Cerebral Effects

Specific Effects of Laserpuncture on the Cerebral Circulation

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Abstract . Acupuncture is a form of traditional Chinese medicine that has developed over thousands of years. We studied the effects of laser puncture, needle acupuncture, and light stimulation on cerebral blood flow in 15 healthy volunteers (mean age 25.0±1.9 years, 5 female, 10 male) with non-invasive transcranial Doppler sonography. In addition 40-Hz stimulus-induced brain oscillations, heart rate, blood pressure, peripheral and cerebral oxygen saturation, and the bispectral index of the EEG were recorded. Stimulation with light significantly increased blood flow velocity in the posterior cerebral artery (p<0.01, ANOVA). Similar but less pronounced effects were seen after needle acupuncture (p< 0.05, ANOVA) and laserpuncture (n.s.) of vision-related acupuncture points. Furthermore both, laserpuncture and needle acupuncture, led to a significant increase in the amplitudes of 40-Hz cerebral oscillations. Stimulation of vision-related acupuncture points with laser light or needle acupuncture elicits specific effects in specific areas of the brain. The results indicate that the brain plays a key intermediate role in acupuncture. However, brain activity of itself does not explain anything about the healing power of acupuncture.

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Vascular Low Level Laser Irradiation Therapy in Treatment of Brain Injury

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Abstract: To evaluate the effect and mechanism of Vascular Low Level Laser Irradiation Therapy on brain injury. In this study thirty-eight SpragueDawley rats received Feeney's brain impact through a left lateral craniectomy under anesthesia. Control and treatment group are set up. According to the time exposed to laser and irradiating postinjury, the treatment group is divided in four subgroups by design. Semiconductor laser was used with a power of 5mW to irridate straightly Rat's femur venous. The Y Water maze was used to assess cognitive performance. Superoxide dismutase(SOD) activity and the level of metabolic production of free radical MDA in Brain and erythrocyte were measured to determinate the level of free radical. We find Vascular Low Level Laser Irradiation Therapy can improve posttraumatic memory deficits. SOD activity is higher in treatment groups than the control group meanwhile the level of MDA is lower. These findings

suggest that Vascular Low Level Laser Irradiation produced a significant reduction in free radical's damage to the brain postinjury.

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Cerebral vascular effects of non-invasive laserneedles measured by transorbital and transtemporal Doppler sonography.

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Laserneedles represent a new non-invasive optical stimulation method which is described for the first time in this paper. We investigated 27 healthy volunteers (mean age+/-SD: 25.15+/-4.12 years; range: 21-38 years; 14 female, 13 male) in a randomised cross-over trial to study differences between laserneedle acupuncture and manual needle acupuncture in specific cerebral parameters. Mean blood flow velocity (v(m)) showed specific and significant increases in the ophthalmic artery during laserneedle stimulation ($p=0.01$) and during manual needle stimulation ($p<0.001$) at vision-related acupoints. At the same time insignificant alterations in v(m) were found in the middle cerebral artery for both acupuncture methods. The eight laserneedles used in this study were arranged at the end of the optical fibres. Each fibre was connected to a semiconductor laser diode emitting at 685 nm with a primary output power of about 55 mW. Optical stimulation using properly adjusted laserneedles has the advantage that the stimulation can hardly be felt by the patient and the operator may also be unaware of whether the laserneedle system is active, and therefore true double blind studies in acupuncture research can be performed.

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Cerebral and peripheral effects of laser needle-stimulation.

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This study comprises scientific-theoretic fundamental investigations of laserneedle technology, a new and painless method of acupuncture stimulation. Laserneedles are not inserted in the skin, but are merely placed on the surface of the acupuncture point. The study documents the significant changes in peripheral microcirculation ($p = 0.005$) and surface temperature of the skin ($p = 0.02$) induced by laser, in 22 healthy volunteers (mean age 24.4 +/- 2.6 years). In addition, a randomised cross-over study to characterise the specific changes in cerebral blood flow velocity with laserneedle acupuncture ($p < 0.001$) is presented. These results provide important information for characterising the effects of laserneedle acupuncture.