

## Partial ligation of the infraorbital nerve-induced cortical hyperexcitation is suppressed by applications of oxytocin and/or low-level laser irradiation

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Nerve injury induces neuropathic pain such as allodynia and hyperalgesia. Effects of current treatments for the neuropathic pain are limited. Previously, we reported that partial ligation of the infraorbital nerve (pl-ION) induced cortical hyperexcitation in responses to mandibular molar pulp stimulation. In the present study, we performed optical recording with a voltage-sensitive dye to investigate the effects of oxytocin and low-level laser therapy (LLLT) on pl-ION-induced cortical hyperexcitation. Oxytocin (500 nmol) and/or LLLT (diode laser, 810 nm, 0.1 W, 500 sec, continuous mode) were locally applied to the injured nerve. Cortical responses to electrical stimulation of the mandibular molar pulp under urethane-anesthesia were recorded 3 days after pl-ION. Both the amplitude and area of excitation in the somatosensory and insular cortices were increased by the pl-ION. The amplitude of cortical excitation enhanced by pl-ION was suppressed by applications of oxytocin or LLLT. The area of cortical excitation enhanced by pl-ION was suppressed by the combined application of oxytocin and LLLT but not by OXT or LLLT alone. These results suggest that oxytocin and LLLT have positive effects in relief of abnormal pain induced by the nerve injury. COI: Osada Lightsurge Square (OSL-S) was provided by Osada (Tokyo, Japan).