



**Research Article**

**THE THERAPEUTIC APPROACH FOR PAIN**

**Parul Sharma\*<sup>1</sup> and Vinika Chaudhary<sup>2</sup>**

<sup>1</sup>Delhi Pharmaceutical Science and Research University, New Delhi

<sup>2</sup>Department of Physiotherapy, Amity University, Uttar Pradesh

**ARTICLE INFO**

**Article History:**

Received 6<sup>th</sup> February, 2018  
Received in revised form 20<sup>th</sup>  
March, 2018 Accepted 8<sup>th</sup> April, 2018  
Published online 28<sup>th</sup> May, 2018

**Key words:**

The therapeutic approach for pain

**ABSTRACT**

**Introduction:** Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. Physiotherapists work across the lifespan continuum assisting patients with their pain with the aim of diminishing pain, improving quality of life where possible and preventing acute and sub-acute painful conditions developing into chronic pain.

**Objective:** To study about the role of physiotherapy in management of pain associated with several musculoskeletal and neurological disorders.

**Methods:** Various articles were taken from pubmed, science direct data base, google scholar, research gate etc and also based on evidence-based guidelines, systematic reviews of the literature and supplementary findings from recent high quality trials.

**Results:** Management techniques such as manual therapy ( massage, soft tissue release , myofascial release), Laser therapy, iontophoresis, ultrasound, transcutaneous electrical stimulation, hydrotherapy, cryotherapy, strengthening and stretching exercises and psychological approaches including relaxation therapy and behavioural therapy approach were also used to help restore physical activities and improve the quality of life for people who have chronic pain conditions by encouraging them to learn how to manage their pain and any disability on a day-to-day basis.

**Conclusion:** The integration of multiple treatment modalities, including behavioral modification therapy, has resulted in considerable improvements for patients suffering from acute and chronic pain in terms of a reduction in the use of medications, improved functional ability, increased likelihood of returning to work, improved quality of patient care and patient satisfaction, as well as reducing healthcare costs .

Copyright©2018 Parul Sharma and Vinika Chaudhary. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**INTRODUCTION**

Pain is a subjective experience with no objective measures. It is being described as an unpleasant feeling that is an essential component of the body's defense system. It provides a rapid warning to the nervous system to initiate a motor response to minimize physical harm.[1] Pain is associated with degenerative joint disease, spinal stenosis, fractures, pressure ulcers, neuropathic pain, urinary retention, post-stroke syndrome, fibromyalgia, cancer pain, contractures, post herpetic neuralgia, oral/dental sources, constipation, improper positioning etc.[2] Psychosocial factors include pre-morbid status or mental illnesses, personality styles, coping strategies, defense mechanisms, and emotional reactions to disability. Others include spirituality, values, environment, adjustment, cognitive abilities, motivation, family, social supports, life roles, and educational level. All of these factors can affect patients and treatment outcomes.[3]

\*Corresponding author: **Parul Sharma**  
Delhi Pharmaceutical Science and Research University, New Delhi

**Classification of pain:** Pain is classified to guide assessment and treatment. The common types of pain include:

**Nociceptive:** It represents the normal response to noxious insult or injury of tissues such as skin, muscles, visceral organs, joints, tendons, or bones. It includes Somatic such as musculoskeletal (joint pain, myofascial pain) or cutaneous and Visceral such as hollow organs and smooth muscle usually referred.

**Neuropathic:** In this pain is initiated or caused by a primary lesion or disease in the somatosensory nervous system. This pain is characterized by sensory abnormalities such as numbness to hypersensitivity, and to paresthesias such as tingling. Examples such as: diabetic neuropathy, spinal cord injury pain, phantom limb (post-amputation) pain and post-stroke central pain.

**Inflammatory:** It is a result of activation and sensitization of the nociceptive pain pathways by mediators such as proinflammatory cytokines such IL-1-alpha, IL-1-beta, IL-6 and TNF-alpha released by infiltrating leukocytes, vascular endothelial cells, or tissue resident mast cells at a site of tissue

inflammation. Examples include appendicitis, rheumatoid arthritis, inflammatory bowel disease, and herpes zoster.

**Physiology of Pain:** The major components of the brain systems involved in processing pain-related information. There are four major processes: transduction, transmission, modulation, and perception.

- Transduction refers to the processes by which tissue-damaging stimuli activate nerve endings.
- Transmission is to the relay the functions by which the message is passed from the site of tissue injury to the brain regions underlying perception
- Modulation is a neural process that acts specifically to reduce activity in the transmission system.
- Perception is the subjective awareness produced by sensory signals; it involves the integration of many sensory messages into a coherent whole. [4]

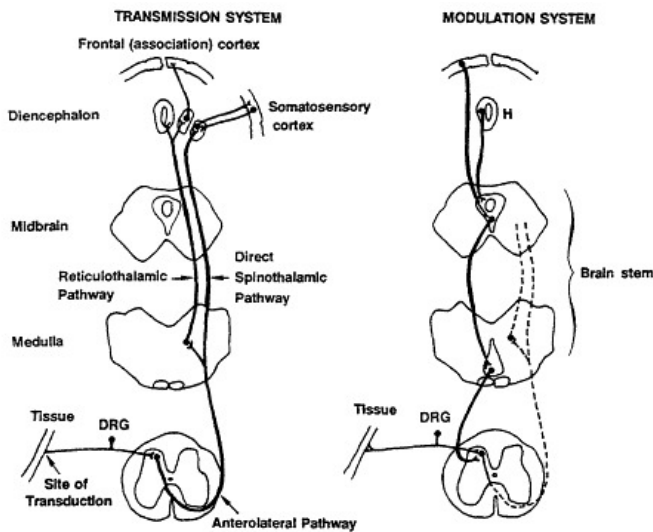


Figure 1 Diagrammatic outline of the major neural structures relevant to pain.

The sequence of events leading to firstly pain perception starts in the transmission system simultaneously with transduction (lower left) system, in which a noxious stimulus produces afferent nociceptor impulses. These impulses are conducted to the spinal cord, where the afferent nociceptors contact the central pain-transmission cells. These cells relay the pain information either through the spinothalamic tract or the reticular formation to the thalamus. From the thalamus, the message is passed to the cerebral cortex. (DRG: dorsal root ganglion). The pain-modulation system has inputs from the frontal association cortex and the hypothalamus (H). The outflow is through the midbrain and medulla to the dorsal horn of the spinal cord, where it inhibits pain-transmission cells, therefore, reducing the perceived pain.

**Assessment of Pain:** Pain assessment should be individualized and properly documented so that all involved in the patient's care understand the pain problem. Using the WILDA approach ensures that the 5 key components to a pain assessment are incorporated into the process. [5]

**PAIN ASSESSMENT GUIDE**

**TELL ME ABOUT YOUR PAIN**

**W**ords to describe pain

aching	throbbing	shooting
stabbing	gnawing	sharp
tender	burning	exhausting
tiring	penetrating	nagging
numb	miserable	unbearable
dull	radiating	squeezing
crampy	deep	pressure

**Pain in other languages**

itami	Japanese	dolor	Spanish
tong	Chinese	douleur	French
dau	Vietnamese	bolno	Russian

**I**ntensity (0-10)  
If 0 is no pain and 10 is the worst pain imaginable, what is your pain now? ... in the last 24 hours?

**L**ocation  
Where is your pain?

**D**uration  
Is the pain always there?  
Does the pain come and go? (Breakthrough Pain)  
Do you have both types of pain?

**A**ggravating and Alleviating Factors  
What makes the pain better?  
What makes the pain worse?

**How does pain affect**

sleep	energy	relationships
appetite	activity	mood

**Are you experiencing any other symptoms?**

nausea/vomiting	itching	urinary retention
constipation	sleepiness/confusion	weakness

**Things to check**

vital signs, past medication history, knowledge of pain, and use of noninvasive techniques

**Screening of pain:** A screen for pain will be initiated on first contact and should include:- Past Medical History, Location, Intensity, Quality, Onset, duration variations and rhythms (mechanism of injury), Manner of expressing pain, Methods of reducing pain including pharmacological/non-pharmacological.

Factors that cause or increase the pain experience

- Effects of pain on function
- Coping strategies
- Psychosocial factors. [6]

**Objective Measures of Pain in Physiotherapy**

There are number of assessment tools are available to measure the intensity, the duration, frequency, location and description of the pain. It should also become a part of the ongoing assessment. Typically, the therapist will assess these elements to determine the efficacy of the treatment.

- A numeric rating scale (NRS) asks patients to rate pain from 0 (no pain) to 10 (worst possible pain).
- Another tool is to use visual symbols indicating the degree of pain such as the Wong-Baker FACES® Pain Rating Scale.
- Using a visual analog scale (VAS) for pain, patients are asked to note their pain intensity - such as placing a line on the scale -- between two verbal descriptors, e.g., no pain and worst possible pain. Then a ruler is used to measure the distance between no pain and the patient's line. [7]

**Pain history and presentation:** This includes observation during and after the evaluation.

- Neural tissue tension testing involves a pressure and stretch to determine the glide of the peripheral nerve trunk and assess possible restrictions along its course.
- Functional assessment is probably the most important element that a physiotherapist needs to include in a patient's assessment; the impact that pain has on the

person's functional abilities can uniquely be addressed by a physiotherapist. The patient's inability or difficulty to perform Activities of Daily Living (ADLs) must be the cornerstone of the patient evaluation.

### **Pain Management**

A pain management programme is a specialist rehabilitation approach by health care providers including physiotherapists, occupational therapists and psychologists for groups of patients.[8] Physiotherapy is a vital aspect of pain management for a wide range of conditions. Many pain management strategies, such as medication or intervention techniques, will provide only temporary relief of symptoms. Our goal is to provide a long-term solution to your pain by addressing the underlying cause. For this reason it is recommended that physiotherapy should be given in conjunction with other appropriate pain management techniques.

Physiotherapists attempt to utilise a combination of strategies to bring pain relief to their patients. They know that pain is not only subjective, but an objective experience.

**Physical** – this involves directing the treatment interventions to the physiological and anatomical aspects. Healing the tissue that was damaged due to injury, disuse, etc. is the main focus. This is often the target for relief in acute pain that is due to a very recent injury or recurrent and repetitive physiological stress. Such physical interventions are often passive and the effect may be limited to a short duration.

**Cognitive** – are typically based on suggestions from the clinician that encourage the patient's active participation in the healing process. This is often used in chronic pain patterns that cannot break the cycle of pain a disability/disuse pain. This must be initiated by the patient as it focusses on addressing the patient's perception of pain and its resulting limitations.

**Behavioural** – changes on part of the patient are probably the most effective methods to bring about long term pain relief. Exercises, biofeedback, relaxation techniques, etc. are examples. There is a learning period where the patient is trained to perform these methods and when trained is able to perform them independently.[9]

Physical therapy modalities include pain relieving modalities like hot and cold packs, ultrasound, short wave diathermy, low frequency currents (TENS, diadynamic currents, interferential currents), high voltage galvanic stimulation, laser and neurostimulation techniques like deep brain stimulation and transcranial magnetic stimulation alongwith manual therapy. Commonly used physical agents in physiotherapy are heat, electricity, light, sound, and cold. Most of these agents are used to improve the lymphatic and blood circulation to the area due to a local vasodilation effect and possible muscle relaxation.[10]

**Cryotherapy (cold therapy):** cold produces vasoconstriction with vasodilatation following reflexively; it causes decreased local metabolism; and it minimizes enzymatic activity and the subsequent demand for oxygen. [11] Cold diminishes muscle spindle activity as well as slowing nerve conduction velocity. As a result, cold is commonly used for pain control and decreasing muscle spasticity and muscle guarding. [12] Based on these various physiological effects, cryotherapy is most commonly used during the first 48 h of acute musculoskeletal

injuries such as sprains, strains and contusions. [13] Use beyond the acute phase is justified for continued pain control, muscle re-education and control of swelling when utilized with compression. [14] Contraindications for cryotherapy include ischaemia, cold intolerance, Raynaud's phenomenon, cold allergy, inability to communicate and insensate skin. [15] Care must be taken when using cold therapy over nerves due to the potential development of neuropraxia (conduction block). Recommendations to minimize this complication include limiting ice application to less than 30 min and protecting any peripheral nerves in the region. [16]

Ice packs, iced compression wraps, slushes, ice massage, ice whirlpools, contrast baths and vapocoolant sprays are some methods of cold application.

**Therapeutic heat modalities:** As heat is applied to a body surface, circulatory changes occur which include vasodilatation of the arterioles and capillaries. As a result of increased metabolic tissue demands, there is a subsequent increase in blood flow with the arrival of various leucocytes, improved delivery of oxygen, increased capillary permeability and hyperaemia. Additional physiological effects include pain control through the removal of pain-causing inflammatory substances such as bradykinins, prostaglandin and histamine substrates due to increased blood flow. Heat also acts directly on free nerve endings and provides muscle relaxation by decreasing the muscle spindle's sensitivity to stretch via the gamma system. Inhibitory pathways can be activated by the use of heat modalities with subsequent muscle relaxation. Central processes may also provide for sedation and decreased pain awareness. Thus, therapeutic heat assists in altering the pain-muscle guarding (spasm) cycle. [17] One of the most useful therapeutic effects of heat includes improved collagen flexibility, especially when accompanied by prolonged stretching, as well as a subjective decrease in joint stiffness. Based on the physiological effects of therapeutic heat, indications for heat modalities with specific attention to the injured athlete include pain, muscle spasm, contracture, bursitis and tenosynovitis. Contraindications for heat include peripheral vascular disease, bleeding diathesis, malignancy, acute trauma, sensory deficits or in patients that are unable to communicate about their sensation of pain. [15]

The more commonly used modes for superficial heat are hydrocollator packs, whirlpools, contrast baths, infrared lamps, paraffin baths, fluidotherapy and moist air. The deep heating agents include ultrasound and phonophoresis. Shortwave, microwave diathermy and Radiant heat are not used much anymore.

**Therapeutic electricity:** The use of therapeutic electricity dates back many centuries. One of the earliest accounts of the use of electricity for a musculoskeletal problem occurred in 1747 when a man with rheumatoid arthritis and involvement of the small joint in his hands received marked relief of his pain symptoms through the use of electricity. [18] Today, different forms of therapeutic electricity are used in the treatment of musculoskeletal and sports injuries. Electric currents are used to promote healing of injured tissue, to stimulate muscles, to stimulate sensory nerves in treating pain or to create an electrical field on the skin surface to drive ions beneficial to the healing process into or through the skin.

Action mechanisms of electrotherapy have been suggested to be local release of neurotransmitters such as serotonin, raised

levels of ATP, release of endorphine and its own anti-inflammatory effects. Dorsal column activation is another mechanism of electrotherapy. It has been shown that low frequency currents increase microcirculation and endoneural blood flow. Electrotherapy can also be effective in correcting the disrupted microcirculation in diabetic polyneuropathy and increase oxidative capacity in muscles via metabolic effect. [10]

Contraindications of electrical therapy include stimulation over cardiac pacemakers, electrical implants, carotid sinus, epiglottis, abdomen and gravid uterus. [15] Treatment should be avoided over any area that is anaesthetic to avoid local burns. Recent scars in the area to be treated should also be avoided because of the potential for wound dehiscence. Any area where metal is embedded close to the skin in the area to be treated should be avoided for fear of concentrating the heat source at the metal surface. Any form of electricity should be avoided near an area of acute injury if active bleeding is still present to prevent worsening of the haemorrhage.

The various forms of therapeutic electricity include TENS, muscle electrical stimulation (HVPGS), percutaneous electrical nerve stimulation, iontophoresis, interferential current, and diadynamic currents. Neurostimulation techniques including transcranial magnetic stimulation (TMS) and cortical electrical stimulation (CES), spinal cord stimulation (SCS) and deep brain stimulation (DBS) have also been found effective in the treatment of neuropathic pain. [10]

**Laser:** Laser is another physical therapy agent that can be used in the treatment of pain. Laser causes release of some chemicals like ACTH and beta-endorphins, reduction of prostaglandin E and SOD activity, balance of intra-extra cellular activities and accelerates ATP and collagen synthesis. Laser is contra indicated over eyes, cancerous lesions, pregnancy, pacemakers, thrombosis and photochemical drugs. [10]

**Traction:** Traction is the technique in which a distractive force is applied to a part of the body to stretch soft tissues and to separate joint surfaces. [19] The main reason for its use is relief of pain. Pain relief may occur through one of several mechanisms, including rest through immobilization, distraction of the joints and associated improved nutrition to the articular cartilage, tightening of the longitudinal ligament and decreasing the intradiscal pressure. The last two both press a bulging disc more centrally, relieving nerve root pressure via increasing the foraminal diameter, improving head posture, and elongating muscles to improve blood flow and reduce spasm. Contraindications to the use of spinal traction include an unstable spine, ligamentous instability, vertebrobasilar artery insufficiency, atlantoaxial instability, rheumatoid arthritis, osteomyelitis, discitis, neoplasm, severe osteoporosis, untreated hypertension, severe anxiety, cauda equina syndrome and myelopathy. [20]

#### **Manual therapy**

**Massage:** This improves local circulation from the mechanical forces on the treatment surface area and may also elicit the pain gating mechanism at the spinal cord level. [21] Contraindications for massage include dermatological conditions, acute infection or thromboembolism.

**Myofascial release:** It is another specialised manual therapy technique that works on the release of trigger and tender points with realigning the fascia layers. [22]

**Joint mobilization:** It is one of the most commonly used manual therapy technique by physiotherapists. It requires proper guidance and controlled passive oscillations in specific directions and amplitude, collagen fibres in the joint and surrounding areas are loosened. This produces pain relief and regains joint mobility to improve function. Based on the amplitude and force applied, mobilisation is characterised from Grade I to V. It is contraindicated in patients that may have osteoporosis, malignancy, vascular disease, acute infection in the area treated, etc. [9]

**Cognitive therapy** includes treatment strategies focused on emotional, behavioral or mental dysfunction and helps in removing negative symptoms such as anxiety or depression, modify or reverse problem behaviours, thereby improving the positive feelings and self confidence. It helps the individual cope with situational crises such as bereavement, pain, or prolonged medical illnesses, improve the individual's relationships, manage conflict or enhance positive personality growth and development. The use of CBT is gradually increasing in neuropathic pain. Especially in elderly patients, relaxation techniques, the accurate planning of activity-rest cycles, cognitive reconstruction, meditation and distraction techniques can be used. [23]

**Behavioural therapy** aims to decrease pain and amount of medication, improve dysfunction, increase quality of life and physical activity and bring the patient's self-esteem back. The major parts of rehabilitation methods are therapeutic exercise, biofeedback and relaxation techniques.

**Therapeutic Exercises:** Many kinds of therapeutic exercises have already been used in the rehabilitation program such as conditioning, strengthening and stretching exercises to improve mobility, muscle strength, muscle tone and improve range of motion. Aerobic exercises may also be incorporated to improve endurance level of cardiovascular system. One of the other desirable effect of sufficient intensity of exercise is the release of betaendorphin levels which can help alleviate pain and improve mood. [9]. An intelligently designed exercise programme that is prescribed to the patient, with the patient's needs and lifestyle in mind, should become the cornerstone of a pain management programme.

**Relaxation therapy:** It is a process that focuses on using a combination of breathing and muscle relaxation in order to deal with stress. Relaxation therapy is useful in decreasing anxiety, autonomic hyperactivity and muscle tension. Progressive muscle relaxation, imaging, controlled breathing or listening to relaxed music therapy have been started to be used in chronic pain.

**Mirror therapy:** Mirror therapy and graded motor imagery are rehabilitation procedures developed with the hope of correcting this disorganization and thus decrease the pain. Mirror therapy is one of the rehabilitation methods that is widely used in patients suffering from neuropathic pain. It is been used in patients with stroke, phantom limb pain and complex regional pain syndrome (CRPS) and found effective in increasing upper extremity functionality. [24]

## CONCLUSION

Physiotherapy must be started as early as possible to minimise pain, stiffness, contractures and deformities. Ergonomic guidance must be followed regularly. Follow up is equally important specially for chronic spinal and arthritis pain. Exercises should be done under the guidance of qualified Physiotherapist and progressive exercises to be given as patient improves. Standardised outcome measures, both functional and self-report, that are currently in widespread use in pain management centres should be advocated for broad clinical use to effectively measure outcomes and provide a benchmark for management. Support for ongoing professional development and career structure should be put in place, and ongoing research for the physiotherapy management of people with chronic pain should be better supported by funding bodies to ensure best evidence-based practice.

## References

1. Kumar KH, Elavarasi P, *Definition of pain and classification of pain disorders. J Adv Clin Res Insights*: 2016;3, 87-90.
2. Shah, S. A., *Pain Management in the Elderly*. The American Geriatrics Society: 2017.
3. Leslie NR, *Chronic Pain*. In: Susan BO, Thomas JS, George DFeditors. *Physical Rehabilitation 6e* New York.
4. Osterweis M, *Pain and Disability: Clinical, Behavioral, and Public Policy Perspectives, the anatomy and physiology of pain*, 1987.
5. Fink R., *Pain assessment: the cornerstone to optimal pain management*. Proc (Bayl Univ Med Cent). 2000;13(3):236-9.
6. Rehab Complex Musculo Skeletal Best Practice Team, *Rehabilitation Standards: Pain*, Functional Standard Number 1, Effective Date: September 2005.
7. Martin D, *Clinical Solutions*, Pain Assessment and Management in Long-Term Care, March 2017.
8. *Chronic pain*, chartered society of physiotherapy, 4 may 2017.
9. Saroj MS. *Role of Physiotherapy in Pain Managemen*. Supplement to jornal of the association of physicians of India: 2015; 32-35.
10. Akyuz G, Kenis O, *Physical Therapy Modalities and Rehabilitation Techniques in the Treatment of Neuropathic Pain. Int J Phys Med Rehabil* 2013; 1: 124. doi:10.4172/jpmr.
11. Lehmann, J. & de Lateur, B., *Cryotherapy. In: Therapeutic Heat and Cold*. Williams & Wilkins, Baltimore, 1982a; 563-602
12. Chambers, R., *Clinical uses of cryotherapy. Physical Therapy*, 1969; 49, 245-249.
13. Grana, W., Curl, W. & Reider, B., *Therapeutic Modalities for Sport Injuries*. Year Book Medical Publishers, Chicago: 1986; 25-31.
14. Quillen, W. & Rouillier, L., *Initial management of acute ankle sprains with rapid pulsed pneumatic compression and cold. Journal of Orthopaedic and Sports Physical Therapy* 1982;4, 39-43.
15. Basford, J., *Physical agents*. In: *Rehabilitation Medicine: Principles and Practice*, 3rd ed. Lippencott-Raven, Philadelphia: 1998; 483-520
16. Drez, D., Faust, D. & Evans, J. *Cryotherapy and nerve palsy. American Journal of Sports Medicine* 1981; 9, 256-257.
17. Fountain, F., Gersten, J. & Sengir, O., *Decrease in muscle spasm produced by ultrasound, hot packs, and infrared radiation. Archives of Physical Medicine and Rehabilitation*, 1960; 41, 293-298.
18. Licht, S., *History of electrotherapy*. In: *Therapeutic Electricity and Ultraviolet Radiation*, 3rd edn. Williams & Wilkins, Baltimore: 1983; 1-64.
19. Hinterbucher, C., *Traction. In: Traction and Massage, 3rd edn*. Williams & Wilkins, Baltimore: 1985; 17-200.
20. Rechtein, J., Andary, M., Holmes, T. & Wieting, M., *Manipulation, massage, and traction*. In: *Rehabilitation Medicine: Principles and Practice*, 3rd edn, Lippencott-Raven, Philadelphia: 1998; 521-552.
21. Krusen F, Kottke FJ, Ellwood PM, *Handbook of physical medicine and rehabilitation*, 2 edn., Philadelphia: WB Saunders 1971.
22. Barnes J., *MFR: a comprehensive evaluatory and treatment approach*, 1 edn., Paoli PA: MFR Seminars, 1990.
23. Turk DC, Audette J, Levy RM, Mackey SC, Stanos S., *Assessment and treatment of psychosocial comorbidities in patients with neuropathic pain. Mayo ClinProc*: 2010; 85: S42-50.
24. Lee MM, Cho HY, Song CH., *The mirror therapy program enhances upper-limb motor recovery and motor function in acute stroke patients. Am J Phys Med Rehabil*: 2012; 91: 689-696, quiz 697-700.

### How to cite this article:

Parul Sharma and Vinika Chaudhary (2018) 'The Therapeutic Approach For Pain', *International Journal of Current Advanced Research*, 07(5), pp. 12414-12418. DOI: <http://dx.doi.org/10.24327/ijcar.2018.12418.2182>

\*\*\*\*\*