



IJCRR

Vol 06 issue 08

Section: Healthcare

Category: Review

Received on: 05/02/14

Revised on: 02/03/14

Accepted on: 29/03/14

NON-PHARMACOLOGICAL INTERVENTIONS IN ALGIATRY

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ABSTRACT

This review presents and discusses an overview of the emerging non-pharmacological treatment options and strategies for managing pain. When medications are not satisfactory due to various causes e.g. compliance, side effects, cost effectiveness non-pharmacological management of pain comes in to picture. Although these interventions effectively manage pain they are overlooked and underused. If medical person is familiar with these therapies he or she can identify and educate patients who may benefit from it. They are providing effective analgesia, well accepted, simple measures and adjunct to pharmacological therapies. Non-pharmacological pain management utilizes ways to alter thoughts and focus concentration to better manage and reduce pain. These include physical modalities, mind-body therapies, behavioural modification, manual therapies, natural therapies, neurostimulation, static magnets, cannabinoids.

Keywords: Pain, Algiatry, Alternative Therapies, Non-Pharmacological Management.

INTRODUCTION

Decline in the living quality, functional status, daily life activities, working capacity, social interaction, work force have been observed in the painful situations^{1,2,3,4} due to which in addition to the pharmacological treatment options for pain management, today, non-pharmacological treatment options and complementary medical attempts have started to be used.^{5, 6} Many patients still suffer from pain despite of progress in technology and knowledge regarding effective pain management. Medical drugs treat the somatic (emotional and physiological) aspect of pain while non-pharmacological interventions aim to treat affective, cognitive, behavioural and socio-cultural dimensions of the pain.⁷

Non-Pharmacological management of pain

These therapies decrease the stress, anxiety, pain behaviour, feeling of weakness, needed dosage of analgesic drugs thereby decrease the side effects

and improve functional level, individual control feeling.⁸ They affect the pain transmission by Gate Control Theory of Malzek or by the release of natural opioids like endorphins and enkephalin.^{4,5,7}

Non-pharmacological management of pain is described below in nine groups such as physical modalities, mind-body therapies, behavioural modification, manual therapies, natural therapies, neurostimulation, bio-field therapies, static magnets and cannabinoids.

Physical modalities

Beds

Prescribing different mattresses by physicians like fluidized, air, and foam overlays can improve patient comfort as bedding itself often can be wrinkled or irritating. Pillow can improve coughing effort, stabilize a joint, prevent deformity, help a splint and provide psychological support if brought from home.

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.⁹ It can be provided by warm blankets, electric heating pads, moist hot packs.

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.

Massage

Massage is manipulation applied on the soft tissue with tapotement, friction, percussion, vibration. It activates large diameter fibres (A β), inhibits pain messages carried by smaller fibres (A δ and C fibers), increase endorphins, and causes decreased sensitivity to pain, relieves the mind, muscles and increase the pain threshold.⁹

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.¹⁰

Positioning

Positioning provided by pillows, special beds and weight lifting, position changes increases blood flow, prevents muscle contraction and spasm and reduces acute pain.¹¹ It is the most common non-pharmacological method used in post-operative patients.¹²

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.⁹ 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.

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.¹³

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.⁹ Pain can be effectively managed by guiding patient to dreaming for more than 4 days.¹³

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 preschooler 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.¹⁴

Praying

Praying relieves depression and anxiety that is caused by chronic pain in older people.^{9,15}

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.¹⁶ It can last for few minutes to 30 minutes.^{16,17} 8 weeks meditation is useful for relieving the pain of chronic lumbago.¹⁸

Yoga

Yoga is useful against musculoskeletal pain because of physical stretching, moves and increasing strength.¹⁹ Applying yoga for 16 weeks has cured the chronic lumbago, reduced functional insufficiency and use of pain killers due to it.²⁰

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.^{7,21} It has decreased pain and anxiety level in paediatric cancer patients.²²

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.²³

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

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.²⁵ Effective in treatment of many types of chronic pain.^{26,27}

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.^{28,29}

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.^{9,30,31}

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.⁸ Pressure is applied by five techniques - compressing move, putting move, rubbing move, thumb move, figure move which is generally deep but not painful. Used for migraine pain, back pain, muscle pain, end stage cancer pain, side effects of chemotherapy.^{32,33,34,35,36}

Natural Therapies

Herbal Treatment

Herbal medicine is the chemical materials obtained from inside, root, leave, seed and flower parts of the herbs.⁹ It is commonly used to treat lumbago and back pains.^{16,37}

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.³⁰ 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.²⁴

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.⁹ Effective while treating back pain and chronic lumbago.^{37,38}

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.^{39,40} Stimulation of Left Primary motor cortex corresponding to hand area treated pain due to trauma, spinal disc degeneration, arthritis, skull base fracture and Crohn's disease.⁴¹ When right secondary somatosensory cortex area is stimulated visceral pain due to chronic pancreatitis⁴² while stimulation of right dorsolateral prefrontal cortex and left dorsolateral prefrontal cortex treated fibromyalgia and chronic migraine respectively.^{43,44}

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.⁴⁵

Acupuncture

It works by Gate Control Theory of Melzack 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.¹⁷

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, 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.

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.⁴⁸ 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.⁴⁹ 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.⁵⁰

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.⁵¹

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 metaanalysis.⁵²

Cannabinoids

Efficacy of the cannabinoids like canabidiol/delta-9-tetrahydrocannabinol (THC) buccal spray has been proved for the treatment of neuropathic pain as in multiple sclerosis in a metaanalysis.⁵³

CONCLUSION

As a result, with the combination of pharmacological and non-pharmacological therapies the pain can be managed in a more effective manner. These techniques must be encouraged as a part of the comprehensive pain management efforts. They should be included to the care plan when patient is appropriate and willing, together with medical and pharmacological treatments. We need more study results that support the efficiency of these methods.

ACKNOWLEDGEMENT

Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

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