

# Somatosensory Therapy: Healing the Brain-Body Pain Link

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The Somatosensory Rehabilitation of Neuropathic Pain, is a method whose aim is to treat conditions of a reduced sense of touch or sensation (hypoesthesia) in order to decrease neuropathic pain. Neuropathic pain, with a prevalency of 6.9% of the general population, represents an important public health problem. e.g. Carpal Tunnel Syndrome (CTS) concerns 2.7% of the general population.; i.e. Complex Regional Pain Syndrome (CRPS) concerns 26/100,000 person-years of the general population. Patients with chronic pain need every possible therapy to battle the pain. Chronic pain is not a symptom but a syndrome in its own right, and requires therapists from a wide range of disciplines. So too, transcutaneous electrical nerve stimulation and other physical therapy procedures emerged rapidly, bringing substantial pain relief to large numbers of people.

## History

In 1869, the French surgeon Jean Joseph Emile Létiévant was the first to map the altered sensibility of the cutaneous sense : aesthesiography. In 1872, after the American Civil War the American neurologist Silas Weir Mitchell was the first to observe the correlation between the altered cutaneous fibres and the burning pain that he named causalgia. For him the cohabitation of altered cutaneous fibres and non-altered was the etiology of this neuropathic pain symptom. In 1909, the British surgeons Wilfred Trotter and H. Morrision Davies studied on volunteers (themselves) the sensory recovery in altered sensibility of the skin. In 1915, during World War I the German surgeon Paul Hoffmann and the French neurologist Jules Tinel discovered a sign of sensory recovery: the Hoffmann-Tinel or Tinel sign. In 1954, after World War II, a council of surgeons defined a classification of sensory recovery. In 1978, the hand surgeon A Lee Dellon created a new tool to follow the sensory recovery: the moving 2-point discrimination test. In 1981, he published his first Textbook about the testing after nerve injury and repair and was the first to propose a re-education of sensibility. In 1997, he made his concept more clear by proposing a new title for his Textbook: Somatosensory Testing and Rehabilitation. In 1998, Birgit Rosen and Göran Lundborg created a new tool to test altered sensibility. They proposed a multisensory treatment (auditive and somatosensory sense) and published their papers as sensory relearning. Somatosensory testing is simultaneously testing and rehabilitation. To make the concept more clear, Claude J. Spicher proposed, in 2006, the concept of somatosensory rehabilitation. As the somatosensory system is considered as the centre of one of the etiologies of neuropathic pain Spicher proposed to switch the concept, in the French version of WIKIPEDIA fr:Rééducation sensitive de la douleur the concept of Somatosensory Rehabilitation into Somatosensory Rehabilitation of Pain, in order to enlighten the aim of this method, which is to reduce neuropathic pain. In 1979, Ulf Lindblom - at that time the president of International Association for the Study of Pain - insisted on the fact that pain itself is the centre of concern for both the patient and the physician but the sensory abnormalities which often occur in the painful area are important as well. In 2015, as an activity in the Global Year Against Neuropathic Pain, IASP Special Interest Group

on Neuropathic Pain(NeuPSIG) established a committee to (1) critically evaluate the use of the grading system in the 7 years after its publication, (2) assess the usefulness and limitations of the grading system, and (3) update the grading system if required, for improved application in clinical and research settings.

### **Somatosensory Rehabilitation of Neuropathic Pain**

The aim of somatosensory rehabilitation is to increase the quality of touch or even normalize the sensation of touch in the case of neuropathic pain due to peripheral nerve lesions. Because, when hypoesthesia decreases, neuropathic pain decreases. The assessment of partial hypoesthesia (axonotmesis) is based on the concept of the largest cutaneous distribution of the nerve branch. The first phase is the mapping which outlines the hypoesthetic territory - aesthesiography. The second phase is the regular and rigorous assessment of the quality of hypoesthesia in terms of pressure perception threshold. This is an important part of this rehabilitation.

Sometimes, the hypoesthetic territory is masked by a patch of skin which is painful to touch and is therefore not accessible. Since 1979, this stimulus induced pain is to be called allodynia in medicine. The original definition comes from Merksey and Bogduk (1994) "pain due to a stimulus which does not normally provoke pain". In such situations, while doing the diagnostic testing of axonal lesions at the first occupational or physical therapy session, the two point discrimination test is impossible, because it induces pain."This conflict between hypersensitivity and hypoesthesia is commonly seen in the clinical setting in patients with CRPS".

The presence of mechanical allodynia, hinders other physical treatments. For the reason that, any contact on the hypersensitive territory, although it can be bearable in the moment, can induce several hours of a very painful post-effect or even several sleepless nights. This hypersensitivity to touch is induced by the peripheral nerve lesion of the large myelinated A-beta fibers.

In other words, after a peripheral nerve lesion, aberrant sprouting occurs in the dorsal horn which can explain that a non-noxious stimulus is perceived as being noxious. This is one of the explanatory models of the different mechanisms of central sensitization.