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REVIEW ARTICLE

NEUROGENIC ORIGIN OF PAIN IN ARTHRITIS AND ROLE OF HOMOEOPATHY IN TREATMENT OF ARTHRITIS

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Abstract

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Arthritis pain affects millions of people worldwide yet we still have only a limited understanding of what makes our joints ache. This review examines the sensory innervation of diarthroidal joints and discusses the neurophysiological processes that lead to the generation of painful sensation. During inflammation, joint nerves become sensitized to mechanical stimuli through the actions of neuropeptides, eicosanoids, proteinase-activated receptors and ion channel ligands. The contribution of immunocytes to arthritis pain is also reviewed. Finally, the existence of an endogenous analgesic system in joints is considered and the reasons for its inability to control pain are postulated.

INTRODUCTION

According to a recent report released by the World Health Organization, musculoskeletal disorders are the most frequent cause of disability in the modern world, and the prevalence of these diseases is rising at an alarming rate. The most prominent reason for loss of joint mobility and function is chronic or episodic pain, which leads to

psychological distress and impaired quality of life. Current therapies to help alleviate joint pain have limited effectiveness and certain drugs produce unwanted negative side effects, thereby precluding their long-term use. In short, millions of patients are suffering from the debilitating effects of joint pain for which there is no satisfactory treatment. One of the reasons for this lack of effective pain

management is the paucity in our knowledge of what actually causes joint pain. We are only now starting to identify some of the mediators and mechanisms that cause joints to become painful, allowing us to develop future new targets that could better alleviate arthritis pain. This review summarizes what is known about the origin of joint pain by describing the neurobiological processes initiated in the joint that give rise to neural signals and that are ultimately decoded by the central nervous system into pain perception.

Joint Innervations And Nociception:

Knee joints are richly innervated by sensory and sympathetic nerves. Postganglionic sympathetic fibres terminate near articular blood vessels, where they regulate joint blood flow through varying degrees of vasoconstrictor tone. The primary function of sensory nerves is to detect and transmit mechanical information from the joint to the central nervous system. Large diameter myelinated nerve fibres encode and transmit proprioceptive signals, which can be interpreted as being either dynamic (movement sensations) or static (position sense). Pain-sensing nerve fibres are typically less than 5 μm in diameter and are either unmyelinated (type IV) or myelinated with an unmyelinated 'free' nerve ending (type III). These slowly conducting fibres typically have a high

threshold and only respond to noxious mechanical stimuli, and as such are referred to as nociceptors. In the rat and cat, 80% of all knees joint afferent nerve fibres are nociceptive, suggesting that joints are astutely designed to sense abnormal and potentially destructive movement. Nociceptors are located throughout the joint, having been identified in the capsule, ligaments, menisci, periosteum and subchondral bone. The most distal segment of type III and type IV afferents is devoid of a myelin sheath and perineurium, and it is believed that this is the sensory region of the nociceptive nerve. Transmission electron microscopy revealed an hour glass shape repeating pattern along the length of type III and type IV nerve terminals, and the multiple bulbous areas exhibit the characteristic features of receptive sites. It is within these 'bead-like' structures on the terminals of 'free' nerve endings that joint pain originates.

Peripheral Sensitization And Joint Inflammation:

During inflammation, major plasticity changes occur in the peripheral and central nervous systems that lower the pain thresholds, giving rise to allodynia (pain in response to a normally innocuous stimulus) and hyperalgesia (heightened pain intensity in response to a normally painful stimulus). One means by which

pain is generated in arthritic joints is via the stimulation of so-called 'silent nociceptors'. These afferent nerve fibres are quiescent in normal joints; however, following tissue injury or induction of inflammation these nociceptors become active and start to send nociceptive information to the central nervous system. This supplementary input from the periphery by the 'silent nociceptors' is one of the contributing factors responsible for the generation of arthritis pain.

Factors Contributing To Joint Peripheral Sensitization:

The evidence presented thus far clearly indicates that peripheral sensitization of joint afferents is the origin of arthritis pain. Hence, a greater understanding of the mechanisms and mediators responsible for the generation and maintenance of joint sensitization could lead to development of novel drug targets that could alleviate or even abolish arthritis pain. The factors that alter joint mechanosensitivity and promote nociception can be divided into two separate groups: mechanical factors and inflammatory mediators.

Specimen recording from a knee joint afferent fibre during rotation (torque) of the knee. Close intra-arterial injection of a PAR4 agonist caused spontaneous nerve activity as well as increased afferent firing

rate during normal rotation compared with control.

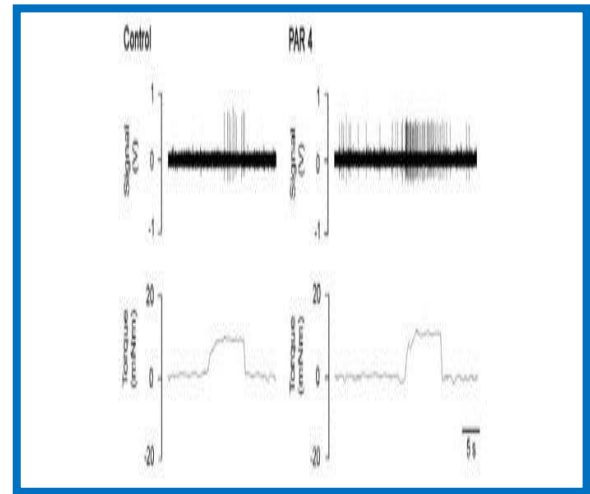


Figure 1: Arthritis and Pain Neurogenic origin of joint pain

HOMOEOPATHIC THERAPEUTICS

Individualisation is one of the fundamental principles of Homoeopathy. Different methods of analysis are in use to individualise a patient in Homoeopathy. The most prominent and commonly practiced method of individualisation of a case is through the construction of totality of symptoms. Hahnemann has narrated individualisation based on characteristic totality in aphorism 147 and 153 of Organon of Medicine. The other method of individualisation suggested by Dr. Kent is based on the general symptoms. Hahnemann and Kent also have stressed the importance of mind symptoms in individualisation of the case. The statement of Dr. Kent confirms his views in this regard as he observes, 'It is the man

who is sick and man consist of what he thinks and what he loves and there is nothing else in a man. Man is the will and understanding and the house in which he lives is his body' Tyler and Weir opined that strong mental generals will rule out all other lesser marked symptoms.^[4] Dr. Richard Hughes pointed out that the final selection of a similar remedy should be based on individual similarity, especially in those diseases that affect every subject in their way. Thus, the views of Dr. Kent and Dr. Richard Hughes underline the same idea of Hahnemann as said in aphorism 5 of Organon that individualisation of the patient with the help of disposition is possible in Homoeopathy. Gibson et al in their study found significant improvement in subjective pain, articular index, stiffness and grip strength in those patients receiving homoeopathic remedies. Motiwala et al in their study on the effect of homoeopathic treatment on Activity of daily living (ADL) concluded Homoeopathic medicines have potential to improve the ADL of OA patients by reducing pain and stiffness and limiting progress of the disease without any adverse systemic effects and can safely be employed as a comprehensive health care therapeutics.

A few effective homoeopathic medicine along with indication in treatment of Arthritis are given below-

1. **Rhus Tox**- Rhus tox arthritis symptoms are relieved by motion. They are worse from sitting and worse from rising from a sitting position, or on first commencing to move; continued motion, however, relieves. Warmth also relieves.
2. **Bryonia Alba** - The arthritis of bryonia attacks the joints themselves, producing particular rheumatism and it also inflames the muscles tissue, causing muscular rheumatism. The muscles are sore and swollen, and the joints are violently inflamed, red, swollen, shiny, and very hot.
3. **Causticum**- The symptoms calling for Causticum are stiffness of the joints. The tendons seem shortened and the limbs are drawn out of shape. It is sort of rheumatoid arthritis.
4. **Ledum Paul.**- Ledum is one of our best remedies for arthritis and gout, especially the latter. The great symptom which has always been regarded as the distinctive characteristic is the direction the pains take, namely, going from below upwards.

- 5. Pulsatilla** – Pulsatilla is usually brought prominently to mind when there is a tendency for the rheumatism to shift about, wandering rheumatic pains being one of its red strings.
- 6. Calcarea Carbonica** - It is one of the important medicines for Osteoarthritis especially of knee joint. There is mild swelling and pain in the deeper portion of the joint. The pain is generally worse in cold damp weather.
- 7. Rhododendron-** Rheumatic pains which wander from joint to joint with swelling of joints, worse before or during thunderstorm, cold or wet or unsettled weather. Better from warm wrapping. Enlargement of joints not due to gouty deposits. Arthritic nodes.
- 8. Kalmia-** Kalmia is another of the remedies which have wandering pains, and it is especially useful in pains affecting the chest i.e. the cost chondral articulation. It has also tearing pain in legs, without swelling. The pain is neuralgic type of pain. The pain from the chest portion shoots down into the stomach and abdomen. Sometimes the pain from chest traverses downwards in arm. The pain is always attended or succeeded by numbness of the part.
- 9. Colchicum-** This is the great remedy for gout the typical case calling

for colchicum is where the swelling is red or pale, with extreme tenderness to touch, a tendency to shift about from joint to joint, and pains which are worse on the slightest motion. If the general symptoms of great prostration of the muscular system and abdominal bloating be present colchicum is the remedy. It is more indicated when the smaller joints, fingers, toes, wrist and ankles, are affected; the pains are very violent, patient can not

- 10. Caulophyllum-**This is an effective medicine for rheumatoid arthritis and is commonly used for women. It is used when small joints are affected more, compared to the larger joints in the limbs bear to have the parts touched or to have anyone near him.
- 11. Antimonium Crudum – To reduce pain in finger joints.** It is very beneficial to treat pain in finger joints and reduce its inflammation. Persons needing it mainly have worsening of pain from cold. They find relief by warm applications. Drawing sensation in the fingers may also be felt.
- 12. Actaea Spicata – For wrist pain and swelling.** Actaea Spicata is mainly given for cases where wrist pain and swelling are present. Wrist is also red with heat. The pain is worse from motion. It is also indicated to treat pain

and swelling in other small joints of fingers, toes and ankle.

13. Arnica – For markedly tender joints.

Arnica is majorly used when the joints are extremely tender. Person has great fear of touching the affected joint due to pain and tenderness. The knee also has sore, bruised pain along with intense swelling.

CONCLUSION

Homoeopathic medicines may be useful as stand-alone treatment of patients with severe arthritis. The treatment is efficacious long after cessation and is not accompanied by significant side-effects.

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