



AIIMS, Rajkot (Gujarat)
Managing Pain – Beyond Drugs

All India Institute of Medical Sciences, Rajkot



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e – Bulletin

Volume1, Issue 1, February 2023



Published by

Department of Physiology

All India Institute of Medical Sciences (AIIMS), Rajkot

Pain is a very **subjective experience**: what you feel isn't exactly the same as what someone else feels. Defining pain is difficult, then. Because pain almost always has emotional and psychological components (in addition to physical pain), there is no objective test that can quantify the exact degree of pain a person is feeling.

Types of Pain: Acute Pain and Chronic Pain

Pain can be divided into two main types: acute pain and chronic pain.

There's acute pain—short-lasting pain that was caused by, for example, crunching your finger in the car door. The nerves in your finger send a pain message to the brain, demonstrating main purpose of pain: to tell us when something is wrong in our bodies.

The pain signals sent by acute pain are helpful, and typically, acute pain goes away once the cause of the pain has been addressed.



However, pain can be chronic. Pain can linger long after the original injury or nerve damage, and chronic pain is typically defined as pain that lasts more than 6 months.

Pain can also be defined as chronic (or intractable pain) when there's no clear physiologic cause for the lingering pain. In these cases, the body continues to send pain signals even though there is nothing creating the need for the pain signal.

Definition of Pain

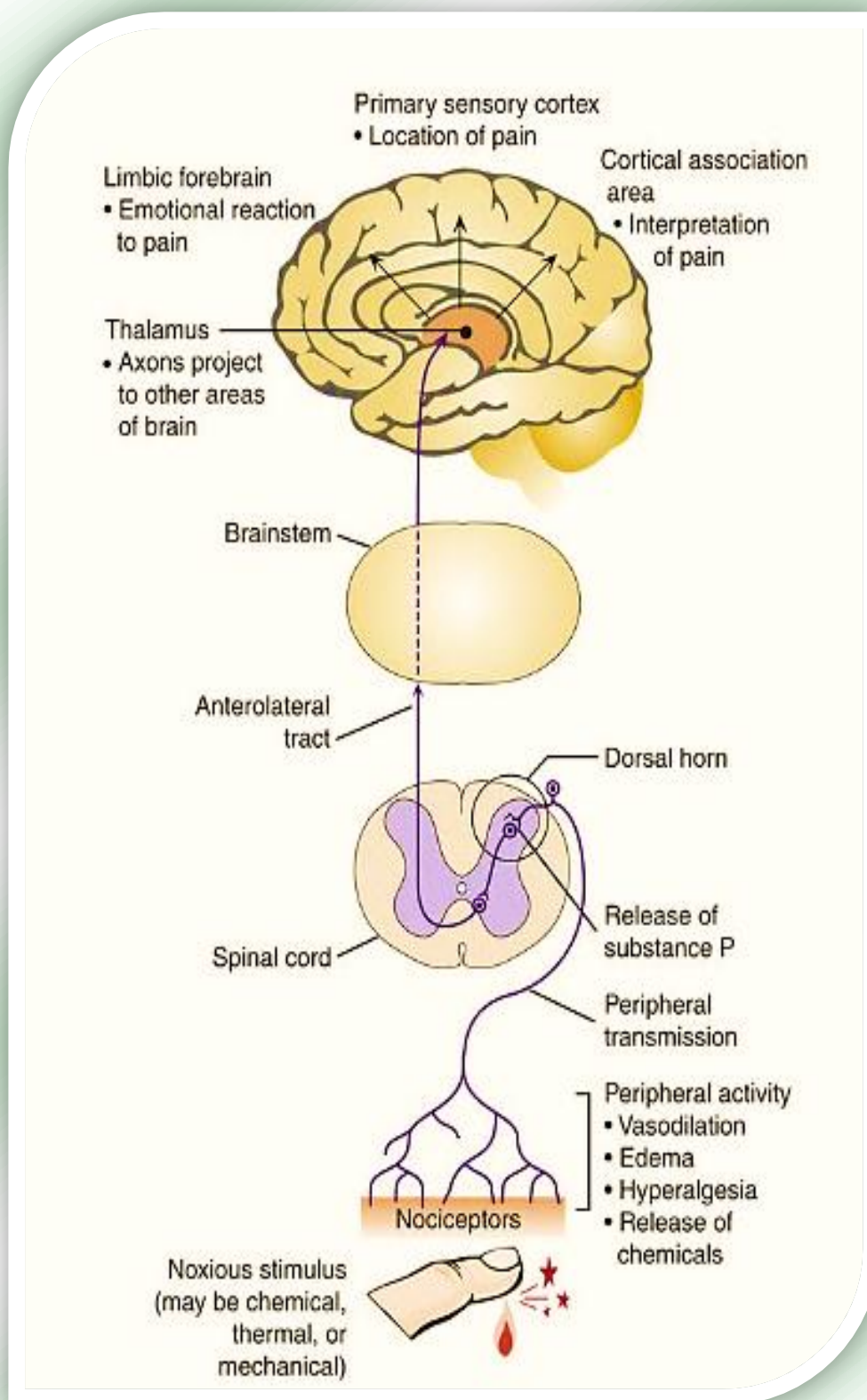
In 1973, the International Association for the Study of Pain (IASP) released a definition of pain that has stood for decades:

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

This broad definition encompasses both acute and chronic pain, and it even addresses the conundrum of chronic pain: it is unpleasant. It does have an emotional side, but there isn't always a known cause. However, it is undeniable that the patient is experiencing pain, even if the medical community can't say why exactly.

The IASP's general definition of pain is helpful, but it's interesting to note that there isn't a widely accepted definition of chronic pain specifically.

❖ How Pain and Pain Signals Work





● **Some Pain Conditions**

Cancer	Opioid Use Disorder/Addiction
Carpal Tunnel Syndrome	Osteoarthritis
CRPS/RSD	Osteoporosis
Diabetic Neuropathy	Plantar Fasciitis
Ehlers-Danlos Syndrome (EDS)	Post herpetic Neuralgia
Fibromyalgia	Insomnia
Gout	Pelvic Pain
hatter Amyloidosis	Psoriatic Arthritis
Low Back Pain	Rheumatoid Arthritis
Lupus	Sickle Cell Disease
Lyme Disease	Thigh Pain
Migraine and Headaches	Traumatic Brain Injuries
Neck Pain	TMJ Disorders

● **Non Pharmacological Treatments for Pain**

Non-pharmacological treatments for pain relief fall into two broad categories: counterirritants (e.g., acupuncture, electrical stimulation, auriculotherapy, and physiotherapy) and mind-body techniques (e.g., cognitive-behavioral therapy, hypnosis, relaxation, and psychotherapy). Among them, acupuncture – a component of Chinese traditional medicine – and electrical nerve stimulation – applied via torpedo fish in premodern times – have been used for several millennia

<p>Heat Its application helps to reduce striated muscle spasm, relax smooth muscles and moves the reflex arcs that inhibit the pain by means of heat receptors and reduces pain by vasodilatation effect. It can be provided by warm blankets, electric heating pads, moist hot packs.</p>	<p>Cold Its application reduces muscle spasm and has longer lasting effect than application of heat. By vasoconstriction effect it causes reduction in inflammation, oedema and bleeding. It can be applied by ice-packs, ice-cubes and cool wash clothes.</p>
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<p>Massage Massage is manipulation applied on the soft tissue with tapotement, friction, percussion, vibration. It activates large diameter fibres (Aβ), inhibits pain messages carried by smaller fibres (Aδ and C fibers), increase endorphins, and causes decreased sensitivity to pain, relieves the mind, muscles and increase the pain threshold.</p>	<p>Exercise Exercise increases the movement, increasing the blood flow, preventing spasm and contractures of the muscles, muscle atrophy, deterioration of bones and joints and relieving the pain following orthopaedic injuries.</p>
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Positioning
 Positioning provided by pillows, special beds and weight lifting, position changes increases blood flow, prevents muscle contraction and spasm and reduces acute pain. It is the most common non- pharmacological method used in post-operative patients.



Restriction of movement/ resting

It can be used for fractures and back injuries patients who need certain bed rest and patients which are in traction.

Mind Body Therapies Relaxation

Relaxation techniques cause an increase in slow brain waves in EEG by decreasing O₂ consumption, blood pressure, respiration amount and pulse rate and prevent the sensitivity developed against the pain. Appropriate for any type of pain which works by reducing muscle tension and anxiety. It can be provided by focusing on respiration and PMR (progressive muscular relaxation) techniques.

Dreaming

Patient is made to focus on stimulant that makes him happy e.g. pattern, sound, colour, light etc. for a short period of time. Pain can be effectively managed by guiding patient to dreaming for more than 4 days.

Yoga

Yoga is useful against musculoskeletal pain because of physical stretching, moves and increasing strength. Applying yoga for 16 weeks has cured the chronic lumbago, reduced functional insufficiency and use of pain killers due to it.

Behavioural Modification

These therapies aim to increase the functional level of the patient, firstly reduce and then completely stop painkiller usage. They teach the patient to avoid the maladaptive behaviour such as remaining motionless, grimacing, moaning and reinforcement of well adaptive behaviour like physical activities.

Bio-feedback

It is aimed to control of physiological reactions such as muscle tension, body temperature, heart rate, brain activity and other vital parameters for symptomatic improvement by mental and physical exercises, visualization and deep breaths. Effective in treatment of many types of chronic pain.

Guided Imagery

This is done by taking attention away from pain by guiding through an imaginary mental image of tastes, sounds, sights, smells and feelings especially for children as imagination is spontaneous and natural for them.

Distraction

It gets the attention away from the pain, decreases its severity and increases tolerance. Small babies can be distracted by use of colourful moving objects, singing songs while pre-schooler can be distracted by telling stories or looking at the books or videos. Watching TV, listening to music, reading books, dreaming are the other methods. Praying.

Praying relieves depression and anxiety that is caused by chronic pain in older people.

Meditation

Meditation is focusing on the moment and the present achieved by focusing on individual's own respiration, a word or picture. It is effective in relieving pain as it helps relaxation. It can last for few minutes to 30 minutes. 8 weeks meditation is useful for relieving the pain of chronic lumbago.

Hypnosis

Hypnosis is the deep physical relaxation state similar to sleep during which subconscious can be reached. It is used for analgesia in chronic pains such as cancer pain and effective in head and neck pain, phantom pain. It has decreased pain and anxiety level in paediatric cancer patients.

Cognitive Behaviour Therapy

These therapies are a part of multimodal approach in pain management, which helps the patient to improve self-esteem and to develop management behaviour against pain. Study stated that they should be applied earlier and before the patient experiences the pain.²⁴

Manual Therapies Prolotherapy

It is proliferation injection therapy, in which non-pharmacological and non-active irritant solution is injected in the region of tendons or ligaments to strengthen connective tissue and alleviating musculoskeletal pain. Examples of such solutions are hyperosmolar dextrose, sodium morrhuate, phenol and glycerine. Indicated in low back pain, knee osteoarthritis, achillestendinopathy, shoulder dislocation, neck strain, costochondritis, plantar fasciitis, lateral epicondylitis, pain from whiplash injury and fibromyalgia.



Chiropractic

It is neck pulling movement causes joint realignment and gentle manipulation used in treatment of the disorders in connective tissues and musculoskeletal system. It relieves the pain with application made on spine and joints which have positive effect on neural system and natural defence mechanisms. 16 Contraindications of this therapy are rheumatoid arthritis, tumours, infections and severe cervical disc hernia.

Reflexology

Pressure applied to reflex points on our feet corresponding to all parts of our body, organs and system causes the stress to be relieved and reduction in pain perception. Pressure is applied by five techniques - compressing move, putting move, rubbing move, thumb move, finger move which is generally deep but not painful. Used for migraine pain, back pain, muscle pain, end stage cancer.

Natural Therapies Herbal Treatment

Herbal medicine is the chemical materials obtained from inside, root, leave, seed and flower parts of the herbs. It is commonly used to treat lumbago and back pains.

Aroma Therapy

The use of scented oils can be relaxing and reduce pain. Study stated that the aroma oils reached the lymph system by means of blood circulation and provided recovery by means of intercellular fluids. Lavender oil is used in treating migraine pain, osteoarthritis, rheumatoid arthritis, lumbago. Eucalyptus, black pepper, ginger, daisy, licorice, rosemary and murrh oils are used in relieving pain.

Hydro Therapy (Balneotherapy)

Hydro therapy is using water for treatment by thermal spring and potable water resources. When it is used with temperature effect, it is known as hydrothermal therapy. Hydrothermal therapy stimulate the immune system, circulation, provides hormones that are suppressing the stress, increases the blood flow, relax the muscles and reduces the sensitivity developed against the pain. Effective while treating back pain and chronic lumbago.

➤ Neurostimulation

Repetitive Transcranial Magnetic Stimulation (rTMS)

It is based on a time-varying magnetic field that generates an electric current inside the skull, where it can be focused and restricted to small brain areas by appropriate stimulation coil geometry and size. Primary motor cortex corresponding to the painful area stimulated by rTMS treated the chronic pain due to trigeminal neuralgia, thalamic pain, brainstem lesion, brachial plexus injury, spinal cord lesion, post stroke, peripheral neuroma operation, cauda equina lesion, central supratentorial lesion. Stimulation of Left Primary motor cortex corresponding to hand area treated pain due to trauma, spinal disc degeneration, arthritis, skull base fracture and crohndisease. When right secondary somatosensory cortex area is stimulated visceral pain due to chronic pancreatitis while stimulation of right dorsolateral prefrontal cortex and left dorsolateral prefrontal cortex treated fibromyalgia and chronic migraine respectively.

Transcranial Direct Current Stimulation (tDCS)

It is based on the application of a weak direct current to the scalp that flows between anode and cathode electrodes. Primary motor cortex corresponding to the painful area stimulated with 2 mA current for 5 sessions of 20 minutes treated chronic pain due to Spinal cord injury.

Acupressure

Physical pressure is applied on selected points of body by fingers, hands, palms, wrists and knees in order to provide internal flow of energy. It reduces back pain, headache, and osteoarthritis, musculoskeletal pain, neck pain, nausea, vomiting and sleeping problem.⁴⁷ It is non-invasive and safe. Both acupuncture and acupressure are component of traditional Chinese medicine.



Acupuncture

Acupuncture has been used in traditional Chinese medicine (TCM) for over 3000 years in combination with herbal medicines, dietary therapy, Tui Na massage, and energy exercises (Tai Chi and Qi Gong). TCM seeks to maintain energy homeostasis within the body and in interaction with the outside world, with the goal not only of maintaining health and preventing disease, but also of treating existing disease. Thus, TCM is suggested as a complementary alternative method to be used in combination with.

Its works by Gate Control Theory of Malzek i.e. effect of sensory stimulant (e.g. chronic lumbago) can be suppressed with another stimulant (pricking a needle) within neural system. It causes production of endorphin, serotonin and acetylcholine within CNS. 46 Effective in cure of patella-femoral pain, rheumatoid arthritis pain post traumatic somatic pain and idiopathic head pain.

Transcutaneous Electrical Nerve Stimulation (TENS)

It is electrical stimulation to the skin to manage the pain. Gate Control Theory is used to define how TENS affects the pain. Thick and rapid transmitting nerve fibres are stimulated artificially with TENS and the pain transmission is tried to be stopped or reduced by electro analgesia method. TENS has reduced the narcotic drugs usage and pain level.¹⁴ Most common use of TENS is for managing acute, chronic and post operative pain with or without pharmacological agents. Study stated that post-operative pain management with TENS has reduced the needed analgesic drug dosage and pain level.

Static Magnets

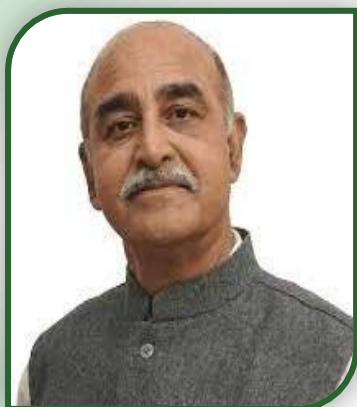
There is no support of evidences for the use of static magnets as pain relieving tool and it cannot be recommended as an effective treatment as stated in the systemic review and meta-analysis.

Bio-field Therapies

Bio-field is defined as energy that surrounds and penetrates the human body. These therapies aim to do modification of the patient's bio-field and thereby stimulating the auto healing response. These therapies include Reiki, Healing touch, Therapeutic touch (TT). A systemic review stated that strong evidence for reducing pain intensity in pain population, moderate evidence for reducing pain intensity in hospitalized and cancer populations and a need for high-quality studies in this area.

Cannabinoids

Efficacy of the cannabinoids like cannabidiol/delta-9-tetrahydrocannabinol (THC) buccal spray has been proved for the treatment of neuropathic pain as in multiple sclerosis in a meta-analysis.



Message from the Executive Director:

I heartily congratulate the Department of Physiology for bringing this informative newsletter on "Managing Pain - Beyond Drugs". My best wishes to the entire team.

Prof. Dr. (Col) CDS Katoch, Executive Director,

Team Physiology, AIIMS Rajkot



Message from HOD

This is an effort to bring forward important information on Pain. This initiative will definitely be useful for medical students, practitioners and all readers. We hope that this e-bulletin will increase your knowledge on Managing Pain.

- Dr. Vivek Kumar Sharma
(Professor and HOD, Department of Physiology)

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