Current Concepts Review

Pain Dysfunction Syndromes

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Physicians are frequently called on to treat patients whose complaints of pain appear to be excessive, non-anatomical, or otherwise out of proportion with the nature of the reported injury or of the physical findings. Not infrequently, patients deny that they have even had an injury. Depending on the nature of the underlying injury, if it is identifiable, and of the associated physical findings, patients who have such a pain disorder may be diagnosed as having sympathetic dystrophy, causalgia, hysteria, or any one of a number of other diagnoses, in an attempt to name the cause of the excessive pain. The false sense of having made a diagnosis may obscure further investigation or an understanding of related problems that the patient may have. To avoid such diagnostic “tunnel vision”, it is useful to categorize an excessive, non-anatomical, or otherwise seemingly abnormal pattern of pain under the general heading of pain dysfunction syndrome. Such a classification is purely descriptive, and it permits maximum flexibility for diagnostic and therapeutic intervention.

In general, pain dysfunction syndromes can be thought of as having three primary components and one secondary component. A local trigger is the immediate local physical event that precipitated the pain. Psychological factors include not only the patient’s personality but also the social circumstances surrounding the injury and the potential for primary or secondary gain from continued disability. Systemic factors are the generalized conditions that exacerbate pain from a local source or could cause local pain. Sympathetic nervous-system dysfunction is the secondary component of pain dysfunction syndromes and should be considered separately.

Local Triggers

Once a pain dysfunction is identified, it is important to pinpoint the local painful focus accurately. The focus may be relatively obvious, as when there is a fracture or an open wound, but it may also be subtle, particularly when the patient has a chronic work-stress or overuse syndrome. In some patients, a presumed pain dysfunction may ultimately be identified as non-dysfunctional (that is, appropriate) pain arising from a painful but previously unrecognized local condition, such as an osteoid-osteoma. Injections of a local anesthetic may be helpful in identifying the painful focus or foci.

Often, the original local trigger is obscured by a superimposed surgical procedure or other iatrogenic intervention, as well as by exaggeration of the symptoms by the patient. Taking a careful history is essential, starting with the first symptom that the patient noted and progressing to the present. It is often instructive to compare the patient’s recollection of events with those recorded in contemporary medical reports. Gross discrepancies between the patient’s account and the medical reports may give insight into the patient’s personality and social environment, as well as into patient-physician or patient-employer conflicts, all of which may contribute to the pain dysfunction.

Physical examination of a patient who has pain dysfunction is difficult; often, pain overflow into a non-anatomical distribution obscures subtle physical findings or makes the evaluation equivocal. This is especially true in patients who have a cumulative trauma or overuse disorder, such as tendinitis, for which the diagnosis depends strongly on physical examination.

A number of diagnostic tests may add objective data. Plain radiographs of the involved area are often helpful, as are special imaging studies, such as tomography and arthrography. Radionuclide scanning and thermography may show isolated foci of activity to support a specific anatomical diagnosis as well as to provide evidence of sympathetic dysfunction.

Electromyography and nerve-conduction studies are helpful in identifying neurogenic foci of disease as well as in unmasking an underlying systemic illness with associated neuropathy. Electrodagnostic evaluation of a patient who has pain dysfunction should be more extensive than usual, and it should include a careful study of other areas of the body to determine the presence of neuropathy, proximal function of the involved limb, and evidence of entrapment of nerves in the spine or in the thoracic outlet as well as of more distal entrapment syndromes.

A clear, specific understanding of the anatomical basis of the original complaint is the goal. Without such an understanding, successful management of the pain problem is nearly impossible. In some patients, however, a thorough evaluation (short of invasive diagnostic procedures or an exploratory surgical procedure) may be totally unrewarding.

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In such patients, the physician must be willing to stop at "I don't know", rather than proceed at the risk of creating physical morbidity where there was none previously. Pressure from the patient, from third-party insurers, or from the physician's own ego to pursue progressively higher risk, lower yield diagnostic procedures in order to arrive at a codable diagnosis must be resisted.

Psychological Factors

Psychological factors may be the principal cause of pain dysfunction, as in somatoform pain or conversion disorders, when no real local trigger exists. Even in patients who have an identifiable local trigger, however, psychological factors frequently interfere with recovery from the pain dysfunction. The question of secondary gain often arises, and when litigation or compensation is involved it is important that these issues be resolved as soon as possible.

If the so-called green poltice of a financial settlement is successful in relieving a patient's symptoms, further diagnostic and therapeutic measures clearly are no longer necessary. This indirect approach is usually more successful than attempts to expose a malingering patient. Such attempts at exposure, even if they are successful and are gratifying to the previously frustrated physician, often destroy any potential for aiding the patient.

Pain dysfunction may be aggravated by a patient's underlying anger. Facial expressions and other so-called body language are often clues to underlying psychological problems. Inappropriate affects, such as smiling while describing severe pain, are occasionally seen, particularly in patients who have a conversion disorder. The patient may refer to the injured part in the third person or indicate, by lack of spontaneous movement, that the injured part is no longer integrated completely into his or her body image. Depression is common in patients who have chronic pain, as are manifestations such as insomnia, constriction, and anorexia. An MMPI or other personality inventory is frequently helpful in identifying more subtle personality factors, particularly for the physician who has not had psychiatric training. However, it is important to approach the topic of ordering such tests delicately, as many patients may consider the tests themselves to be an accusation of psychiatric disease.

A patient's reaction to pain is modified by the basic organization of his or her personality, the meaning of the injured part to the patient, racial and cultural expectations, support mechanisms that are provided by the family and the community, age, the cumulative effect of previous losses (physical or psychological), and the potential for secondary psychological gain in patient-spouse, patient-employer, patient-physician, or other conflicts. As has been mentioned, litigation and worker's compensation are other complicating issues that frequently prevent the amelioration of dysfunctional pain.

Substance abuse, whether of alcohol or of prescription or illicit drugs, is common in pain dysfunction. A history of such behavior must be carefully sought.

A number of psychiatric syndromes are usually or always associated with pain dysfunction. All of them have a negative effect on prognosis. Somatization disorders, malingering, factitious wounds, and conversion reactions all may be associated with pain dysfunction.

A somatization disorder is a syndrome of 'recurrent and multiple somatic complaints of several years' duration for which medical attention is sought but that apparently are not due to any physical disorder'. The disorder is very common in patients who have chronic pain. Symptoms are presented in a dramatic or exaggerated way as part of a complicated medical history in which many diagnoses have been made. Associated anxiety and other changes in mood are common. Symptoms typically begin in the teenage years. The syndrome occurs almost exclusively in girls, and the incidence is between 0.2 and 2 per cent. Common symptoms include non-organic vomiting, pain in the extremities, shortness of breath without exertion, amnesia, and difficulty swallowing. Sexual dysfunction is also frequent.

A somatization disorder is closely related to a somatoform pain disorder, which is a preoccupation with pain in the absence of physical findings to account for the pain or its intensity. The requirements for a diagnosis of a somatoform pain disorder are less strict than for a somatization disorder; the diagnosis of somatoform pain requires that the patient exhibit a preoccupation with pain for at least six months without underlying organic pathology. A somatoform pain disorder is more common in women than in men by a ratio of approximately two to one.

In addition to distinguishing somatization and somatoform disorders from organic causes of pain, these syndromes must be differentiated from malingering, which is the intentional misrepresentation of symptoms, and from conversion disorders, in which the symptoms are more localized and acute. A somatization disorder also must be differentiated from a factitious disorder with physical symptoms, the difference being that a factitious injury is self-inflicted.

Malingering is the deliberate misrepresentation of symptoms in order to escape a duty or obligation. Symptoms may be feigned or actually created factitiously. Malingering is rarely diagnosed psychiatrically in patients who have chronic pain.

A factitious injury, in psychiatric classification, may be part of either a malingering disorder, if there is an obvious secondary gain to be achieved (such as preferential treatment in prison, monetary compensation, and so on), or a factitious disorder, if there is no apparent external incentive. Although the disorders are clearly distinguished by psychiatrists, clinical differentiation is often difficult. There is a broad gray zone in which obvious secondary gains are operative but the illness is out of proportion with that needed to attain them. The patient who has a factitious disorder has a psychological need to assume the role of a sick person, without regard to economic or social gain, and often seems
truly unaware, on a conscious level, that the injury is self-inflicted. This extreme degree of denial often is also seen in members of the patient's family; the suggestion that the patient is responsible for his or her own symptoms often is met with shock and outrage and may, therefore, be counterproductive. Münchausen disease is a subtype of factitious disorder that is characterized by visits to numerous physicians, to whom the patient feigns an acute, dramatic illness and demonstrates considerable understanding of medical terminology.

A conversion disorder, or hysterical neurosis, is a response to psychological conflicts or needs and is manifested by unintentionally produced signs of physical disorder that cannot be explained by any known or identifiable physical cause. A very close cause-and-effect relationship must be established before this diagnosis can be made. The symptoms may be of brief duration or be recurrent, but a typical conversion disorder is characterized by a much more acute illness than is seen with a somatization disorder.

A conversion disorder is often encountered in a patient who has chronic pain. Again, however, there is a potential for overlap between a conversion disorder and conversion symptoms of a somatization disorder, as well as between the unintentionally feigned signs of conversion impairment and the intentionally feigned signs of factitious impairment. Taking a careful history from a patient who has a conversion disorder usually enables one to identify a focus of hostility or conflict with a prior treating physician, with a spouse, or with an employer. A clenched fist may be symbolic of a patient's repressed anger. Other conversion patterns include pseudoparalysis and the common stocking or glove anesthesia.

It is important to remember that not all patients who have a pain dysfunction have abnormal personality factors. For those who do, an unanswered question often is whether the personality dysfunction was present before the injury or developed as a response to chronic, unremitting pain. Such a distinction may be important, as the former situation probably makes treatment more difficult than does the latter. Many patients have some elements of an abnormal personality but defy categorization in the current psychiatric classification because of a short duration of symptoms, an insufficient number of different symptoms, or confusing areas of overlap between internal and external sources of gain. The disorders of such patients emphasize the need for a comprehensive, non-pejorative term, such as pain dysfunction, to identify them while diagnostic and therapeutic measures are proceeding.

Systemic Factors

A number of systemic disorders may exacerbate pain from local trauma. In some patients, apparent pain dysfunction actually may be the first sign of systemic illness. The orthopaedist's role as surgical specialist must not lead him or her to consider only pain that originates in the musculoskeletal system. The polyneuropathy of diabetes mellitus, lupus erythematosus, polymyalgia rheumatica, giant-cell arteritis, and multiple sclerosis are all systemic disorders for which the primary presenting symptom may be pain; thus, these disorders may mimic pain dysfunction. Also, the presenting symptom of ischemic heart disease or a Pancoast tumor may be referred pain. A complete discussion of the differential diagnosis of pain is clearly beyond the scope of this review. However, it is important that the physician remain aware that the presenting symptom of a generalized disorder may be local pain and that many illnesses, such as the various vascular disorders, may interfere with wound-healing and thus with recovery from injury. Some of these illnesses can be identified by physical examination alone. A complete blood-cell count, determinations of the sedimentation rate and of fasting blood-glucose levels, studies of thyroid function, determination of serum calcium levels, radiography, and electromyography screen for the most common systemic disorders that cause pain.

**Reflex Sympathetic-Dystrophy Syndrome**

Reflex sympathetic-dystrophy syndrome represents a spectrum of sympathetic nervous dysfunction that can accentuate or perpetuate pain dysfunction. Lankford suggested classifying sympathetic dystrophy into two types, based on the type of injury. The first, causalgia, is secondary to injury to a nerve. A minor causalgia is associated with injury to a sensory nerve and a major causalgia, with injury to a mixed nerve. The second type of sympathetic dystrophy, traumatic dystrophy, is also divided into two subtypes: a minor dystrophy is secondary to a musculoskeletal injury, such as a contusion or a sprain, and a major traumatic dystrophy is secondary to a major skeletal injury, such as a fracture.

Some syndromes do not fit easily into Lankford's classification. For example, shoulder-hand syndrome is a non-traumatic dystrophy of the upper extremity secondary to a proximal painful focus in the region of the shoulder. Similarly, Sudeck atrophy is an end-stage of osteoporosis and of atrophy of the skin and muscle, which is common to all forms of sympathetic dystrophy. Another problem with this classification is the mistaken impression that is given by the use of the terms major and minor, as a minor causalgia may be as disabling as a major one.

Regardless of the scheme of classification, the diagnosis of reflex sympathetic dystrophy traditionally has been based on the physical findings of vasomotor changes, sudomotor dysfunction, changes in the temperature of the skin, stiffness of the joints, and swelling combined with pain. The exact findings depend on the length of time between the onset of the disorder and the time when the patient is examined.

Reflex sympathetic dystrophy represents a spectrum of disease. At one extreme, the findings are obvious and the diagnosis is relatively easy. When the findings are more subtle or equivocal, however, the diagnosis is more difficult, and misdiagnosing a condition as sympathetic dystrophy when it may or may not involve sympathetic dysfunction is all too common. When such difficulty arises, additional
diagnostic tests may be helpful. Three-phase bone scans19, measurement of vasomotor22 or sudomotor reflexes17, and thermography23 are three currently available methods that can contribute objective data for the establishment of the diagnosis of reflex sympathetic dystrophy. The test that establishes the diagnosis beyond reasonable doubt, however, is the response to sympathetic blockade15,18,25. If a patient who is thought to have sympathetic dystrophy does not respond to treatment that eliminates the sympathetic inflow, the diagnosis is in question and additional investigations should be performed.

Treatment of Pain Dysfunction Syndrome

The key to successful treatment of any pain dysfunction syndrome is early recognition. Once the diagnosis has been confirmed by identifying the painful focus and the aggravating factor — either psychological, systemic, sympathetic, or some combination of the three — treatment can be instituted. Although the management of pain dysfunction often requires a team approach, it is important that the leader or coordinator of the team be clearly specified6. Depending on the components that are involved in the pain dysfunction, the members of the team may include therapists, psychiatrists, anesthesiologists, or other specialists in addition to the primary physician.

It is critical to establish rapport with the patient10,32, but this is a delicate matter, as it also is important not to permit the patient to become dependent on the physician. For this reason, the patient must actively participate in the program of treatment from the start. Regularly scheduled visits, regardless of how the patient says that he or she feels, may reduce the patient’s need to develop new symptoms to get continuing attention. The visits should include counseling for both the patient and the family, and only essential laboratory tests or other diagnostic procedures should be done19,30. Any additional procedures should be deferred, if possible, until the complaints of pain can be brought under control.

Frequently it appears that a somatization disorder, conversion reaction, or factitious injury is a defense mechanism to avoid unpleasantness at work or at home. Unfortunately, the underlying desire to avoid confrontation at home or at work usually carries over to the clinical setting, so that the patient often refuses psychiatric intervention or even the suggestion that a psychiatric problem may be a source of the problem6,10. Such an admission would force the patient to acknowledge that there is a confrontational situation at work or at home that he or she is subconsciously trying to avoid. If the situation at work or at home is resolved, the patient may then feel trapped between continuing to have complaints of pain or admitting that there was a psychiatric basis for the complaints32. In these circumstances, the introduction of a new modality of treatment, or even a trivial modification of a previous modality at the right time, may offer patients an “honorable exit” by permitting clinical improvement without admitting to a personality disturbance32. Thus, for some patients, it may be important to change the program of treatment from time to time to see if such a change will provide an honorable exit. Psychiatric intervention itself usually is of little benefit.

Conversion reactions are often easy to detect but difficult to treat6,36. As the patient’s insight into the reason for the symptoms is often inadequate, confrontation is usually of little benefit. Again, an honorable exit may prove useful. Psychiatric advice often is informative to the treating physician, but frequently the patient is unwilling to accept psychiatric counseling. In many such patients, the impairments persist for years16. In a patient who has a conversion reaction, good prognostic signs include the development of a capacity for insight, the ability to create lasting interpersonal relationships, a steady work and marital history, and the formation of a therapeutic alliance with the treating team32.

Factitious disorders are also difficult to manage, and confrontation is often as counterproductive as it is with a patient who has a conversion reaction. Use of protective dressings, where possible, to prevent the patient from further self-inflicted harm, is advised, and the use of such dressings also helps to confirm the diagnosis. Despite major psychopathology, few, if any, of these patients respond to psychotherapy1,3. In patients who have Münchhausen syndrome, who tend to be peripatetic, notification of other medical centers concerning the patient’s modus operandi may be necessary. True wandering Münchhausen-syndrome patients are more likely to be psychopathic or sociopathic3 than are other patients who have a factitious disorder. For all patients who have a factitious disorder, one must avoid the trap of exploratory surgery, which all too often creates an additional painful focus without revealing a previously occult diagnosis.

The treatment of sympathetic dysfunction involves the blockade of abnormal sympathetic impulses. Although, at the time of writing, at most centers this was being done by stellate ganglion block15, intravenous regional perfusion with guanethidine19 and systemic calcium-channel blockade23 also may be useful. If the diagnosis of sympathetic dysfunction is accurate, the blockade usually eliminates that component of the pain dysfunction. It is important to remember, however, that sympathetic dysfunction may be only a small part of the entire pain dysfunction. Failure to improve after a sympathetic blockade may, therefore, be a condemnation not of the modality of treatment but rather of the accuracy of the diagnosis.

Control of pain may involve the blocking of nerves or of local soft-tissue trigger points30 or any of a variety of physical modalities, including transcutaneous electrical nerve stimulation6, massage, ultrasound, relaxation therapy, and biofeedback34. Although a detailed description of the physiology of the perception of pain is beyond the scope of this review, the treating physician should take advantage of current knowledge of the physiology of pain in selecting the modality or modalities27. In addition to the normal perception of painful stimuli, in patients who have pain dysfunction the perception of pain may be enhanced due to factors at the site of the pain. These factors particularly
include mediators of inflammation, such as histamine, bradykinin, prostaglandins, and free oxygen radicals. Peripherally acting analgesics, such as aspirin, other non-steroidal anti-inflammatory drugs, and acetaminophen, are often helpful in such patients.

Injury to peripheral nerves may cause defects of transmission that produce spontaneous painful discharges, called ephapses\(^2\). Ephapses may respond to nerve blocks or medications that decrease neuroexcitability, such as anti-seizure medications. Central nervous-system neurotransmitters, primarily endorphins, result in the final integration of the perception of pain at the conscious level, although competitive nerve stimulation may block the proximal transmission or sensation of pain\(^2;9,21\). In addition to the endorphin system, which is mimicked clinically by narcotics, serotonergic and noradrenergic systems are also capable of inhibiting pain\(^3\). In choosing the modalities of treatment, it is important that they be simple, preferably pain-free, and non-invasive. As dependency on drugs is often a major problem for patients who have pain dysfunction\(^27\), it is best to use only drugs that have a low potential for abuse. Narcotics are rarely indicated.

The restoration of functional activity is extremely important. Passive physical modalities, such as resting splints, contrast-temperature baths, alternating pressure splints, and massage, may be helpful in relieving discomfort\(^4\). It is important that these passive modalities do not cause pain themselves. If they do, the pain dysfunction may flare up. This will increase the patient's distrust of the modality of treatment and of the treating team and can compromise the result. Active exercises usually are best; performance of the activities of daily living as well as those that are involved in pursuing a simple hobby or in work should be encouraged\(^27\).

As has been mentioned, anger is frequently a major component of pain dysfunction. It is critical to defuse the anger as quickly as possible. In general, the most expeditious way to do this is to gain the patient's confidence and trust with a gentle, pain-free program of treatment.

Complete immobilization of an injured part is often counterproductive, as it increases the risk of contracture of the joint and reinforces the patient's sense of dependency and disability. Manipulation of the injured part for the purpose of improving motion also should be avoided, if possible, as the increased pain after the manipulation may aggravate the underlying pain disorder. Active mobilization and work-simulating programs are usually preferred, as they enable the patient to control the therapy program\(^9\). Consequently, the patient is in the best position to stop the stress before the pain dysfunction is in danger of flaring up and is responsible for the program of rehabilitation; this control may reduce dependency on the treating physician and therapists.

Narcotics should be avoided in the treatment of pain dysfunction syndromes. Even though they may be quite effective in reducing pain, the risk of establishing a dependency on narcotics in these patients, who often have personality inadequacies, is great. Treatment of drug abuse, although beyond the scope of this review, is often a critical corollary to the successful management of a patient who has pain dysfunction syndrome.

Surgical treatment is sometimes necessary, even in the presence of an acute pain dysfunction. The most common reason for the operation is to reduce a fracture or to treat an infection. Long-acting regional block anesthesia should be employed, when possible, to avoid the use of narcotics and to provide a prolonged pain-free postoperative interval\(^7\). In some patients, several days of continuous blockade is helpful, particularly when regular access to the wound is necessary. Neuromas and lesions that compress a nerve may also require treatment before the pain dysfunction is under complete control. Here also, long-acting peripheral-nerve blocks or transcutaneous electrical nerve stimulation postoperatively is often helpful in reducing dependence on narcotics. Elective surgical procedures, such as the release of a contracture of a joint, should be deferred until the pain dysfunction has resolved.

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References


