Transcranial Infrared **Laser** Therapy Improves Clinical Rating Scores After Embolic Strokes in Rabbits

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Background and Purpose—Because photon energy delivered using a low-energy infrared **laser** may be useful to treat stroke, we determined whether transcranial **laser** therapy would improve behavioral deficits in a rabbit small clot embolic stroke model (RSCEM).

Methods—In this study, the behavioral and physiological effects of **laser** treatment were measured. The RSCEM was used to assess whether low-energy **laser** treatment (7.5 or 25 mW/cm2) altered clinical rating scores (behavior) when given to rabbits beginning 1 to 24 hours postembolization. Behavioral analysis was conducted from 24 hours to 21 days after embolization, allowing for the determination of the effective stroke dose (P50) or clot amount (mg) that produces neurological deficits in 50% of the rabbits. Using the RSCEM, a treatment is considered beneficial if it significantly increases the P50 compared with the control group.

Results—In the present study, the P50 value for controls were 0.97□0.19 mg to 1.10□0.17 mg; this was increased by 100% to 195% (P50□2.02□0.46 to 2.98□0.65 mg) if **laser** treatment was initiated up to 6 hours, but not 24 hours, postembolization (P50□1.23□0.15 mg). **Laser** treatment also produced a durable effect that was measurable 21 days after embolization. **Laser** treatment (25 mW/cm2) did not affect the physiological variables that were measured.

Conclusions—This study shows that **laser** treatment improved behavioral performance if initiated within 6 hours of an embolic stroke and the effect of **laser** treatment is durable. Therefore, transcranial **laser** treatment may be useful to treat human stroke patients and should be further developed. (Stroke. 2004;35:1985-1988.)