

# Neuropsychiatric Management of Persistent Pain

R Anand

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## Abstract

Persistent or chronic pain is a major cause of disability and distress all over the world. Chronic pain can affect adults, old people and children in every culture. Relief from persistent pain is a major thrust of research into developing newer modalities of treatments. Pain is not just a sensation. It has a psychological component. Brain and mind mechanisms are equally involved in the experience of pain. An effective management strategy should take a holistic view of the experience of chronic pain and a multidisciplinary approach. The present review summarizes the current state of the science of the neuropsychiatric management of persistent pain.

## INTRODUCTION

Pain is the most frequent complaint in medical practice. Intractable and persistent pain is common. Back pain disables a large number of people in every part of the world. Pain disorders are diagnosed twice as commonly in women than in men. The peak ages of presentation are in the 40s and 50s, perhaps because the tolerance to pain declines with age. But more recently, due to changing lifestyles and occupations, pain disorders are becoming more prevalent in the younger populations. Pain used to be most common in persons with blue-collared occupations due to increased likelihood of work-related injuries. But in recent times, with the emergence and boom of the information technology industry, job-related repetitive strain injuries (RSIs), leading to persistent pain syndromes are becoming common in this population. First degree relatives of patients with pain disorder have an increased likelihood of pain disorders. This indicates a possible genetic basis for the behavioral mechanisms of the experience of pain. Depressive disorders, anxiety disorders and substance abuse are more common in the families of pain disorder patients than in the general population.

## DEFINITION OF PAIN

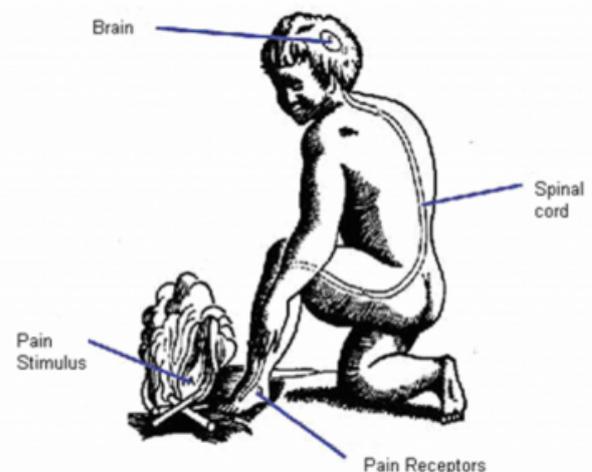
Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage.

Pain is not just sensation. It is experienced in our consciousness. It has effects on the mind. Mind can be

usefully employed to modify the experience.

## THE EXPERIENCE OF PAIN

Figure 1



*Descartes' model of pain*

Injury causes tissue damage. Pain signals are sent to the brain via the spinal cord. The signals pass through different circuits in the brain. One important system is the limbic system which is involved with emotions. The other important circuits are the higher brain circuits in the cerebrum which is involved in the cognitive processing of any sensory signal. Brain thus processes the signals. Threat to the integrity and survival of the organism is established. Brain sends signals to minimize damage to the tissue and protect the organism. Reflex muscle spasm occurs to protect

the injured area. The organism withdraws from the source of pain. From the negative sensation and experience of pain, the organism learns to avoid similar injury in the future. When the tissue heals, the brain sends less and less signals causing decreased pain and muscle spasm. The emotional and higher brain responses also change their reactions accordingly.

### DEFINITION OF PERSISTENT PAIN

Persistent or chronic pain is pain that is persistent, which can be either continuous or recurrent and of sufficient duration and intensity to adversely affect a patient's well-being, level of functioning and quality of life.

### THE EXPERIENCE OF PERSISTENT PAIN

There is usually absence of ongoing illness or healing has occurred after injury and is complete. The brain and the nervous system, for unknown reasons, continue to send pain signals to the muscles as though a new injury is occurring. The nervous system reacts to the memory of an injury. It sends similar signals to those sent in response to an injury. These signals 'remind' the patient of actual injury. The patient responds as though it is an acute injury every time.

Nerve injury may result in multiple changes within the central nervous system that perpetuate the pain experience. Increased numbers of the signals called action potentials cause hypersensitivity to pain (hyperalgesia). Redistribution of synapses, which connect the nerve cells establishing a circuit allowing the cells to communicate with each other, for mechanoreceptors, that generally receive pain signals, causes perception of pain to non-painful stimuli (allodynia). Increased receptive field size, especially in the dorsal horn cells, a group of nerve cells situated in columns in the back of the spinal cord, results in spread of pain. This happens because of neural plasticity, which is the flexible ability of the nervous tissue to modify their connections or circuits to accommodate to circumstances, in the central nervous system.

The use of exercise and psychological treatments may be effective in persistent or chronic pain because these treatments retrain the nervous system to reestablish more normal neural connections.

### THE DISABILITY OF PERSISTENT PAIN

- Progressive deterioration in the ability to function at work, at home and in social situations
- Increased dependence on others

- Increased dependence on the health care systems (diagnostic workups, imaging, medications, interventional procedures)
- Sleep disturbances
- Appetite disturbances
- Mood disturbances like anxiety and depression
- Cognitive disturbances like poor concentration and memory problems
- Financial difficulties
- Relationship difficulties
- Involvement in medico-legal issues particularly in accident or work-related injury
- Additional comorbidities that may be seen include:
  - Deconditioning
  - Disuse of affected body part(s)
  - Difficulty adhering to recommended treatment
  - Disability that far exceeds physical/medical findings
  - Drug misuse/abuse

### COMMON CONDITIONS WITH PERSISTENT PAIN

- Osteoarthritis
- Rheumatoid arthritis
- Spinal pain: lumbar, cervical, thoracic – with or without radiculopathy
- Complex regional pain syndrome (reflex sympathetic dystrophy) – upper or lower extremities
- Fibromyalgia syndrome (generalized musculoskeletal pain)
- Chronic fatigue syndrome (CFS) and Myalgic encephalomyelitis (ME)
- Spondylarthropathies like ankylosing spondylitis

- Myofascial pain syndrome [MPS](regional muscle pain)
- Painful peripheral neuropathy
- Temporomandibular joint (TMJ) dysfunction
- Post-herpetic neuralgia
- Headache: migraine, tension, cluster, cervicogenic, etc.
- Associated central nervous system symptoms – sensory, motor, autonomic
- Impact of pain on sleep, appetite, mood, activities of daily living, work and social functioning
- Screening for anxiety, depression, substance use, addiction, psychosomatic disorders, personality difficulties, personality traits, coping styles, preexisting psychiatric conditions

### NEUROPSYCHIATRIC EVALUATION OF PERSISTENT PAIN

Neuropsychiatric assessment forms a part of a multidisciplinary approach to the management of persistent pain. Therefore the neuropsychiatrist is a member of the multidisciplinary team working towards a common goal. Effective outcomes are achieved with open and ongoing communication among the various team members.

#### PRIMARY PRINCIPLES

- Recognize the multiple dimensions of persistent pain – biological, psychological, behavioral, familial, social, vocational, medico-legal
- Identify and understand the nature of the patient's presentation including possible etiology and maintaining factors
- Identify and understand the comorbid conditions affecting treatment
- Identify and understand patient's expectations and goals
- For patients with complex pain problems, a detailed psychiatric evaluation is necessary. Note: Depression and anxiety are common comorbidities of chronic pain, either preexisting or as a complication of the pain itself.
- Special evaluation techniques have to be applied for the elderly, especially those with dementia, people with learning disabilities or mental retardation, and children
- Vocational and medico-legal issues if relevant
- General medical history
- Treatment history – pharmacological, physical, psychological, surgical and other therapies and their effectiveness
- Patient's ideas about the pain and its causes
- Patient's expectations and goals of evaluation and treatment

#### PAIN HISTORY

- Chronology of presentation
- Mechanism of onset
- Duration
- Location/s, referral, radiation, character and quality of pain using a pain diagram if possible
- Intensity of pain using a numeric (0 = no pain, 10 = worst pain imaginable) or visual analog rating scale
- Aggravating and relieving factors

#### EXAMINATION

Examination of the central nervous system and musculoskeletal system is done if necessary. Most patients would have already undergone detailed examinations by the referring surgeon or physician and would have records of such evaluations.

Mental status examination gives a comprehensive idea of the patient's present state of mind.

Assessment of function – abilities and deficits, mobility, self-care, physical performance, energy levels, vocational, familial, social and sexual function.

#### INVESTIGATIONS

Investigations are extensions of the history and examination. They have to be appropriate and selective. They should be

requested only when the answer to the following questions is a definite 'yes'.

1. Will the test help formulate a clinical diagnosis?
2. Will the test impact the treatment?

Most patients referred to a neuropsychiatrist would have already undergone relevant investigations such as laboratory tests, X-rays, CT and MRI scans, nerve conduction studies and electromyography. In some conditions, a psychological testing by a clinical psychologist can provide valuable information.

### DIAGNOSTIC FORMULATION

The diagnostic impression takes into consideration the multiple dimensions of persistent pain. The components would include:

- Primary or working clinical diagnosis
- Medical comorbidities if any
- Psychiatric comorbidities if any
- Personality and coping styles
- Impact of pain on function

### RATING SCALES AND INSTRUMENTS

These are objective measuring devices that are used first in the initial assessment and subsequently in follow-up sessions and are most valuable in gaining information on progress. They consist of structured or semi-structured questionnaires that are completed either by the patient, when it is called self-rated scale, or by the treating clinician. They also provide a tangible feedback for the patient in assessing his/her own responses to the therapies. This will enable both therapist and patient to modify and improve strategies of management. These can also prove most useful in research and audit which are essential for the progress and advancement of medical science and knowledge.

### CARE AND TREATMENT OF PERSISTENT PAIN

The reasonable aim of management of persistent pain is to decrease the pain when possible and improve the function for the individual. This is a process wherein the patient and the members of the multidisciplinary therapeutic team work together to reduce pain, improve function, develop effective management strategies according to the individual's abilities and capacities, and maintain the improvements achieved

over time. This requires that the treatment plan emphasizes active participation by the patient, patient responsibility and development of self-management skills.

Management of chronic pain also involves general health management with particular attention to posture, weight, sleep disturbance, cardiovascular and pulmonary risk reduction, and avoidance of harmful habits like tobacco, alcohol and drug use.

Although pain may not be fully eliminated, treatment aims to reduce daily pain level, and the frequency, severity, and duration of the pain flares. In general, pain levels do not significantly improve until the patient has begun reconditioning and has increased his or her level of daily activities.

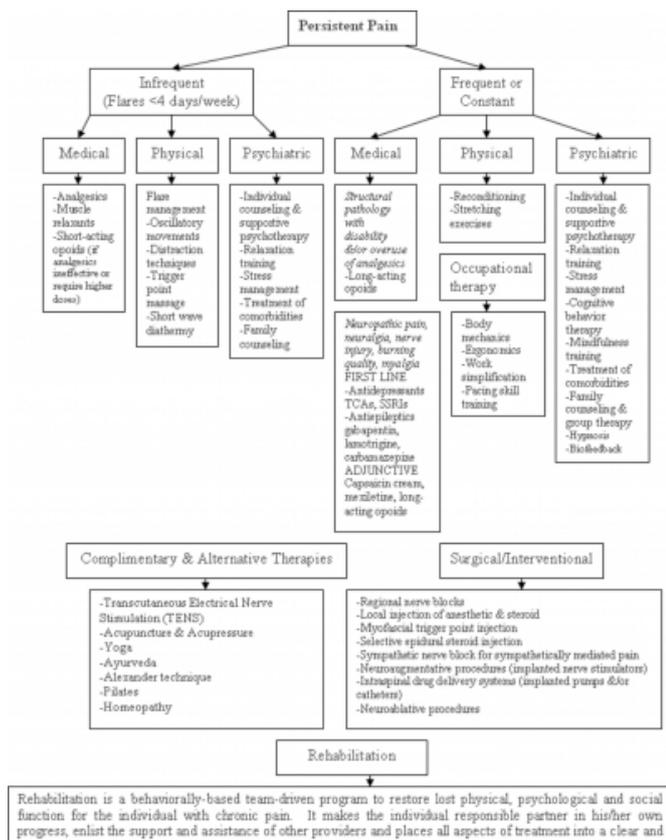
### PRIMARY PRINCIPLES

- Earlier the intervention, better the outcome
- Goals of therapy should be specific and realistic
- Define what will be done and the time frame for each
- Clearly define the rationale and who will be involved with each therapy
- All members of the multidisciplinary team should be clear about the treatment plan and work towards the same goal
- Best therapeutic outcomes are obtained by using a combination of therapeutic interventions
- Document the treatments and measure the progress
- Empower the patient and his/her family to enable them to control the course to the maximum extent possible

### ALGORITHM FOR THE MANAGEMENT OF PERSISTENT PAIN

Below is a comprehensive algorithm for the multidisciplinary management of persistent pain. It is beyond the scope of this article to cover each of the different modalities indicated. Topics relevant to the neuropsychiatric aspect of management have been briefly summarized.

Figure 2



**USE OF NEUROPSYCHIATRIC MEDICATIONS IN PERSISTENT PAIN**

Many studies have shown the effectiveness of neuropsychiatric medications in persistent pain, particularly neuropathic pain. These medications will not restore nerve function but will reduce the quality of pain experience. Tricyclic antidepressant drugs (TCAs) can relieve pain in 55 – 67% of patients. The commonly used TCAs are amitriptyline, imipramine, and clomipramine. It has been shown that use of selective serotonin reuptake inhibitor drugs (SSRIs) can reduce neuropathic pain by 70 – 80%. Additionally, antidepressant medications can improve the sleep disturbance, anxiety and depression that are commonly associated with chronic pain.

Antiepileptic medications are also very useful in neuropathic pain. Carbamazepine is well established as an effective drug in the management of trigeminal neuralgia and there are case reports of its effectiveness in neuropathic pain. Gabapentin, a newer antiepileptic drug, is shown to be effective in reducing pain severity in diabetic neuropathy and in post-herpetic neuralgia. There are case reports of lamotrigine, another newer antiepileptic, being helpful in reducing neuropathic pain.

Medications like mexiletene, capsaicin cream and long-acting opioids though are less effective by themselves in neuropathic pain, have shown to be useful when used as adjunctive therapy with antidepressants and antiepileptics.

Like with other medications, the drugs have to be used in proper dosages for sufficient periods of time. The onset of action may not be immediate and may take several weeks. They have to be monitored for efficacy and emergent side effects. Side effects if they do occur are usually transient. But if persistent and causing distress, they have to be addressed. Before prescribing, it is essential to be aware of interactions with other medications that the patient may already be taking and also presence of other medical conditions which can increase the chances of adverse effects and/or modify the response.

**INDIVIDUAL COUNSELING AND SUPPORTIVE PSYCHOTHERAPY**

Counseling and supportive psychotherapy involves active and empathic listening. It offers support by an authority figure during a period of distress and temporary decompensation. It also involves educating the patient and helping him/her understand the nature of the problem. This then facilitates use of better coping strategies and offers clearer direction. Guidance and advice is offered in dealing with the current situation so as to make informed choices. The main emphasis is on patient empowerment and effective self-management. The techniques used must make the patient feel safe, secure, accepted, protected, encouraged, and motivated to achieve legitimate independence.

**RELAXATION TRAINING**

In persistent pain, the body responds to the pain signals as if it is an acute stress state every time. Even though there is no injury as such, threat signals stimulate production of stress hormones and other brain mechanisms, and the body goes into survival mode. This causes the body to be under stress constantly which is exhausting and which in turn can lead to physical stress-related disorders. As a result of stress, the individual's normal thought functions are suppressed and he/she reacts to the situation leading to maladaptive responses. Relaxation training is a behavioral technique which helps to break the cycle of stress response and bring physiological and psychological relaxation which will then facilitate rational and logical thought processes. The techniques used involve breathing exercises, deep muscle relaxation exercises, guided imagery and meditation.

### **STRESS MANAGEMENT**

This involves systematic instruction and education regarding stress in the context of the experience of persistent pain. This incorporates psychoeducation, body awareness, relaxation training, problem-solving skills, mood management, goal setting and self-discipline. It is aimed at providing the necessary tools and skills to deal with the current situation and future self-management. The goal is to improve overall effectiveness and efficiency in managing stress and thus regain control over one's life.

### **COGNITIVE BEHAVIOR THERAPY**

The pain signals are experienced and processed in the brain. This may activate certain thoughts, memories and emotions. The person experiencing a pain sensation will have some emotional response(s) to it. He/she will experience certain thoughts and/or images during or immediately following the pain. Similarly, thoughts and emotions that are activated in the brain may also affect the pain signal. Our thoughts, memories, and emotions can influence the experience of pain physiologically. Persistent pain evokes negative thoughts and feelings which take a life of their own. The pain is interpreted as unmanageable and uncontrollable. There is a constant preoccupation with the pain. Maladaptive patterns of behaviors and thinking leaves the individual feeling helpless and out of control.

Cognitive therapy addresses the importance of realistic, healthy beliefs, attitudes, and behaviors in reducing the emotional and physical suffering associated with pain. Cognitive therapy is geared toward identifying any emotional, cognitive, behavioral, physiological, and/or environmental (e.g., family, social, cultural, and societal) difficulties that might be influencing the experience of pain. Although it is rare for clients to become pain free, cognitive therapy teaches people how to reduce their pain, how to be less affected by their pain, and enhance their functioning in various life roles. It helps them be in control of the pain rather than feel being controlled by the pain. It is an effective and powerful tool in facilitating self-management.

### **MINDFULNESS TRAINING**

Mindfulness is being fully and totally aware of the present from moment to moment. It is awareness without judgment of what is, via direct and immediate experience. When we systematically examine ourselves, we find that we spend most of our waking hours either in the past or the future and very little in the present. We are constantly recollecting our past and applying it to the future. This becomes a hurdle to

our progress, growth and development. When there is a chronic physical or mental condition, the progress is all the more retarded. Persistent pain can lead an individual into such a perpetual state of distress and suffering. Mindfulness techniques are adaptations from ancient Eastern philosophy and spiritual practice of yoga, vipassana, Zen, etc. Research both in the USA and the UK has shown its usefulness in managing persistent pain, chronic medical conditions and psychiatric disorders.

### **TREATMENT OF COMORBIDITIES**

Depression and anxiety are the commonest comorbid psychiatric conditions in persistent pain. They may preexist or may be a complication of the pain itself. There may be other psychiatric conditions like substance use disorder and addiction, psychosomatic disorders, personality disorders, other major and minor psychiatric disorders which can influence the experience and management of pain. These need to be screened for, thoroughly evaluated if present and treated with the appropriate biological and psychological therapies. Persistent pain management can run concurrently as the psychiatric condition begins to improve.

### **FAMILY COUNSELING AND GROUP THERAPY**

Selected family members who play significant role in the patient's life and whose life may be affected by the patient's problem need to be included in the management as there may be significant disruption of family and social life. Various issues that may be affecting the relationship are explored. Difficulties in communication, maladaptive behaviors and family distress are addressed. The family as a whole is then becomes more informed and effective in responding to the situation appropriately.

Group therapy offers an opportunity to persons experiencing similar symptoms to come together, share and explore their experiences, provide feedback, learn from each other and help and guide each other towards better understanding and management of their problems. The group is guided by a trained therapist who uses various techniques drawn from psychological models to bring about positive change in the members.

### **HYPNOSIS**

This is not widely available as it requires special training. This is usually practiced by a medically trained hypnotist. Hypnosis techniques are used to produce hypnotic analgesia in order to reduce and/or eliminate organically-based pain sensations.

### BIOFEEDBACK

Biofeedback provides information to the individual regarding one or more physiological processes of the body that normally operate outside consciousness so as to enable the person to gain some degree of voluntary control over such bodily functions. It involves the use of instruments that measure functions like electromyography, electroencephalography, pulse, temperature and blood pressure monitors, galvanic skin response, etc. The outcome is thus a measurable relaxation response and a display of mastery over pain by the individual.

### CONCLUSION

Management of persistent pain has to be systematic and involves active participation and cooperation from the suffering individual with the multidisciplinary therapeutic team. Neuropsychiatric management is one component of the multidimensional approach to persistent pain management which is a complex medical condition. The expectations and goals of treatment are in common with the multidisciplinary team. Open communication has to be maintained with the other members of the therapeutic team. The progress towards treatment goals has to be periodically assessed and therapy modified accordingly. When planned end points of therapy are reached the patient is discharged. The therapist should ensure that the patient is well equipped to self-manage his/her condition. There has to be contingency plans for flare ups and other events. Follow up arrangements are made to monitor maintenance of gains and /or development of new problems. Documentation is made of the assessment, follow-up, progress and discharge

outcomes.

### USEFUL WEBSITES

1. National Pain Foundation – <http://www.nationalpainfoundation.org>
2. National Foundation for the Treatment of Pain – <http://www.paincare.org>
3. Chronic Pain Foundation – <http://www.chronicpainfoundation.com>
4. The Mayday Pain Project – <http://www.painandhealth.org>
5. International Association for the Study of Pain – <http://www.iasp-pain.org>

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**Author Information**

**Ramanujapuram Anand, M.B.B.S., D.P.M., M.D. (Neurology), C.S.T. (U.K), F.I.P.S.**  
Consultant Neuropsychiatrist