

Laser Therapy vs. Ultrasound

[Photomed Laser Surg.](#) 2008 Feb;26(1):6-9.

Comparison between the effect of low-level laser therapy and low-intensity pulsed ultrasonic irradiation in vitro.

[Oliveira RF](#), [Oliveira DA](#), [Monteiro W](#), [Zangaro RA](#), [Magini M](#), [Soares CP](#).

Laboratório de Dinâmica de Compartmento Celular, Instituto de Pesquisa e Desenvolvimento (IP&D), UNIVAP, São José dos Campos, São Paulo, Brazil.

ABSTRACT Objective: The objective of this study was to compare the effect of low-level laser therapy (LLLТ) and low-intensity pulsed ultrasound (LIPUS) on fibroblast cell culture. Several methods, including ultrasound treatment and LLLТ, are being used to facilitate tissue repair and healing processes. **Materials and Methods:** L929 fibroblast cell cultures were irradiated with low-level laser energy and LIPUS. Cultures irradiated with ultrasound were divided into five groups: group 1: control (did not receive irradiation); group 2: 0.2 W/cm² in pulsed mode at 10% (1:9 duty cycle); group 3: 0.6 W/cm² in pulsed mode at 10% (1:9 duty cycle); group 4: 0.2 W/cm² in pulsed mode at 20% (2:8 duty cycle); and group 5: 0.6 W/cm² in pulsed mode at 20% (2:8 duty cycle). Cultures irradiated with laser energy were divided into three groups: group 1: control (did not receive irradiation); group 2: 6 J/cm²; and group 3: 50 mJ/cm². Each group was irradiated at 24-h intervals, with the following incubation periods post-irradiation: 24, 48, and 72 h; after each irradiation cycle the cultures were analyzed using MTT [3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide]. **Results:** Analysis of results after LLLТ and LIPUS demonstrated that the effect of laser therapy on fibroblast cell culture was greater than that of LIPUS ($p < 0.05$). **Conclusion:** Results demonstrated that LLLТ significantly increased fibroblastic activity more than LIPUS. Therefore, in the first and second phases of tissue repair, laser treatment may be more effective than ultrasound treatment.

[J Hand Ther.](#) 2008 Jan-Mar;21(1):63-8.

The Short-term Efficacy of Laser, Brace, and Ultrasound Treatment in Lateral Epicondylitis: A Prospective, Randomized, Controlled Trial.

[Oken O](#), [Kahraman Y](#), [Ayhan F](#), [Canpolat S](#), [Yorgancioglu ZR](#), [Oken OF](#).

Ankara Education and Research Hospital, Department of Physical Medicine and Rehabilitation, Division of Hand Rehabilitation, Ankara, Turkey.

The aims of this study were to evaluate the effects of low-level laser therapy (LLLT) and to compare these with the effects of brace or ultrasound (US) treatment in tennis elbow. The study design used was a prospective and randomized, controlled, single-blind trial. Fifty-eight outpatients with lateral epicondylitis (9 men, 49 women) were included in the trial. The patients were divided into three groups: 1) brace group-brace plus exercise, 2) ultrasound group-US plus exercise, and 3) laser group-LLLT plus exercise. Patients in the brace group used a lateral counterforce brace for three weeks, US plus hot pack in the ultrasound group, and laser plus hot pack in the LLLT group. In addition, all patients were given progressive stretching and strengthening exercise programs. Grip strength and pain severity were evaluated with visual analog scale (VAS) at baseline, at the second week of treatment, and at the sixth week of treatment. VAS improved significantly in all groups after the treatment and in the ultrasound and laser groups at the sixth week ($p < 0.05$). Grip strength of the affected hand increased only in the laser group after treatment, but was not changed at the sixth week. There were no significant differences between the groups on VAS and grip strength at baseline and at follow-up assessments. The results show that, in patients with lateral epicondylitis, a brace has a shorter beneficial effect than US and laser therapy in reducing pain, and that laser therapy is more effective than the brace and US treatment in improving grip strength.

[Clin Tech Small Anim Pract.](#) 2007 Nov;22(4):160-5.

Select modalities.

Canapp DA.

Veterinary Orthopedic and Sports Medicine Group, Ellicott City, MD 21042, USA.
dcanapp@vetsportsmedicine.com

Physical rehabilitation modalities such as therapeutic ultrasound (TU), transcutaneous electrical neuromuscular stimulation (TENS), neuromuscular electrical stimulation (NMES), cold or low-level laser therapy (LLLT), and pulsed magnetic field therapy (PMF) can all, when used properly, assist in treating orthopedic injuries, neurological conditions, and chronic conditions brought about by normal aging in our small animal companions. TU uses sound waves to produce both thermal and nonthermal effects that aid in tissue healing, repair, and function. TENS uses different frequencies of electrical current to decrease pain and inflammation. NMES also uses an electrical current to stimulate muscle contraction to assist in normal neuromuscular function in postorthopedic and neurological injuries. LLLT uses light energy to reduce pain, decrease inflammation, and stimulate healing at a cellular level. PMF uses magnetic field to stimulate normal cellular ion exchange and oxygen utilization and promote generalized healing of tissues. These modalities are discussed in detail covering mechanism of action, parameters, settings, and indications/contraindications of use in our small animals. Although these modalities are important in the physical rehabilitation of small animals, they need to be incorporated with a proper diagnosis, manual therapy, and home exercise program into a specific and individualized patient treatment protocol.

[Photomed Laser Surg.](#) 2006 Dec;24(6):735-40.

Comparative study of how low-level laser therapy and low-intensity pulsed ultrasound affect bone repair in rats.

[Lirani-Galvão AP](#), [Jorgetti V](#), [da Silva OL](#).

Bioengineering Department, University of São Paulo, São Paulo, Brazil.
analirani@hotmail.com

OBJECTIVE: This study aimed to compare the consequences of low-level laser therapy (LLLT) and low-intensity pulsed ultrasound (LIPUS) on bone repair. **BACKGROUND DATA:** Many studies have assessed the effects of LLLT and LIPUS on bone repair, but a comparison of them is rare. **METHODS:** Male Wistar rats (n = 48) with tibial bone osteotomy were used. One group had the osteotomized limb treated with LLLT (GaAlAs laser, 780 nm, 30 mW, 112.5 J/cm²) and the second group with LIPUS (1.5 MHz, 30 mW/cm²), both for 12 sessions (five times per week); a third group was the control. After 20 days, rats were sacrificed and had their tibias submitted to a bending test or histomorphometric analysis. **RESULTS:** In the bending test, maximum load at failure of LLLT group was significantly higher (p < 0.05). Bone histomorphometry revealed a significant increase in osteoblast number and surface, and osteoid volume in the LLLT group, and a significant increase in eroded and osteoclast surfaces in the LIPUS group. **CONCLUSION:** LIPUS enhanced bone repair by promoting bone resorption in the osteotomy area, while LLLT accelerated this process through bone formation.

[Australas Chiropr Osteopathy.](#) 1998 Jul;7(2):53-67.

A critical review of the current conservative therapies for tennis elbow (lateral epicondylitis).

[Viola L](#).

The pathogenesis, pathology, natural course, and in particular the treatment of lateral epicondylitis (tennis elbow) remains controversial. An extensive review of the scientific literature with respect to the conservative treatment of tennis elbow, revealed that acceptable epidemiological techniques of the prospective randomised control trials or case controlled studies are scarce. While administration of steroid compounds has traditionally been the mainstay of conservative treatment of tennis elbow, the high recurrence rate of side effects and structural tissue changes associated with steroid therapy, leaves this modality as the most controversial approach in the treatment of tennis elbow. In contrast, in some studies evidence in favour of a role for classical acupuncture, ultrasound and low level laser as effective therapeutic means in the treatment of tennis elbow has been provided. As these modalities have not been associated with any side effects, in view of the ease of application, low cost and good curative effects, their increased application has been suggested by some authors. This proposition, however, remains rather conjectural until it could be convincingly substantiated by future studies with appropriate epidemiological design.

