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Editorial comment

Mirror-therapy: An important tool in the management of Complex Regional Pain Syndrome (CRPS)

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In this issue of the *Scandinavian Journal of Pain* Al Sayegh and co-workers, with Stephen Butler as senior author, review mirror therapy for CRPS, reminding us of the diagnostic criteria of CRPS in describing the successful outcome of a long-standing (6 years!) case with this baffling pain condition. Only after mirror-therapy was added to the management programme with focus on motor-neglect-symptoms did her CRPS resolve, bringing the patient back to a near normal life without pain and motor-dysfunction.

1. The original hypothesis about protective disuse being a "neglect-like" symptom

It is important to note that Stephen Butler was one of the main authors of the first descriptions published about neglect or "neglect-like" symptoms as part of classical CRPS, already in 1995 [2,3]. At that time, editors and reviewers of scientific journals did not believe in this observation and the hypothesis of "neglect-like" motor symptoms, and they rejected the manuscript [4]. The present paper [1] is one of several recent publications that confirm that "neglect-like" symptoms are in fact part of the conundrum of CRPS-1 [4,5].

2. Why mirror therapy for CRPS?

As for phantom pain, attacking the "neglect-like" symptoms of CRPS with mirror-therapy may normalize the functional disorganization in the CNS, contributing to restoring functions and abolishing the pathological pain. Stephen Butler's group reviewed and evaluated nine publications of varying quality about mirror-therapy for CRPS, only two of which are of high scientific quality [1].

Even though treatment for CRPS type I (no nerve injury) and II (with injury of a major nerve) in general are the same, most research on mirror therapy has been on CRPS type I. Also in the present review [1], they found only one publication where mirror therapy was effective for two patients with CRPS type II. Therefore, one should be careful in concluding that mirror therapy is effective in management of both CRPS-I and CRPS-II.

3. Aetiology and pathogenesis of CRPS are unknown

Our lack of curative therapy for CRPS is a consequence of the fact that we do not know any aetiology, and we do not understand the pathogenesis of CRPS. The precipitating cause(s) may be a minimal strain or tissue injury that develops into this complex health problem with abnormal pain and allodynia as the primary symptom. Secondary symptoms and signs from the somatosensory nervous system, the neuromuscular-system, and from the autonomic nervous system create a baffling clinical picture.

The patient develops a "protective disuse" because moving and using and especially touching the extremity aggravates the pain [2–5]. The subsequent psychosocial reactions to this biological phenomenon are often profound: Depression and fatigue, anxiety and catastrophizing thoughts about never becoming pain-free again. Health care providers with no or little knowledge of CRPS, nurses as well as physicians, too often meet these unfortunate patients with disbelief, labelling their pain as "functional", implying that somehow the pain is psychogenic. This re-enforces stigma and the patients' psychosocial dysfunctions.

4. Neglect or "neglect-like" symptoms result from disuse and prevent restorative muscle use

The neglect phenomenon, common after cerebrovascular stroke, develops in many of the long-standing CRPS-patients. Patients make comments such as "It feels like it is not part of me anymore" and "It feels disconnected from my brain and body" [4]. The patient's conscious CNS no longer can communicate with the CRPS-affected extremity. At this stage of CRPS, therapeutic manoeuvres intended to increase conscious activity and normalize use of the extremity, are no longer effective; the patient cannot voluntarily move the muscles in the CRPS-hand or -foot. The hypothesis of why mirror-therapy may be effective is that by watching the mirror image of the healthy extremity, the patient's brain is "fooled" or "tricked" into reestablishing control of movements in the CRPS-extremity

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5. What is optimal dose and timing?

Mirror-therapy, originally developed for phantom-pain, obviously can have beneficial effects on this pathological "neglect-like" phenomenon in CRPS, as clearly demonstrated by the case description of Al Sayegh et al. and the nine publications they were able to locate in their systematic review of mirror-therapy [1].

However, the interventions with mirror therapy varied in the reviewed studies [1]. Some only use a mirror [7], others combined mirror therapy with cognitive therapy [1]. Others still, as in Moseley's approach, used graded motor imagery in three progressive stages, aiming to activate cortical networks that are involved in sensory-motor processing [6].

In future studies, specification of the different approaches will be important, as will be focus on dosage and compliance. In Moseley's study [6] there were contact between the therapist and the patient every day, the patients using the mirror up to nine times a day. In another study, the therapists met the patients only every 2nd week [1].

6. Mirror therapy as part of rehabilitation programmes of CRPS-patients

It is not realistic to hope that mirror-therapy now will solve all problems around the CRPS-conundrum. However, the illustrative case described by Stephen Butler's group in Sweden, is a timely reminder of this addition to our toolbox when dealing with the unfortunate CRPS pain patients. It is not the mirror, it is more the context in which it is used, that has effect. Focus on information and motivation, dosing, and compliance is essential. In rehabilitation institutions, where the patients can stay for weeks, daily contact with therapists will help motivate patients to more activity. In such a setting, the potent "context sensitive therapeutic effect" will be an important part of the total effect on pain and function of CRPS-patients.

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