 18%, 34%).

Table 3. *Evaluation of discogenic pain*

Number of patients evaluated 72 from sample of 120	
Discography positive	43% (31)
Discography negative	57% (41)

Overall prevalence 26%; Prevalence among suspected patients 43%

Results of discography were compared with the patient's response to facet joint blocks as shown in Table 4. There was no difference noted among patients who were either negative or false positive for facet joint pain with regards to their response for discography.

Sacroiliac Joint Pain

As shown in Table 5, 20 patients presented with clinical symptoms leading to potential diagnosis of sacroiliac joint pain. These 20 patients underwent screening blocks with lidocaine. Six were shown to be positive with a single block with lidocaine, with a 30% incidence from a sample of patients undergoing sacroiliac joint blocks. Confirmatory blocks with bupivacaine were performed in all six patients and two patients were shown to be positive, with a 2% prevalence of sacroiliac joint pain for the overall sample and a 10% incidence of patients who were suspected to have sacroiliac joint pain. The false positive rate was 22%.

Segmental Dural/Nerve Root Pain

Patients who were negative for diagnosis of facet joint pain, discogenic pain or sacroiliac joint pain were considered as nonresponders and as potential sufferers of dural/nerve root pain. All 35 patients underwent transforaminal epidural injections. Of these, 16 patients responded positively, with pain relief, with a potential overall prevalence of segmental dural/nerve root pain of 13%.

Table 4. *Comparison of positive discography in patients with false positive and negative facet joint mediated pain*

	Facet Joint Blocks		
Discography	False Positive (34)	Negative (38)	Total (72)
Positive	47% (16)	39% (15)	43% (31)
Negative	53% (18)	61% (23)	57% (41)

( ) Number of patients

Table 5. *Evaluation for sacroiliac joint mediated pain*

	Number of patients = 20	
	Double blocks	
Single blocks	Positive	Negative
Positive	2	4
Negative	0	14

Overall prevalence 2%; Prevalence among suspected patients 10%; False positive rate 22%

Relative Contribution of Various Structures

Facet joint pain was seen in 48, or 40% of patients; discogenic pain in 31 patients, or 26%; and sacroiliac joint pain in two patients, or 2%. Pain generators were identified in 81 patients, or 68%, utilizing techniques of scientific scrutiny. Potential segmental dural/nerve root pain was identified in 13% of the patients.

Traumatic Versus Gradual Onset

Tables 6 and 7 show comparison of results of facet joint nerve blocks and provocative discography, based on mode of onset of pain.

Table 6. *Comparison of positive facet joint pain based on mode of the onset of the pain*

	Traumatic (61)	**Gradual (59)**
Positive	36% (22)	44% (26)
Negative	64% (39)	56% (33)

( ) number of patients

DISCUSSION

In a review of the possible sources and causes of back pain, Bogduk (2) described a multitude of structures responsible for acute or chronic low back pain, which included vertebral bodies, kissing spines, lamina impaction, spondylolysis, muscle sprain, muscle spasm, muscle imbalance, trigger points, iliac crest syndrome, compartment syndrome, fat herniation, dural pain, epidural plexus, interspinous ligament, iliolumbar ligament, sacroiliac joint pain, zygapophyseal joint pain, and internal disc disruption. He also described the depth and quality of evidence to substantiate belief in any particular source or cause. Fascinatingly, this review showed that those conditions which have attracted the greatest popularity in clinical practice – muscle pain, ligament pain, trigger points – are associated with the smallest amount of scientific evidence (2). Not only are data on the mechanism of pain in these conditions and its prevalence simply lacking, but there is no established reliable means of diagnosis. In contrast, Bogduk (2) felt that the less popular diagnoses - zygapophysial joint pain, sacroiliac joint pain, and internal disc disruption – are the ones that have the greatest amount of scientific data. However, Nachemson and Vingard (36) in their approach to best-evidence synthesis in assessment of patients with neck and back pain, concluded that various studies outside imaging have rarely demonstrated clinical utility in scientifically admissible studies and, if so, only in small numbers of patients. Ramsey et al (37) found that the evaluation of various diagnostic and treatment devices lacking in scientific regard included facet blocks, discography, and diagnostic nerve root infiltration, along with other tests including neurophysiologic tests including EMG, stress radiographs and flexion and extension x-ray studies, bone scintography, thermography, diagnostic ultrasound, and temporary external fixation. Nachemson and Vingard (36) also concluded that discography is one of the most controversial diagnostic tests without proven clinical utility.

The rationale for diagnostic neural blockade in the management of low back pain stems from the fact that clinical features and imaging or neurophysiologic studies do not permit the accurate diagnosis of causation of low back pain in the majority of patients in the absence of disc herniation and neurological deficit (3-12, 35, 38, 39, 40). In addition, it was also shown that sacroiliac joint pain is resistant to identification by history and physical examination data (8, 18, 40, 41). Broadhurst and Bond (31) claimed

Table 7. *Comparison of positive discography based on mode of the onset of the pain*

	Traumatic		**Gradual**		**Overall**
	Facet joint negative (39)	Total (61)	Facet joint negative (33)	Total (59)	
Positive	49% (19)	31% (19)	36% (12)	20% (12)	43% (31)

sensitivity in the range of 77% to 87% and a specificity of 100% with a set of provocative maneuvers. Slipman et al (32) demonstrated a positive predictive value of 60% in diagnosing sacroiliac joint syndrome in patients with three positive provocative maneuvers. However, no corroborative radiologic findings have been identified in patients with sacroiliac joint syndrome (29, 32, 42-45). The inability of the clinical picture, as well as radiological features to characterize pain from facet joints, has been demonstrated (10, 12, 15). Inaccurate or incomplete diagnosis in patients referred to pain treatment centers has been reported to range from 40% to 67%, with incidence of psychogenic pain in only 1 in 3,000 patients; and the presence of organic origin of pain was mistakenly branded as psychosomatic in 98% of these cases (46, 47).

The cardinal findings of the present study are: 1) a prevalence rate of facet joint pain of 40% with double blocks with a false-positive rate of 47% with single blocks; 2) a 26% prevalence of discogenic pain with provocative discography; 3) and a 2% prevalence of sacroiliac joint pain with comparative local anesthetic blocks.

Thus, we were able to identify a possible or probable pain generator in 68% of the patients. Other possible sources were muscles, dura mater/nerve root, interspinous ligaments, and iliolumbar ligament. The interspinous ligaments receives innervation from the medial branches of the lumbar dorsal rami and experimental stimulation of the interspinous ligament produces low back pain and referred pain in the lower extremities (2). Since medial branches of the lumbar dorsal rami have been blocked for facet joint pain, if in fact there is interspinous ligament pain existent, it may be bundled with facet joint pain.

The next possible structure is the iliolumbar ligament, which presumably receives innervation, either from the dorsal rami or ventral rami of the L4 and L5 spinal nerves. Its prevalence, either in acute or chronic back pain, is unknown. We also have not identified or suspected this syndrome in any of the patients in the study.

Muscles of the lumbar spine were ruled out on the basis that there were no trigger points identified in these patients in the lumbosacral area.

Finally, pain of dural/nerve root origin was considered. The dura mater is innervated by an extensive plexus derived from the lumbar sinuvertebral nerves (2). Stimulation of the dura invokes back pain and somatic referred pain into the buttocks, which raises the possibility that dural irritation could be a source of back pain. In addition, it has been inferred that dural tethering can be a cause of pain. However, dural irritation and resultant back pain are subject to conjecture (2). Since all other probable structures were ruled out, evaluation of the dura mater/nerve root as causative of low back pain was an option. We utilized transforaminal epidural injections, which anesthetized the innervation to the disc as well as to the dura. Since discography had been performed in all these patients prior to transforaminal epidural injection, we believe that the response to transforaminal epidural injection was of dural/nerve root pain. This is only a proposition. However, it is of interest that 13% of the total population receiving transforaminal epidural injections responded favorably, with the possibility that pain was of dural/nerve root origin in this population. If this possibility is accepted, this study indicates that a pain generator was identified with probability in 68% of the patients and possibly in an additional 13% of the patients, with a total of identification of a pain generator in 81%. Even then, there was no pain generator identified in 19% of the patients.

The prevalence of lumbar facet joint pain of 40% determined in this study is similar to our previous reports (13-17), and similar to Schwarzer et al's (7) report in the Australian population, but higher than the reported incidence by Schwarzer et al (5) in which the prevalence was reported in 15% of the patients. In this study (5), the majority of the patients studied had sustained injuries related to work or to a motor vehicle accident. We also analyzed our results and compared patients who had sustained some type of injury to patients developing chronic low back pain with gradual onset. Our results showed that facet joint pain was diagnosed in 36% of 61 patients, with history of trauma and in 44% of 59 patients with gradual onset, still higher than the 15% reported by Schwarzer et al (5). However, there was also significant difference between age groups which could have added to the higher incidence in our present study, similar to that of Schwarzer et al (7) showing a 40% incidence in the Australian population with higher median age. The criteria adapted for the diagnosis of lumbar facet joint pain in this study are as stringent as those adapted by previous investigators.

Discogenic pain was seen in only 26% of the patients, in contrast to 39% of the patients from the previous study (3). However, the prevalence among patients after the facet joint pain was eliminated by medial branch blocks was 43%, similar to the reports of Schwarzer et al (3). Further, Schwarzer et al (3), included only patients developing low back pain following injury. Analysis of our results with

onset of back pain following trauma vs with gradual onset showed positive provocative discography in 49% of 39 patients with traumatic onset, in contrast to 36% of 33 patients with gradual onset. Thus, overall prevalence was 31% in traumatic group, compared with 20% of the gradual onset group, closer to Schwarzer et al's (3) results. The criteria applied in this evaluation are extremely simple, yet reliable and stringent, as a negative controlled disc was mandatory. However, even the relaxation of these criteria, especially with the lack of a negative, controlled disc, may not increase the incidence; as there were no cases in this study group where negative, controlled discs were not identified. Opponents of discography may dismiss or ignore the results of the present study, mainly due to preconceived objections.

Sacroiliac joint pain was seen in only 2% of the patients from the overall sample and in 10% of the patients in whom sacroiliac joint pain was suspected. This was in contrast to the previous results of 19% (18) and 30% (8). However, while in one study the results may be different due to inclusion of only patients with either work related or motor vehicle injury, in both studies only the patients with suspicion of sacroiliac joint pain were included. In addition, Schwarzer et al (8) also used single local anesthetic block, whereas Maigne et al (18) used a double block paradigm with comparative local anesthetics, reporting a prevalence in the chronic low back pain population of 19%, with a false-positive rate of 29%. We have no explanations for the differences, except that the populations studied are different. We may also be criticized that the prevalence of facet joint pain in this study is greater than Schwarzer et al's study (5) at the expense of sacroiliac joint pain. However, we believe that we attempted to identify patients suspected of sacroiliac joint pain appropriately.

Finally, patients who were negative for facet joint and/or discogenic, as well as sacroiliac joint pain, were approached with a probable cause of dural/nerve root pain, that responded to transforaminal epidural injections. This was seen in 13% of the patients. There are no studies showing incidence of positive response to transforaminal epidural injections for prevalence purposes. Transforaminal injections were performed with low volume injections. Even if the injection spread to other structures or levels, it would not confuse the results, as all patients underwent diagnostic facet joint nerve blocks and provocative discography. .

We may be criticized for using controlled, comparative local anesthetic blocks of facet joint nerves instead of placebo-controlled diagnostic blocks, or intraarticular injections for facet joint pain. However, one of the reported drawbacks of local anesthetic control is that comparative local anesthetic blocks may not be implementable for intraarticular blocks because it is not known whether the placement of local anesthetic in a relatively avascular environment such as a joint space affects its expected duration of action. Thus, we employed medial branch blocks utilizing comparative local anesthetic agents in all cases. Placebo controlled blocks are not feasible in partice settings in U.S. There was also a significant false-positive rate of 47% with single blocks; thus, once again justifying and validating the ability of controlled, comparative local anesthetic blocks. However, these may again be reliable only in 85% of cases (12).

We may be criticized for our patient selection, which was randomized. In a study such as this one, a consecutive design or a sequential design also will yield valid results. However, due to the recent attention focused on randomized trials and preoccupation with them; and the fact that we have performed studies with consecutive and sequential design in the past, this approach was taken. The randomization should only improve the validity.

The current study may also be criticized for utilizing the present algorithmic approach with every patient undergoing facet joint nerve blocks. We adopted this paradigm to avoid any confusion in the diagnosis. In addition, in our practice, it has been our experience that facet joints are most commonly involved, followed by the disc. This approach is also easier, and less expensive, with better patient acceptance. Thus, a different algorithm, with discography as they primary and first procedure, before facet joint blocks, will be more involved and less productive, and patient acceptance will be different. Additionally, this study represents only a select population presenting to a non-university interventional pain medicine setting. In this setting, though comprehensive and multidisciplinary, patients are considered for treatment only if there has been a failure of conservative modalities of treatments. The practice setting involves a metropolitan area, with 70% of the patients drawn from outside the county of the practice location. Thus, the results may not be generalized to all types of practices, and all types of low back pain. We may even be criticized that this is not a proper assessment of the relative prevalence of three conditions; namely, facet joint pain, discogenic pain and sacroiliac joint pain. This algorithmic approach has not been tested; thus, it may include inherent bias in starting with facet joint nerve blocks and using discography only in patients who prove negative to facet joint pain. It may also be questioned as to

what might have occurred if discography had been used first and facet joint nerve blocks had been applied only in discography negative cases. We believe this is not a practical algorithm to approach; however, we do not know the results. It will be interesting to see if results will differ. Thus, we believe that, even though this is a report of the yield of the algorithm applied in this study, the results are significant and the methodology is accurate specific to the patient population and practice setting. In addition, the authors also recognize that the diagnosis arrived at is not definitive. In fact, the reliability of diagnostic facet joint nerve blocks has been stated to be approximately 85% utilizing a comparative local anesthetic double block paradigm (12). In addition, the reliability of provocative discography has been controversial (24-28). A double-block paradigm was not applied for transforaminal epidural injections. Authors of this study believe that the approach used, at least should provide a conceptual basis and represent a platform from which other studies can build.

Multiple pioneering studies by Schwarzer et al (3-8) have evaluated the prevalence of three conditions.

In contrast, the current study may be considered as the first trial using precision diagnostic injections to evaluate patients with various pain generators, in a specific but heterogenous group of patients with low back pain.

CONCLUSION

The results of this study show that the facet joint is the most common pain generator in chronic low back pain, with identification of the facet joint in 40% of patients, followed by the disc in 26% of patients, and the sacroiliac joint in only 2% of the patients.

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