

## Management of CRPS with Somatosensory Rehabilitation of Pain

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Considering complex regional pain syndrome (CRPS) as a syndrome with somatosensory signs and symptoms, somatosensory rehabilitation of pain can be used to treat that specific condition. With all the symptoms typically related to CRPS, according to the Budapest criteria (Harden et al., 2010), **CRPS patients present somatosensory disorders and neuropathic pain** complaints can often be observed in clinical observations. To make a diagnosis of CRPS, three conditions must be present at the time of examination. First, the patient must experience continuing pain which is disproportionate to any inciting event. Second, there should be at least one symptom from each defined category. And third, clinical signs should be present in at least two categories. The four categories are: Sensory, Vasomotor, Sudomotor / Edema and Motor / Trophic. Using the Somatosensory rehabilitation of Pain method, it is primal to consider the symptoms observed like the visible effect of CRPS. By this mean, treating only the symptom, like only treating the Decrease range of motion or the Edema, is not considered as a complete treatment of the CRPS. If we think of CRPS as a neuropathic condition, that could have been triggered by an axonal lesion of a specific cutaneous branch, *visible or not*, then treating that syndrome with somatosensory rehabilitation will improve symptoms and somatosensory disorders like static mechanical allodynia and hypoaesthesia.

A large part of patients with CRPS observed in clinical practice over the years at the *Centre de reeducation sensitive de la douleur* presents **static mechanical allodynia**, a neuropathic condition that can be effectively treated with somatosensory rehabilitation of pain method (Spicher et al., 2006, 2008, 2009). First, the health professional must properly assess the portion of skin touch by static mechanical allodynia with an allodynography. Then it is possible to determine the severity of static mechanical allodynia using a scale of 7 levels expressing the amount of non-painful pressure stimulation needed to trigger a reaction of pain: the rainbow pain scale. In the presence of an allodynic territory, a tactile device (used at home) and a vibratory device (used in therapy) are employed to provide comfortable somatosensory stimulations in a zone that is proximal to the territory of static mechanical allodynia but that is *distant* enough to ensure that the patient's experience is described as comfortable. The variable parameter of distant vibrotactile counter-stimulation is the localization of the stimulus application. The tactile device is made of any material providing a comfortable stimulus to each patient (for example, fur, silk, microfiber fleece) and the vibratory device generated mechanical vibrations with frequency at 100 Hz and an amplitude of 0.06 mm (Spicher et al., 2008). As a result, clinical observations on neuropathic pain patients have shown that there is always and underlying hypoaesthesia when mechanical allodynia disappears (Spicher et al., 2007). Therefore static mechanical allodynia is considered as a paradoxical painful hypoaesthesia, and this underlying hypoaesthesia needs to be treated as well.

Some patients with CRPS however did not suffer from paradoxically painful to touch condition. These patients present another somatosensory disorder: **hypoesthesia**, characterised by a loss of perception in a specific portion of their skin. That hypoesthesia will be mapped with an aesthesiography (Létiévant, 1869; Tinel, 1916; Inbal et al., 1987; Spicher, 2013). The severity of hypoesthesia can be assessed with the two-point discrimination test (Weber, 1835; Moberg, 1962; Dellon, 1978; Comtet, 1987) and the pressure perception threshold (von Frey, 1896). Rehabilitation of hypoesthesia requires a daily home program of tactile stimulation for the patient with CRPS, repeated four times a day for five minutes in order to recover. “Look for hypoesthesia, because, by decreasing hypoesthesia neuropathic pain decreases” (Spicher and Clément-Favre, 2008): this paradigm of the SRM explains the search for hypoesthesia. The technique (Spicher, 2006; Spicher and Quintal, 2013) is based on the neuroplasticity of the somatosensory system, involving direct stimulation of the hypoesthetic skin mapped by aesthesiography. A tactile device is used at home and a vibratory one in therapy.

During the treatment of the somatosensory disorders occurring during CRPS, it is possible to treat other symptoms as well but always with a non-painful strict restriction. This involves a prescription to avoid the stimulation of the skin with tactile mechanical allodynia and the realization of the home program mostly during the day before 4 P.M., because of the frequent increasing of pain at night with CRPS.