

## PERSPECTIVE

## PAIN MEDICINE

# Rehabilitation medicine as an integral part of pain medicine

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**Editorial note:** Pain management is rapidly expanding field of medicine, and it now boasts to have overlapped almost every other medical specialty. A good pain specialist needs to understand the pathogenesis of every single pain condition, which he or she might come across. Only then he might be able to address the route-cause and thus offer comfort to his patients. Apart from medicine and surgery, a pain specialist must have fair knowledge about radio-diagnostics, rehabilitation and physiotherapy, human psychology and psychiatry as well as complimentary medicine. To draw the attention of our emerging pain specialists, the current topic was offered to the renowned Turkish author Özge BAYKAN ÇOPUROĞLU, which she happily accepted. The editorial board acknowledges her contribution with thanks and gratitude.

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Physical therapy and rehabilitation practices have comprehensive approaches to evaluating and managing acute and chronic pain conditions. Rehabilitation medicine evaluates each patient's functionality according to the World Health Organization's international classification of functionality, disability and health. The purpose is to determine and treat psychosocial factors that affect activity and participation restrictions in addition to disorders.<sup>1</sup>

Treatment programs often include exercise, physiotherapy modalities, electrical stimulation, cognitive and behavioral treatments, and certain manual therapy techniques. The treatment programs generally focus on the cause for acute pain as well as chronic pain; however, chronic pain programs also include multidisciplinary rehabilitation.<sup>2</sup>

## 1. Physiotherapy Modalities

Modalities are methods used for therapeutic purposes with energy exchange in tissues. Passive methods such as heat, cold, sound waves, electric currents, and electromagnetic waves may include affecting structures such as muscles, fascia, ligaments, tendons, joint capsules, and nerve tissue. The modalities are included as adjunctive therapy in the rehabilitation program and are rarely used alone. Especially in the treatment of acute pain, they are the most effective methods.<sup>3</sup>

Nociceptive modulation is used to decrease the perception of pain by reducing the passage of pain stimuli through the dorsal root ganglion. Rehabilitation techniques use hot-cold or low-to-moderate sensory input for nociceptive modulation to reduce the perception of pain. This is based on the gate control theory of Melzack and Wall.<sup>4</sup>

### Heat and Cold

The literature stated that heat and cold have significant effects. Metabolic and enzymatic processes, nerve conduction, and blood flow can accelerate and slow down temperature changes between 3 and 7 °C. It can have local or systemic effects.

In systemic effects, body temperature can vary between 0.3-0.4 °C with the immersion of the whole body. Ice application can reduce the intra-articular temperature by 6 degrees. Although warming agents vary, most are used to provide hyperemia and analgesia, as well as to reduce muscular tonus. Although cold agents reduce perfusion, they can be used for their analgesic and tonus-reducing effects.<sup>5</sup>

### Electrical Stimulation

Electrical stimulation has a wide range of applications, including muscle reeducation, strengthening, pain control, and healing. Particularly TENS is used for analgesic purposes. Additionally, as iontophoresis can

be applied together with drugs, it is suitable for the analgesic application.

### a. Transcutaneous electrical nerve stimulation

The most common method for modulating nociception is transcutaneous electronic nerve stimulation (TENS). Its mechanism is based on the gate control theory, endogenous mechanism, and stimulation of opioids. Nerve fibers in the skin are stimulated by using electrodes. High-frequency, low-intensity stimulation is better tolerated by individuals and results in immediate analgesia. Stimulations that produce longer-lasting analgesia are low-frequency, high-intensity patterns and cause more discomfort. Stimulation parameters in TENS units used in clinics are amplitude 1-80 mA, frequency 1-150 Hz, and wave width up to 300 µsec. Asymmetrical, biphasic waves are more easily tolerated by patients and there are no iontophoretic effects seen in unidirectional currents. Conventional TENS is the most widely used type. It gives a high frequency, short current transition time and low amplitude warning. Its frequency should generally be 60-80 Hz, current transit time 50-100 µsec, and amplitude intensity 10-30 mA without causing contractions and mild tingling without causing excessive discomfort.<sup>6</sup>

### b. Iontophoresis

It is a method of subcutaneously transferring chemical ions dissolved in water through the skin to the area to be treated locally, via galvanic current and with low-intensity current intensity. The advantage of this application; is to apply directly to the target tissue. In addition, since the ions used in small doses are local applications, they do not affect the body systemically. Therefore, its interaction with other drugs used and its side effects are minimal. It has been reported in different studies that the range of motion of the joint is increased and the pain and inflammation are reduced with the application of iontophoresis.<sup>7</sup>

### c. Deep Brain Stimulation (DBS)

It is a treatment method applied by placing electrodes to stimulate brain structures. It uses non-invasive brain stimulation techniques of *repetitive transcranial magnetic stimulation* (rTMS) and *transcranial direct current stimulation* (tDCS), with an electrode placed on the scalp to stimulate the cortex with electromagnetic force.

In patients experiencing both fibromyalgia and neuropathic pain, there is evidence of reduction in pain when applied to the motor cortex for repetitive sessions lasting 20 min or more. A few side effects were seen with both techniques, such as discomfort at the stimulation site and headache during application.<sup>8</sup>

## 2. Rehabilitation Program

A personalized treatment program for musculoskeletal injuries aims to restore soft tissue flexibility and improve muscle weakness and endurance. Patient education should definitely be done and this education should include postural corrections, information about body biomechanics and proprioception. The patient should be informed about the protection of the injured tissue in the acute period. Modalities can be used to control symptoms and reduce edema.

Manual therapy techniques can help reduce muscle tone and pain with mechanoreceptor activation in support of the controlled movement in the early period. Manual techniques such as massage, facial stretching, traction, and joint mobilization should aim to increase soft tissue flexibility during recovery and reconstruction. In addition, mobilization is used to make movement easier in some joints or parts of the joint. These techniques should not be repeated frequently, as long-term passive therapy puts the patient in a dependent position. Rehabilitation must be prepared, reorganized, and designed to handle pain. While training the posture, the exercises progress from easy to difficult.

During the prevention phase, a program should be designed to maintain gains and prevent re-injury. The patient should be able to independently perform the exercise program at home.<sup>9</sup>

### Therapeutic Exercise

Exercise is a very important tool used for chronic pain. Although many different exercise approaches are used, the purpose of all of them is generally to enhance flexibility, strength, and movement. Regularly performed moderate-intensity aerobic exercises play a role in reducing chronic pain by increasing the production of endogenous opioids, which are important in pain modulation.<sup>10</sup> Biomechanics and ergonomics education suitable for daily life activity or sports activity is an important part of the rehabilitation program.

### Therapeutic Massage

It is one of the oldest and simplest methods of treating musculoskeletal injuries. The classical massage technique is the most frequently applied by physiotherapists. Movements such as stroking, kneading, friction, percussion and shaking on the skin of the effected muscle are applied in the direction of blood flow towards the heart. It is effective in reducing pain due to spasm by increasing circulation in the tissue and providing general relaxation.<sup>11</sup>

### Myofascial Release Techniques and Trigger Points

Myofascial pain often occurs in the upper back and affects millions of people. Tenderness on palpation is associated with areas of increased tonus and smaller areas of tenderness. The myofascial release technique, which is applied directly or indirectly to the fascia, increases the distance between the muscle fibers and increases the elasticity of the tissue. Muscle tone is regulated through the neuromuscular system. It is a practical, simple and effective treatment method for pain caused by muscle spasms.<sup>12</sup>

### Neuroscience Education

Neuroscience Education (NE) is a new treatment technique based on explaining the pain experience to a patient, thus aiming to reduce pain and disability. The pain specialists have been advocating the importance of teaching people how to live well with pain. It reconsiders the possibility that we can help people live well without suffering. According to the biopsychosocial model, psychosocial factors are among the risk factors for the development of pain. Current research recommends cognitive and behavioral treatments with conventional treatments for pain management to control comorbid psychosocial factors and improve long-term outcomes for patients. Essentially, patients should be convinced that the source of their pain is hypersensitization of the central nervous system rather than local tissue damage. Topics such as the physiology of the nervous system, acute pain development and the process of becoming chronic, factors affecting pain, central sensitization, neuroplasticity, and treatment strategies for chronic pain are included in the education.<sup>13</sup>

### Cognitive-Behavioral Therapy (CBT)

Generally, cognitive-behavioral approaches include training, skill acquisition, consolidation, generalization, and maintenance. In education, it is aimed to gain the ability of the patient to struggle with negative thoughts about his own abilities and condition. Cognitive restructuring is the process by which the patient realizes that emotions can be effective in the persistence or emergence of stress and physical symptoms. The aim of skill acquisition and consolidation is for the patient to learn and practice pain management behaviors such as relaxation, problem-solving, distraction, and adjusting the intensity of activity. On the other hand, generalization and maintenance are aimed at making the learned skill permanent.<sup>14</sup>

## 3. Interdisciplinary Treatment

Intense interdisciplinary treatment programs include a comprehensive range of health services. These disciplines are housed within and are among the people being housed within. It depends on the treatment and the underlying condition. In severe cases, it can be practiced

7-8 h a day for 3-4 weeks. Weekly sessions and 3 to 4 therapy sessions are offered per month.<sup>15</sup>

## 4. Conclusion

Rehabilitation medicine has a large range of pain management approaches. The first step in pain management is restoring function. Physical methods like other pain management modalities can be helpful in acute pain situations. It is critical that these interventions are not used on an ongoing basis. Exercise therapy is beneficial in the treatment of all types of pain disorders. A more intense inter-disciplinary consultation process will help the clinicians to benefit the patient with a fast and less cumbersome management pathway.

### Conflict of interest

No conflict of interest declared by either of the authors.

### Authors' contribution

Both authors took equal part in the preparation of this manuscript.

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