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## The effect of upper-extremity aerobic exercise on complex regional pain syndrome type I: a randomized controlled study on subacute stroke.

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### Abstract

**BACKGROUND AND PURPOSE:** Complex regional pain syndrome type I (CPRS I), is a complex of symptoms characterized by diffuse pain usually with associated swelling, vasomotor instability, and severe functional impairment of the affected extremity in stroke patients. Pain is a prominent feature and is often refractory to variety of treatment.

**METHODS:** To investigate the clinical, functional, and psychosocial effects of upper extremity aerobic exercise (UEAE) and compare the effect of aerobic exercise with that of conventional physiotherapy in patients with CPRS type I following stroke as a randomized controlled assessor blinded 4 week-study. A total of 52 inpatients with stroke [mean age:  $65.95 \pm 8.7$  (min. = 53, max. = 80) years, and the mean age of the control group was  $67.50 \pm 11.2$  years], all within 6 months post-stroke and diagnosed with CPRS I. The UEAE program consisted of an arm crank ergometer (10W/min), in addition to a conventional physiotherapy (whirlpool, TENS, retrograd massage). Primary outcome measures were CPRS clinical determinants (pain, hyperalgesia, allodynia, and autonomic abnormalities) secondary outcome measures were functional independence measure (FIM), Nottingham Health Profile (NHP), and Beck Depression Scale scores that were performed at 0 month (baseline) and 4 weeks (post-treatment).

**RESULTS:** In UEAE group, patients reported significant pain relief (89.9%) and significant decline in CRPS signs and symptoms. The mean change in pain at shoulder, pain at the hand as well as and NHP and BDS scores between groups were statistically significant ( $P < 0.05$ ).

**CONCLUSIONS:** UEAE made an excellent improvement in the symptoms and signs of CRPS I. Combined treatment of conventional physiotherapy and aerobic exercises may be an excellent synthesis for this syndrome in these patients.

**KEYWORDS:** Complex regional pain syndrome,; Exercise; Stroke,

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