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The Use Of Waddell Tests In Workers Compensation Claims

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By **Jon L. Gelman** and **Myron E. Brazin, M.D.**



In reviewing numerous medical records, including orthopedic and physical therapy reports, it is common to find mention of "The Waddell Test" and extensive reporting of examination findings featuring the results of its component maneuvers. These comments, will review the testing as it was originally described in its

proper clinical application. Finally, some insights that can be used in formulating cross examination of expert witnesses who feature the Waddell test in their testimony will be discussed.

In permanent disability from workplace injury, physical and mental factors must be considered. It was the intent of Dr. Gordon Waddell (1) and his colleagues to distinguish and standardize "nonorganic" physical signs that sometimes accompany low back pain. Their larger goal was to help identify patients "who require more detailed psychological assessment". Presumably, patients with back pain that exhibit various nonorganic physical signs are individuals that would likely benefit from psychotherapy and psychotropic medication treatment primarily. These same individuals can likely avoid risky surgery.

The authors rejected the notion that their testing identifies malingerers or exaggerators. Among patients with more nonorganic signs were patients with conservative treatment failure, which sometimes resulted in multiple surgeries. Furthermore, nonorganic signs were equally common among litigants and non-litigants. In one group of ten patients with spinal infection or tumors, two had

nonorganic signs. The authors caution: "It is safer to assume that all patients complaining of back pain have a physical source of pain in their back. Equally, all patients with pain show some emotional and behavioral reaction." Moreover, they assert, "Nonorganic signs, in the absence of other nonorganic symptoms, history, and behavior, must not prevent the physical assessment and investigation of such patients."

The presence of three or more of the following "nonorganic" signs is considered to be clinically significant:

- Tenderness (excess or widespread reaction)
 - Superficial
 - Nonanatomic
- Simulation (pain reported with sham maneuvers)
- Axial loading
- Rotation
- Distraction (less pain when attention is diverted)
- Straight leg raising
- Regional (widespread give-way or dysesthesia)
- Weakness
- Sensory
- Overreaction ("disproportionate" psychomotor responses)

These signs are only valid if the examiner is "non-obtrusive". Attempts were made to correlate nonorganic clinical signs with radiographs, but CT scan and EMG is not mentioned; MRI was not yet available. The authors correlated the finding of multiple nonorganic signs with "neurotic" behavior. (In today's parlance, the term "mood disorder" would be considered appropriate.)

The authors recognize the fact that a finding of "overreaction" may be biased by the observer. Furthermore, they realize that, even with a "proven and treatable physical lesion", persons with multiple nonorganic signs may need psychological assessment. Finally, the authors caution that these signs do not substitute for a standard psychological evaluation.

Unfortunately, various court cases resulting in denial of Workers' Compensation benefits contained unchallenged expert testimony that a positive result on Waddell testing demonstrated "symptom magnification", (2) "negative findings", (3) and "exaggerating". (4)

In keeping with the authors' original intent, here are some areas to consider for cross examination:

- Q. Your examination elicited some nonorganic signs. What are nonorganic signs?
- Q. Does the presence of nonorganic signs exclude all pathology in the low back?
- Q. Can persons with serious low back pathology exhibit nonorganic signs?
- Q. Please define "excess" reaction to palpation?
- Q. How are you certain the patient was distracted when you were

testing for nonorganic signs?

Q. How much reaction is "overreaction"?

Q. Are you certain that your examination technique did not influence any of the findings?

Q. Are you aware of any studies reporting treatment outcomes in persons with or without nonorganic signs?

Q. Are you aware that the "simulation" items of axial loading and rotation were proven to have poor interrater reliability? (5)

Q. Are you aware that "overreaction" was proven to have low interrater reliability? (6)

Q. Did you take a psychological or psychiatric history? Why not?

Q. You made a finding of multiple nonorganic signs. Did you refer the patient for psychological testing? Why not? When is it appropriate to make such a referral?

Q. Are you aware of any DSM-IV diagnosis whose criteria requires the presence of nonorganic signs?

Q. To your knowledge, are any psychiatric diagnoses made solely on the basis of physical findings?

Q. Are you aware of the adoption of nonorganic signs as diagnostic criteria by any medical organization?

Q. Does the presence of nonorganic signs mean there is no disability?

Endnotes:

Waddell G, McCulloch JA, Kummel E, Venner, RM: **Nonorganic Physical Signs in Low-Back Pain**
Spine 5:117-125, 1980.

Dr. Waddell was a Scottish physician who conducted a study in the late 1970's evaluating a patients' subjective complaints in relationship to objective findings. *Pierce v. Louisiana Maintenance Service, Inc.*, 668 So.2d 1232 (La.App. 5 Cir. 1996).

Danzy v. Evergreen Presbyterian Ministries, 657 So.2d 491 (La.App. 3 Cir. 1995)
Tharpe v. Henry I.Siegel Company, et al., No. 02S01-9405-CV-00021, 1995 WL 866422 (Tenn. Jan. 3, 1995), *Cooper v. Insurance Company of North America*, 884 S.W.2d 446 (Tenn. 1994).

Korbon GA, DeGood DE, Schroeder ME, Schwartz, DP and Shutty MS: The development of a somatic amplification rating scale for low-back pain. *Spine* 12:787-791, 1987.

Id.

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See also:

Spine 1998 Nov 1;23(21):2367-71 **A reappraisal of the interpretation of "nonorganic signs"**

Main CJ, Waddell G Department of Behavioral Medicine, Hope Hospital, Manchester, England.

Waddell et al in 1980 developed a standardized assessment of behavioral responses to examination. The signs were associated with other clinical measures of illness behavior and distress, and are not simply a feature of medicolegal presentations. Despite clear caveats about the interpretation of the signs, they have been misinterpreted and misused both clinically and medicolegally. Behavioral responses to examination provide useful clinical information, but need to be interpreted with care and understanding. Isolated signs should not be overinterpreted. Multiple signs suggest that the patient does not have a straightforward physical problem, but that psychological factors also need to be considered. Some patients may require both physical management of their physical pathology and more careful management of the psychosocial and behavioral aspects of their illness. Behavioral signs should be understood as response affected by fear in the context of recovery from injury and the development of chronic incapacity. They offer only a psychological "yellow-flag" and not a complete psychological assessment. Behavioral signs are not on their own a test of credibility or faking. PMID: 9820920, UI: 99038361

See The National Medical Library for related materials.

Journal of Psychosomatic Research Vol. 39, No. 6 pp 737-753 **'Functional Overlay', And Illness Behaviour in Chronic Pain: Distress or Malingering? Conceptual difficulties in Medico-Legal Assessment of Personal Injury Claims** -Chris Main & Chris C. Spanswick Pg 746

"Pain behaviour has long been recognized as a concomitant incapacity. It can be assessed on the basis of behavioural observations, using rating scales or videotaped assessment but the behavioural ('nonorganic') sign test is perhaps the most widely reported type of behavioural assessment found in medico-legal practice. The test is incorporated within the physical examination of the back patient. Eight different variables, grouped into five classes, give an assessment of the patient's psychological response to examination. It was recommended that this test should be thought of as only one part of an overall assessment of the patient, and that behavioral signs be only clinically interpretable if the score is clearly elevated. Statistically, the behavioural signs are inter-related and form a dimension of pain behaviour which is correlated with the patient's overall level of distress. Despite the caveats regarding interpretation clearly specified in the original publication, the presence of behavioural signs during clinical examination is sometimes taken by medico-legal assessors as evidence of simulated incapacity. Such an interpretation of behavioural signs has never been scientifically established and reports using the test in such a context should be viewed with suspicion." Pg 750 Table II - Simulated or exaggerated incapacity

Features primarily suggestive

1. Failure to comply with reasonable treatment.
2. Report of severe pain with no associated psychological effects
3. Marked inconsistency in effects of pain on general activities
4. Poor work record and history of persistent appeals against awards
5. Previous litigations

Features not primarily suggestive

1. Mismatch between physical findings and reported symptoms
2. Report of severe or continuous pain
3. Anger
4. Poor response to treatment
5. Behavioural signs/symptoms

Spine Volume 5 Number 2 March/April 1980 pg. 117-125 **Nonorganic Physical Signs in Low-Back Pain**

Gordon Waddell et al. Pg 123 "regression analysis showed that medicolegal factors accounted for less than 1% of the variance in nonorganic signs. It appears that nonorganic signs are not limited to, nor specific to, medicolegal and compensation situations" "The nonorganic signs did not correlate with the MMPI validity scores of F and K." "these validity scores are generally thought to detect unreliable answers, attempts to give socially acceptable answers and deliberate exaggeration." Pg 124 "Similarly, there was no correlation between the nonorganic signs and the validity score L of the Eysenck Personality Questionnaire." "Even with a proven and treatable physical lesion, multiple nonorganic signs help to identify those patients requiring formal psychosocial assessment before surgery for relief of pain. Finally, the nonorganic signs may add one facet to such detailed psychosocial assessment. It must, however, be emphasized that they form only one fact and should not be overinterpreted as a substitute for a complete clinical, nonorganic, or psychological profile."

Acta Orthop Scand (Suppl 251) 1993; 64 pgs. 21-24 **How Patients React to Low Back Pain**

Gordon Waddell Pg 23 "These non-organic or behavioral signs are again clearly separable from the standard signs of physical disease and are closely related to emotional distress. Although they can occur in medicolegal context, they are also commonly seen in the Problem Back Clinic in patients with no legal proceedings or compensation claims. They form part of complex emotional and behavioral patterns. They must not be overinterpreted simplistically as faking and it is essential to assess the whole clinical picture before drawing conclusions." Psychological distress "From an extensive review of previous work and his own detailed clinical studies Sternbach (1974) concluded that the most important psychological disturbances associated with pain were anxiety in acute pain and depression in chronic pain. Main (1983) also found that the most important psychological disturbances in chronic low back pain were increased bodily awareness which is related to anxiety, and depressive symptoms. These are best regarded clinically as forms of distress, a simple emotional reaction to pain and disability."

Spine Volume 13 Number 5 1988 pgs 557- 560 **Do Nonorganic Signs Help to Predict the Return to Activity of Patients with Low-Back Pain?**

Bradish, Lloyd et al. Pg 557 "No correlation was found between the presence of nonorganic signs at initial assessment and either return to activity or resolution of the patient's symptoms." Pg. 559 "The failure of NOS to predict outcome is not unexpected, however, and a recent review indicates that psychological testing with the Minnesota Multiphasic Personality Inventory, despite widespread use, has similarly failed to differentiate among patients and to reliably predict response to specific treatment (Love and Peck) Both methods of assessment, however, may help in the prediction of the patients psychological response to low-back pain. Assessment of nonorganic signs remains an important part of overall assessment of the patient with low-back pain, but as Waddell et al stressed, they should not be overinterpreted. They cannot be relied upon as indicators of outcome within the first 6 months of an initial episode of low-back pain."

Spine Volume 9 Number 2 1984 pgs 209 - 213 **Chronic Low-Back Pain, Psychologic Distress, and Illness Behavior**

Waddell et al. Pg 211 "Analysis of the inappropriate symptoms and signs themselves, however, (Table 5) showed that they appeared to be the result of the severity and chronicity of the physical problem, the amount of Psychologic distress, and some social interactions. The inappropriate symptoms were more important in women and associated with increases bodily awareness and the amount of previous treatment, while the inappropriate signs were more important in man and associated more with depression and medico-legal proceedings. They may be regarded as a magnified presentation or communication of the severity of the patient's whole problem and of the need to do something about it or, more simply, as the clinical equivalent of Psychologic distress. They may develop as a largely unconscious and socially productive "cry for help" but, unfortunately, in the absence of due help they many, in themselves add to disability and become counterproductive." Table 5. Analysis of the Causes of Magnified Illness Behavior

Influences	Physical severity	Distress	Duration	Amount of & failure of treatment	Medico-Legal proceedings	Total Identified
Extent to which These influence Inappropriate	20.1%	26.9%	10.4%	8.4%	6.1%	5.1%
Identifiable Influences symptoms signs	20.1%	26.9%	10.4%	8.4%	6.1%	5.1%
Physical severity	20.1%	26.9%	10.4%	8.4%	6.1%	5.1%
Distress	10.4%	26.9%	10.4%	8.4%	6.1%	5.1%
Duration	6.1%	26.9%	10.4%	8.4%	6.1%	5.1%
Amount of & failure of treatment	8.4%	26.9%	10.4%	8.4%	6.1%	5.1%
Medico-Legal proceedings	0.6%	26.9%	10.4%	8.4%	6.1%	5.1%
Total Identified	57.4%	50.1%	57.4%	50.1%	57.4%	50.1%

Pg. 212 ".....this analysis provided no evidence that Psychologic or behavioral factors were in any way "causative" of the physical problems. If the analysis must start with the physical problem, disability proved to be the best final expression or measure of severity (Table 6). Pain, whether measured by the pain drawing, or McGill pain questionnaire was unsatisfactory - presumably due to problems of measurement and interpretation, while work loss, though the final social expression of low-back pain, appeared to be influenced too heavily by external social factor. Just as pain proved unusable as the ultimate measure of severity, similarity, measures of pain proved unusable as the ultimate measure of severity, similarly, measures of pain added nothing to the analysis of disability - presumably because the physical characteristics used to assess impairment already allowed for pain and pain effects, while psychological measures of distress provided a more precise measure of suffering. As demonstrated in Table 6, physical impairment accounted for less than one-half of the total disability while a further third of the disability could be explained by psychological and behavioral factors. By far, the most powerful Psychologic influences were questionnaire measures of depression and bodily awareness, clinical measure of inappropriate symptoms, and inappropriate signs. Measures of personality were

found to be of little relevance to disability, confirming the last two decades of failure of personality questionnaires to account for illness behavior. Hypochondriac fears or beliefs overlapped with, and were completely overshadowed by, the much more powerful measures of psychologic distress. There was no evidence of psychiatric illness either from psychologic testing or during the psychologist's interview, confirming general clinical experience that referral of a chronic pain patient to a traditional psychiatrist usually fails to elucidate any psychiatric explanation or help. It may be suggested that the terms "hysteria" and "hypochondriasis", in particular, so variously have been used, misused, and abused by clinicians that they should be completely banned in the context of chronic pain. Thus the only clinically important psychologic disturbances identified in this study of chronic low-back pain were psychologic distress and inappropriate symptoms and signs, which it has already been suggested are the clinical equivalent of that distress. These patients were neither personality deficient, neurotic, hypocondriac, hysterical, nor mad but simply distressed by their physical problem and presented that distress to the physician." Table 6. Analysis of the Causes of Disability Extent to which these Main characteristics of illness influence disability Physical impairment 40.3% Psychological distress depression 13.4% increased bodily awareness 9.1% Magnified illness behavior inappropriate symptoms 3.9% inappropriate signs 4.5% Total identified 71.2% Pg 212 "Conclusion This analysis suggests that disability is low-back pain can be understood in terms of physical impairment, psychological distress, and illness behavior, each of which can be defined, observed, and measured. Tragically, although distress and illness behavior may develop secondarily to the underlying physical problem, the analysis shows that in a few patients, the resulting illness behavior can become just as disabling as the original physical problem and may even become the major management problem. This concept of illness may be represented visually as in Figure 1 and emphasizes the need to treat patients and their illness rather than concentrating exclusively on physical disease."

Spine. 1998 Nov 1; 23 (21): 2367-711988 **Behavioral responses to examination. A reappraisal of the interpretation of "nonorganic signs"** Main CJ, Waddell G.

Based on Current Knowledge Clinical History and Chronic Incapacity When the signs were standardized, their relation to psychological factors was not fully understood. It was recognized, however, that these behavioral responses contributed to the explanation of disability and were, in turn, associated with failed previous treatment. Behavioral signs essentially were considered to be a feature only of chronic incapacity. Recent studies have suggested that, although rarer, signs can be identified much earlier in the course of treatment. They therefore may be implicated in the development of chronicity and may be more than simply an aspect, effect, or result of chronicity. The Nature of Pain Behavior The specific concept and the assessment of overt pain behavior were developed concurrently with the behavioral signs and provide more accurate assessment of "overreaction to examination" (one of the behavioral signs). It has become clear that the behavioral signs should be understood as part of a wider set of pain behavior assessment tools, such as pain drawings, reporting of behavior symptoms, need for walking aids, and need for extended down-time. Relation to Other Psychological Factors Originally, the behavioral signs were demonstrated to be related to psychological distress, but the nature of the

relationship was not clearly understood. Since the second half of the 1980s, however, there has been a considerable development in the assessment and understanding of more specific psychological features, such as beliefs and coping strategies and specific fears of hurting and harming. The relation between such parameters and behavioral signs would seem to merit further investigation.

Relation to Fear and Guarded Movements Recent studies using surface electromyography from paraspinal muscles have found patterns of response that distinguish patients with back pain from healthy controls, at rest and during standardized movement. The sEMG abnormality in the patients with back pain improved significantly after they participated in a pain management program. The best predictor of normalization proved to be reduction in fear-avoidance beliefs and increased confidence in managing pain. The study demonstrated a clear association between fear, lack of self-confidence, and guarded movements. In another study of patients with chronic low back pain who participated in a pain management program, a high correlation was demonstrated between behavioral signs and performance on specific functional tasks. These studies suggest that the behavioral signs are perhaps best understood as responses affected by fear.

Theoretical Misunderstandings in Current Orthopedic and Physiotherapeutic Practice There are a number of ways in which the behavioral signs have been misunderstood and misused in practice. A number of theoretical misunderstandings may underlie this misuse.

Conscious Versus Unconscious Origins of Pain Behavior It sometimes is assumed that behavioral responses to examination necessarily are evidence of deliberate and conscious simulation on the part of the patient. Although it is possible to fake such responses, it cannot be assumed without further evidence that behavioral signs are de facto to be viewed with suspicion.

Failure to Understand Fear-Mediated Responses The reactive nature of assessment is not always appreciated. Patients arrive for a consultation with individual expectations and beliefs. Specific fears of pain or further injury can have a powerful influence on how a patient responds to physical examination. If patients have become fearful of pain, they may be nervous about being examined and show fear responses in the form of behavioral signs during physical examination.

Nature of Recovery From Injury and the Development of Chronic Incapacity Not all patients make a complete recovery from injury (whether or not litigation is involved). Even if structural damage has not been clearly identified, soft tissue injury may have led to the development of chronic incapacity through a series of mechanisms, such as reflex spasm and specific fears of hurting, harming, or reinjury. If pain has persisted, it may have led to the development of a disuse syndrome characterized by avoidance of painful movement or activities. It is necessary to appreciate the context of assessment and stage in the patient's history. The behavioral signs, therefore, can be identified and described as they occur during a clinical examination, but can only be understood fully as an aspect of the patient's clinical history. Their interpretation should be clarified further by identification of other clinical and psychological features that may coexist at time of physical examination. It is important to identify general nervousness about consultations and consider factors that may affect how the patient responds to assessment. Specific memories and expectations of painful examinations may produce inconsistencies in presentation as a result of fear. Specific fears of examination should be identified during the clinical interview, because they may influence the patient's reaction to examination. Consideration of fear and pain, misunderstandings regarding hurting/harming, and beliefs

regarding treatment outcome and future incapacity may assist in the interpretation of behavioral signs. **Coexistence With Physical Signs** The behavioral signs test was designed specifically to identify behavioral responses in patients with low back pain. In that particular clinical group, the signs could be separated from physical signs not associated with distress. It should be recognized, however, that patients with low back pain may have other problems.

Neck pain or fibromyalgia, for example, may need to be considered as alternative explanations for behaviors elicited in the context of an assessment of low back pain. **Objectivity, Judgment and Bias** The behavioral signs test was developed as an objective assessment that could be carried out consistently by different examiners. Inevitably, however, a degree of judgment is required. Differences in the number of signs found by different examiners may not necessarily indicate real clinical differences among the groups of patients. Consistent differences among assessors in the number of behavioral signs found may illustrate inconsistencies in the manner in which the signs are elicited, unwitting bias, or even prejudice. **Misuses and Misinterpretations in Clinical Contexts** **Failure to Adhere to the Recommended Cut-Offs (Overinterpretation of Isolated Signs)** Overinterpretation of individual signs is common. The original article clearly stated that the test is designed to identify a pattern of responses to physical examination. **Mistaking the Signs Test for a Full Psychological Assessment** Assessment of behavioral signs is not a complete psychological assessment. It is no more than a screening test. Significantly distressed and disabled patients require a specific psychological assessment. **Justification of Refusal to Offer Adequate/Appropriate Physical Treatment** Clear evidence of behavioral responses to examination indicate that the patient does not have a straightforward physical problem. He or she still may require an orthopedic intervention. In such cases, pain management as well as surgery may be necessary. **Inappropriate Differential Diagnoses** Evidence of a clear behavioral component in the individual's presentation does not mean that there is no need to investigate the rest of a patient's physical signs and symptoms. Significant physical impairment may produce high levels of distress. **Misuses and Misinterpretations in Medicolegal Contexts** **Failure to Recover From Injury** Failure to recover from injury should not necessarily be viewed with suspicion.

An important and significant minority of patients become chronically incapacitated after injury, regardless of whether litigation is involved. **Interpreting Signs as Indicators of Faking** Perhaps the most serious misuse and misinterpretation of behavioral signs has occurred in medicolegal contexts. The signs frequently are used as an indication of faking or simulated incapacity. It is certainly true that all sorts of behavior can be faked, and responses to examination are not exempt from this charge. As stated above, however, behavioral signs may be learned responses to pain that have developed since the original injury and of which the patient is largely unaware. Even if the behavioral signs are assumed to be under voluntary control, however, and if the patient is consciously responding in a guarded manner, it cannot be assumed de facto that the signs are evidence of simulation for the purpose of financial gain. In the first instance, the signs should be viewed as an indicator of pain behavior. Their interpretation should be considered with reference to other psychological and behavioral information. In the absence of distress, fear, mistaken beliefs, maladaptive coping strategies, and active attempts to seek treatment, it is perhaps more likely that the signs are evidence of simulation, but the behavioral signs cannot be interpreted in isolation. Behavioral signs are suggestive of a

"nonorganic" component in the patient's overall presentation. They do not represent a comprehensive psychological evaluation, and formulations such as "functional overlay" should not be taken as definitive. Assessment of psychological impact of pain requires consideration of distress, fears, beliefs about pain, and coping strategies.

Spine Volume 22, Number 14, pgs 1618-1621 1997 A Prospective Study of Waddell Signs in Patients With Chronic Low Back Pain When They May Not Be Predictive Polatin et al. Study Design. Analysis of the treatment-outcome predictive power of Waddell signs by evaluating them before and after functional restoration, with assessment of 1-year socioeconomic outcomes. Results. Statistical analysis of these data revealed no significant associations between Waddell total positive score or changes in score and therapeutic success as measured by any of the behavioral outcomes such as return to work. Also, no predictive value was found for the individual positive signs or their changes and therapeutic success. Conclusions. Although positive Waddell signs have been found to be predictive in patients with short-term chronic low back pain, the current results suggest that, in patients who have longer duration of pain and who undergo a comprehensive functional restoration program, these signs are not significantly prognostic. Because functional restoration is an interdisciplinary approach that effectively manages somatization complaints in a consistent manner by all treatment personnel, such complaints do not create any major barriers to recovery. Therefore, although Waddell signs may be predictive of treatment outcome in less intensive rehabilitation programs, they do not provide any predictive power in a comprehensive functional restoration program, which has a basic goal of managing barriers in recovery in a clinically efficacious manner.

Psychosomatics Volume 34 Number 6 Nov-Dec 1993 pg 494-501 Overlooked Physical Diagnoses in Chronic Pain Patients Involved in Litigation Hendler and Kozikowski Get and read this and the following article in their entirety This study followed the course of 60 chronic pain patients, from referral to a pain diagnostic center through the formulation of complete discharge diagnoses. The most common referral "diagnostics" were really descriptions or vague explanations, such as "chronic pain," "cervical strain," or "lumbar strain." The most commonly missed diagnoses were 1) myofascial disease, 2) facet disease, 3) peripheral nerve entrapment, 4) radiculopathy, and 5) thoracic outlet syndrome. Seventy percent of the laboratory studies ordered by the clinic had significant abnormalities. The authors determined that the overall rate of inaccurate or incomplete diagnosis at referral was 66,7%.

Psychosomatics Volume 37 Number 6 Nov-Dec 1996 pg 509-517 This study followed 120 chronic pain patients referred to a multidisciplinary pain center. The referral diagnosis for many patients, such as "chronic pain," "psychogenic pain," or "lumbar strain," was frequently found to be incomplete or inaccurate (40%) following a multidisciplinary evaluation that used appropriate diagnostic studies, including magnetic resonance imaging, computed tomography, nerve block, and qualitative flowmeter. Significant abnormalities were found in 76% of the diagnostic tests. An organic origin for pain was found in 98% of these patients. The patients were discharged with objective verification of diagnoses including facet disease, nerve entrapment, tempromandibular joint disease,

thoracic outlet syndrome, and herniated discs.

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