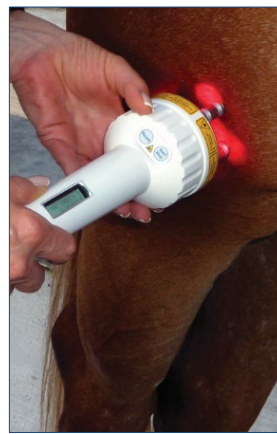


RJ-LASER

Recommendations for Veterinary Therapy



General

Laser therapy is recommended for a large number of diseases in veterinary medicine. Depending on the individual case, it can be used as a stand-alone therapy, as an adjunctive to common treatments and it can easily be combined with other therapies and medicaments.

The RJ laser devices are made for application to individual points, reflex therapy and for local treatment of small and large areas. RJ laser devices are used for:

- ◆ **Local therapy** (macro system)
- ◆ **Reflex therapy** (micro system)
- ◆ **Supply of photon energy** (Joule)
- ◆ **Transfer of information** (Hz)

For successful treatment please consider:

- ◆ **Probes, applicator heads**
- ◆ **Wavelength**
- ◆ **Power**
- ◆ **Energy**
- ◆ **Exposure time**
- ◆ **Modulation frequency**

Class 3B / class 4 lasers have the same indications!

A special position for cl. 3B is acupuncture and ear acupuncture (more suitable because of the small beam exit) and for cl. 4 these are diseases that require heat, also in terms of moxa. It is also ideal for large area treatment and deep regions as joints, internal organs etc. (acceptable therapy duration).

How to reach the target tissue

Depending on the individual conditions of the animal the laser beam can reach the target tissue or will be absorbed by color/pigmentation or particles. The main barriers are:

- 1. Coat/fur: Thickness and volume could absorb high amounts of energy!**
- 2. Color of the fur and skin: Dark pigments will absorb high amounts of photons (less energy supply)**

Skin without hair, e.g. mouth, wounds are perfect to irradiate because the energy of the laser beam can easily reach the cells. In case the skin is dark the beam will heat up the skin easily. Therefor reduce the duty cycle and/or move the probe. The suitable wavelengths with low absorption are between 650/808-915 nm.

Skin covered with fur is always difficult to treat because the hair will absorb parts of the laser energy. A special probe tip can be helpful to remove the hair. RJ offers a variety of solutions:

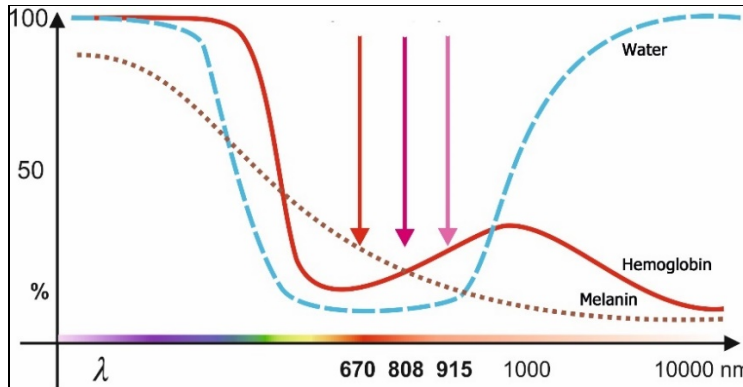
- 1. point applicator**
- 2. multi-cluster probe or applicator type “brush”**

Note

- ◆ **Deep target tissue needs more time and/or higher power to supply satisfactory amounts of energy**
- ◆ **Pressure offers better photon supply (less water in the tissue).**

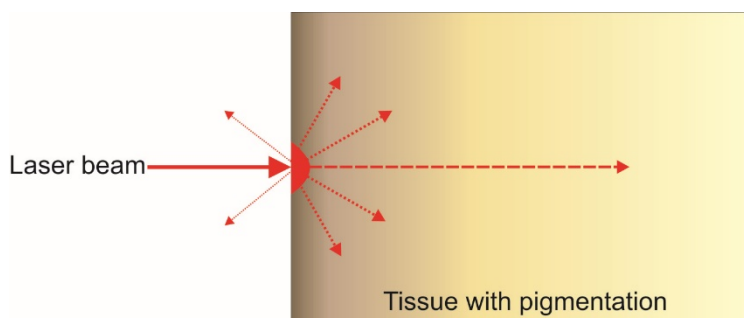
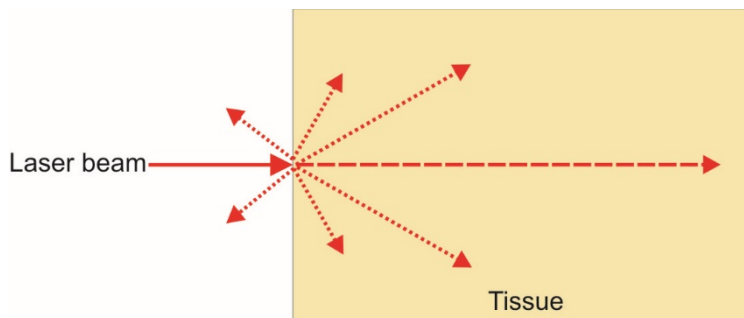
Wavelength/power/energy

RJ laser devices offer the recommended wavelengths for biomodulation. The wavelengths of the RJ laser devices are in a very convenient “window” with very low absorption levels which offer deep penetration. In higher ranges (above 950 nm) absorption by water is greater and in lower ones, below 500 nm, absorption by red blood coloring and melanin is also greater.



Dispersion in the tissue

The laser beam is dispersed among the different constituents in the tissue and reflected by the skin.





Attention! Risk of burns in case of pigmented skin, birth marks etc. because of absorption of melanin or colors in tissue and fur.

In case of pigmented skin use low power or low energy density.

Best wavelengths (less melanin/water absorption) are between 650/808-915 nm.

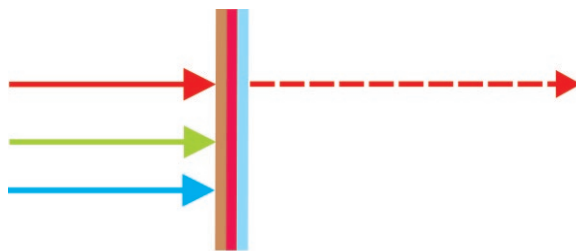
Absorption

The laser beam will be absorbed by the cells and the body's fluids. Absorption is mainly dependent on the color of the laser and that of the tissue constituents, for example, a green argon laser will be absorbed almost completely by the hemoglobin (complementary colors).

The wavelengths of the RJ laser devices (650 - 915 nm) have excellent penetrative properties and there is minimal absorption by hemoglobin, water and melanin.

- ◆ **Dark, pigmented skin (melanin), hair, will absorb more energy than white skin or hair.**
- ◆ **Bone absorbs more energy than skin or muscles**

*)



Melanin, blood, water

*Red beam will penetrate, green and blue will be absorbed by melanin, water and hemoglobin.

Treatment duration and dosage (energy, J/cm²)

The patient's reaction and the symptom being treated should be used as guidelines. As soon as an improvement becomes apparent, therapy time can be adjusted and reduced gradually until final healing.

Start with medium therapy duration

Do not start the treatment for too long with highest power! The goal is to gently "charge" the cells with photon energy. If therapy is undertaken at intensity for too long, maybe blockages could prevent the acceleration of the healing process.

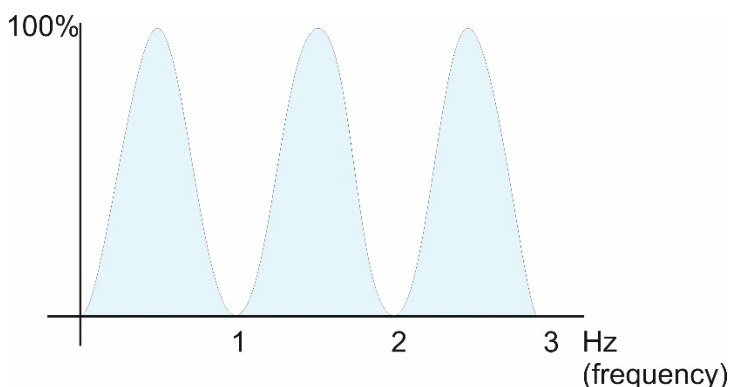
Note: It is better to *saturate* the cells with photon energy during long therapy duration than supplying the total energy within e.g. 2 seconds (as a "flash"). The biological cell system needs time to absorb the energy and react to the stimulus.

Dosage, energy (Joule/cm²)

Instead of talking about *treatment duration and power* it can be expressed in energy or Joule per cm². Within a certain time the required energy for stimulation is applied to the specified area/target (Joule/cm²), example: A size of 30 cm² requires 4 J each cm² and this equals 120 J total energy. Simply set the energy value in the submenu of your RJ laser and the laser will expire once the amount of Joule is reached.

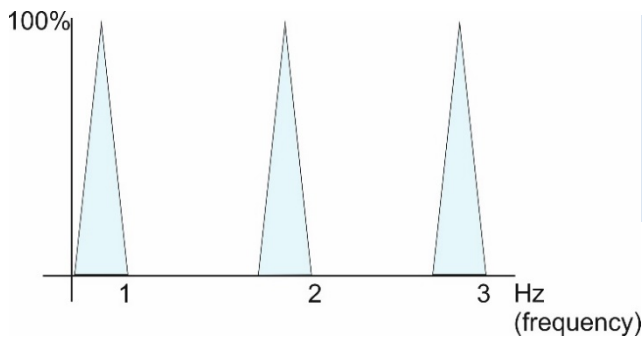
The energy calculation for cw laser diodes is quite simple and depend on the pulse/pause relation (Duty Cycle). For pulsed laser diodes 904 nm it is more complicated. The energy of a pulsed laser is frequency related because the pulse width is fixed 100 or 200 nsec. and the pulse/pause relation is not equal. Higher pulse rates generate more energy.

cw modulation, sinus and square pulse 3 Hz



→ Constant energy level (duty cycle 50%), pulse and pause are of the same relation 1:1.

pulse modulation, needle pulse 3 Hz



Low pulse rate= low energy supply
High pulse rate= high energy supply

→ Energy depends on the pulse rate.

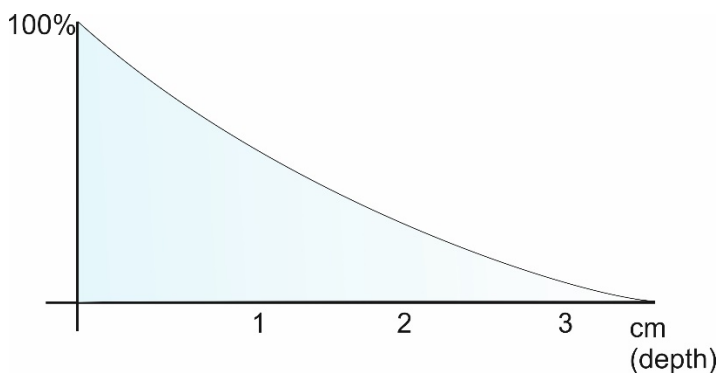
In general the pulse width is 200 nsec. (nano seconds) and the power as high as 90 W/pulse, still the average power is in the mW range, no risk of tissue heating and overstimulation.

Superpulsed mode goes up to almost 40 000 Hz (A´´). A´ and A´´ is recommended for treatment of focal disturbances.

Dosage is relative to target tissue

Consider that the photon energy will be absorbed by the tissue and it makes a difference if you want to irradiate e.g. superficial skin (wound healing) or deeper tissue layers e.g. nerves in the spinal cord region.

With 1 cm penetration roughly 50-80% of the photon energy will be absorbed. To supply sufficient energy into the target tissue, a longer duration is needed or with other words, more Joule must be applied. In case of prolonged therapy duration the skin temperature must be observed carefully.



Follow the research

Please pay attention to the results of scientific research which, of course, must also be integrated into your therapy concept. Generally speaking a dosage of 4-10 Joule per cm² or 2-4 per point is the recommended stimulus for laser therapy.

Recommended anti-inflammatory dosage for Low Level Laser Therapy (according to WALT)

Laser class 3 or 3 B, 780-860nm GaAlAs lasers. Continuous or pulse output less than 0.5 Watt power delivered to the skin over the target tendon or synovial.

Tendinopathy	Points or	Joules	Notes
Carpal-tunnel	2-3	12	Minimum 6 J/point
Lateral epicondylitis	1-2	4	Maximum 100mW/cm ²
Biceps humeri c.l.	1-2	8	
Supraspinatus	2-3	10	Minimum 5 J/point
Infraspinatus	2-3	10	Minimum 5 J/point
Trochanter major	2-4	10	
Patellartendon	2-3	6	
Tract. Iliotibialis	2-3	3	Maximum 100mW/cm ²
Achilles tendon	2-3	8	Maximum 100mW/cm ²
Plantar fasciitis	2-3	12	Minimum 6 J/point
Arthritis			
Finger PIP or MCP	1-2	6	
Wrist	2-4	10	
Humeroradial joint	1-2	4	
Elbow	2-4	10	
Glenohumeral joint	2-4	15	Minimum 6 J/point
Acromioclavicular	1-2	4	
Temporomandibular	1-2	6	
Cervical spine	2-4	15	Minimum 6 J/point
Lumbar spine	2-4	40	Minimum 8 J/point
Hip	2-4	40	Minimum 8 J/point
Knee medial	3-6	20	Minimum 5 J/point
Ankle	2-4	15	

Laser class 3B, 904 nm GaAs lasers (peak pulse output more than 1 Watt). Energy dose delivered to the skin over the target tendon or synovial.

Tendinopathy	Points or	Joules	Notes
Carpal-tunnel	2-3	4	Minimum 2 J/point
Lateral epicondylitis	1-2	1	Maximum 100mW/cm ²
Biceps humeri	1-2	2	
Supraspinatus	2-3	3	Minimum 2 J/point
Infraspinatus	2-3	3	Minimum 2 J/point
Trochanter major	2-3	2	
Patellartendon	2-3	2	
Tract. Iliotibialis	2-3	2	Maximum 100mW/cm ²
Achilles tendon	2-3	2	Maximum 100mW/cm ²
Plantar fasciitis	2-3	3	Minimum 2 J/point
Arthritis			
Finger PIP or MCP	1-2	2	
Wrist	2-3	3	
Humeroradial joint	1-2	2	
Elbow	2-3	3	
Glenohumeral joint	2-3	6	Minimum 2 J/point
Acromioclavicular	1-2	2	
Temporomandibular	1-2	2	
Cervical spine	2-3	6	Minimum 2 J/point
Lumbar spine	2-3	10	Minimum 4 J/point
Hip	2-3	10	Minimum 4 J/point
Knee anteromedial	2-4	6	Minimum 2 J/point
Ankle	2-4	6	

More information at www.walt.nu (World Association for laser Therapy)

Modulation frequency

RJ offers a large variety of biofrequencies and ready **Therapy Programs** based on these frequencies. As an example, the NOGIER frequencies are commonly used since more than 30 years for diagnosis and therapy. Below is a brief summary of the NOGIER frequencies, which are displayed as:

A' B' C' D' E' F' G'

Frequency/Hz	Disease, part of the body	Acupuncture
A'/292	Acute illness, cellular level, inflammation, tumors Body orifices	Shu point
B'/584	Chronic illness, metabolism, cell nutrition Abdomen	Sedation
C'/1168	Circulation, energy transfer, motoric disorder Bones, muscles, joints, extremities	Tonification
D'/2336	Psychic disorders, fatigue, laterality disorders Commissures	Alarm point
E'/4672	Nerve disturbances/pain, neuralgia, neuritis Spinal cord, nerves	Starting point
F'/9344	Depressions, psychic symptoms and causes Bone reconstruction Face, subcortex, emotions	End point
G'/18688	Intellectual and psychosomatic disturbances Frontal cerebral zone	Source point

Low range: A/2,28 B/4,56 C/9,12 D/18,25 E/36,48 F/73 G/146

Regenerating= A+B+F Analgesic= C+D+G Muscle relaxation= E+F Focus= A'+A''

Apply the NOGIER frequencies directly on the body part and if you can according to the RAC pulse reaction (palpation of the exact resonance frequency). **Apply cw and the frequency additionally for a few seconds.**

Condition	General	Dosage/cm2 Frequency	Probe	Additional
Acute	Mainly local therapy	4-6 J local Daily A	Single cw Single sp Cluster sp Cluster cw	Trigger points Ear points
Chronic	Local and reflex therapy combined with basic treatment.	4-6 J local 2x/week B Sealf Heal Qi		4 J
Abdominal disorders	Inner organs (e.g. lungs) are difficult to reach with local irradiation but e.g. the stomach etc. is better to reach. If you do local therapy only, use the laser additional to general therapy. Superpulsed for deep penetration is recommended.	10-12 J local 4-6 J Points 3x/week B	Single sp Cluster sp Cluster cw	Trigger points Organ points in the ear
Abscesses Tissue infections	Easy to treat with any probe, depending on the area. The laser will reduce the inflammatory process and UV will destroy germs. Central and peripheral irradiation. Improvement of the immune system as an adjunctive treatment.	6-8 J local 3-4x/week A Anti-bacterial/viral	Cluster UV Single cw Single sp Satellite	Hormone and vegetative points in the ear PDT with Tolonium chloride.
Anal sacculitis	The laser will reduce the inflammatory process. If chronic, use the laser additional to general therapy. Change of diet is highly recommended.	8-10 J local 3-4x/week A Sealf Heal	Single cw Single sp Satellite	Treat most painful point in the ear zone of the intestine and anus.

Chronic infected skin with ulceration, treated successfully with the cluster probe (Cindy Kneebone, Canada).⁽¹⁾



Condition	General	Dosage/cm2 Frequency	Probe	Additional
Arthritis Arthrosis	Supports the healing best if the joint gap can be reached, reduces symptoms, pain and swelling. Medicaments can be reduced.	8-10 J local 2-3x/week A, B Sealf Heal	Single cw Single sp Larger Cluster sp	Ear points for metabolism and joints Trigger points 4 J
Chronic obstructive pulmonary disease COPB (horses)	Excellent healing outlook with laser therapy. All inflammation processes in the organism. In addition, the individual scars and periodontitis points found during diagnosis were also treated with the laser.	8 J local 2-3x/week Mainly acupuncture Sealf Heal Qi	Single sp	Body points Bl 13), Bl 14, Bl 17, Lu 7, Ki 6, Bl 40, Bl 23, CV 17 St 40, Li 13, TH 5, Ki 3, 4 J
Fracture Joints Tendinitis	50% faster healing with laser therapy. Start as early as possible using red and infrared and two probes simultaneously from opposite sides, if possible. 638 nm for metabolic support esp. in chronic cases. Treat most painful/inflamm. spots for tendinitis.	8-10 J local 2-3x/week A, B, C	Single cw Single sp	Ear points of the zone 4 J
Hematoma	Treatment of hematoma is highly recommended, the laser will increase the healing speed. The swelling will be reduced and healing accelerated. Pain will be reduced.	4-6 J local 3x/week A, C	Single cw Single sp Cluster cw Cluster sp Satellite	
Aural hematoma	Aural hematomas within the earflaps occur when head shaking breaks a blood vessel within the earflap. The earflap may partially or completely swell with blood. Laser therapy starts after the hematoma was drained.	4-6 J local 3x/week B 10 Hz	Single cw Single sp Cluster cw Satellite	
Injury, acute Musculo- skeletal	The laser therapy will improve the healing and reduce pain. Treat the complete area and involved tendons. Pay attention to trigger points far from the center to give further relief.	6-8 J local 3-4x/week A 10 Hz	Single cw Single sp Cluster cw Cluster sp Satellite	Treat most painful point in the ear zone of the intestine and anus.
Laminitis (horse)	The laser is helpful with local application but important is the causal therapy of disorder in liver and kidney.	8-10 J local 3x/week A, B	Single cw Single sp Cluster cw Cluster sp Satellite	3E1, KS9, Bl40 Lu9, Li8, Li13, Gb41, Bl18,

Condition	General	Dosage/cm2 Frequency	Probe	Additional
Lick granuloma	As an additional treatment the laser can be beneficial and reduce symptoms and support healing. Use the laser until the granuloma is under control.	15-20 J local 3x/week E, F	Single cw Single sp Satellite Cluster UV	Treat most painful point in the ear zone of the intestine and anus.
Odontal Gingivitis Stomatitis	For odontal diseases, gingivitis etc. The laser is recommended. Infected cases need PDT (Tolonium chloride). Apply with the dental applicator or from the outside. Treat the most painful spot in case of tooth infections.	6-10 J local 2-3x/week A, F	Single cw Single sp	Dental focus requires the combination A+ A´´ Food/diet
Otitis	Laser will improve the condition rapidly. Treat the internal area with the dental applicator and external with direct contact.	8-10 J local Acute daily Chronic 2-3x/week A	Single cw Single sp Cluster cw	Ear points of the zone 4 J
Pain	Laser reduces pain in acute and chronic conditions. Treat the most painful spot and meridians covering the area.	6-10 J local 3x/week Pain program F, G	Single cw Single sp Cluster cw Cluster sp Satellite	Active ear points with 6 J
Paresis Facial paresis Paralysis Nerve damage	Laser is ideal for nerve healing. Treat the nerve at the outlet and follow the outspread. Treat distal with the cluster and local with the single probe, if possible two probes simultaneously. Nerves need sometimes long treatment durations, especially ruptures (see ROCHKIND).	12 J local 2-3x/week Nerve program E	Single cw Single sp Cluster cw Satellite	Active ear points in the nerve area 4 J
Perianal fistula	Laser can be helpful but generally further causal therapy is required.	8-12 J local 2-3x/week A, B	Single cw Single sp Cluster cw Satellite	
Pyotraumatic dermatitis	Canine pyotraumatic dermatitis ('hot spot' or 'wet eczema') has distinct features. It is typically of acute or peracute onset. Lesions develop within a few hours and are characterized by severe pruritis, erythema and focal alopecia. The surface is moist and often covered by matted hair and accumulated exudation. PD responds rapidly laser treatment.	4-8 J 3-4x/week A, C Skin program	Single cw Single sp Cluster cw Cluster UV Satellite	

Condition	General	Dosage/cm2 Frequency	Probe	Additional
Rhinitis Sinusitis	Apply laser above the area from the outside over the nasal cavity. Test the dental area for focal infections.	4-8 J 3x/week A	Single cw Single sp	Immune points in the ear, check allergy points as well
Spinal cord disorder	Palpate (thumb/index finger) segment for segment of the spinal cord and treat the painful spots (locus-dolendi)	10 J local 3x/week E, vertebra freq.	Single cw Single sp Cluster sp	Massage, adjustment of the vertebra
Snake bites	Laser reduces pain and helps to increase healing, stops inflammation	6-10 J local 2-3x/week F	Single cw Single sp	Dental focus requires the combination A+ A´´
Skin Chronic infections eczema	The laser will reduce the inflammatory process and UV will destroy germs. Central and peripheral irradiation. Improvement of the immune system as an adjunctive treatment.	6-8 J local 3x/week A, C Anti-bacterial/viral	Single cw Cluster UV Cluster cw Satellite	Hormone and vegetative points in the ear PDT - Tolonium chloride.

Chronic infected skin treated successfully with the uv cluster probe (Cindy Kneebone, Canada).⁽²⁾



Condition	General	Dosage/cm2 Frequency	Probe	Additional
Urinary tract disorder	As an adjunct to common therapy the laser helps to improve more rapidly. Treat with direct skin contact ventral/lateral into the pelvic cavity.	10-12 J 3x/week A	Single sp Cluster sp	Check the active ear points for urinary system.
Wound healing Acute Chronic Trauma	Wound healing is probably the most important field for laser therapy. Healing can be performed in any stage, acute and chronic. Most important is red laser with 638 nm and perfect is the combination of re/infrared (4). Start the treatment at the outside of the lesion and in the next step the inner parts. Infected wounds need in many cases additional UV or/and PDT with Tolonium chloride.	6-10 J local Acute daily Chronic 2-3x/week Wound program B, C 10 Hz Sealf Heal	Single cw Single sp Cluster cw Cluster sp Satellite	Liv 3, Sp 2 and of course the ting - point of the affected channel.

Infected wound, treated by Dr.med.vet. Susanne Braun, Hladbrekka 19, IS-200 Kopavogur⁽³⁾



(1)

Wound management (infected chronic wound)

American Bulldog, FS, born 1997.

Initial start of the therapy was in November 2007 - treated with a number of antibiotics and steroids, condition worsened. Referred to a dermatologist: 1 1/2 year using various antibiotics, steroids, topical tacrolimus and oral pentoxifylline. Lesion was a deep, wet oozing ulcer under the tail approx 1 inch diameter. Began the UV laser treatment first on May 14th. Started at 10mins on tail and 10 mins on perineum. Repeated May 19th - tail and perineum was dry and dog didn't bother at it anymore. All medications stopped as of May 14th. Next treatments with UV lasers May 20, 25, June 5, 22, and July 21st (last treatment - HEALED!)

(2)

Wound management (infected chronic wound)

11 year old yellow labrador

Came to us from the Emergency clinic, from dermatology. Been through a number of therapies including a number of antibiotics. Diagnosed in May 2010 with methicillin resistant Staphylococcus pseudointermedius. Prognosis was poor for this patient. She came to us in fear of losing her dog and the fear of this pet being contagious to the population in general. Two weeks with the use of the ultraviolet laser twice a week for 10 minutes. See the healing we achieved within two weeks. The skin was also thickened and has become nearly normal thickness as our treatments continue.

(3)

Wound management (chronic healing disorder)

The horse suffered under serious wound healing disorder with periostitis after traumatic injury. The process had a chronic approach and the horse was almost unable to move his leg. Dr. Susanne Braun decided to use the laser intensively as soon as she received the patient. The therapy was successful, led fast relieve and complete healing (03.18.-05.05.2005).

Therapy example: MRSA infections

Four cases of MRSA (Methicillin Resistant Staphylococcus Aureus) infections in dogs treated with laser therapy/acupuncture 90 watt/904nm cl. 3B pulsed without any additional conventional treatment (as antibiotics etc.).

Performed by Dr.med.vet. Uwe Petermann

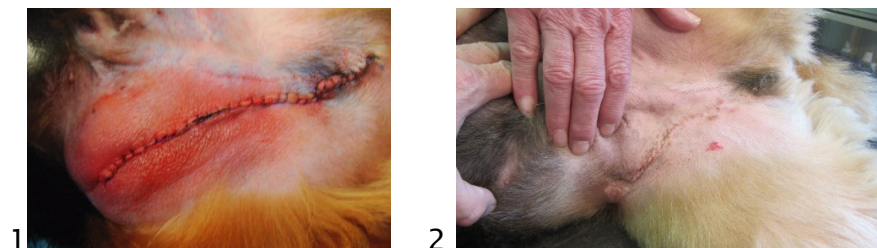


1) MRSA infected wound after half year of conventional treatment before laser acupuncture shows infiltrative inflammation and hyper granulation.

2) 10 days later after laser acupuncture with nice granulation tissue and edge with good epithelia.

3) Complete healing without further surgery and antibiotics

Petermann 2011, (Reprint with permission from: Kontrollierte Laserakupunktur, Sonntag Verlag in MVS Medizinverlag. Stuttgart, Germany: Thieme Verlagsgruppe 2011)



1) MRSA Infection in a Bernese mountain dog after castration, treated conventional for a period of 3 month in a veterinary hospital. After two further operations the dog should be put down.

2) Completely cured after 3 weeks laser therapy/acupuncture without any additional treatment.



1



2

1) MRSA infection in a white shepherd dog from breast cancer surgery. Suture is completely infected and fistulating. There was no cure over several weeks of treatment. Bitch should be put down.

2) State after 5 weeks of laser acupuncture. Complete wound healing without any additional treatment.



1



2

1) MRSA infection in a Doberman after tumor surgery. Suture is completely uprooted. There was no option for conventional cure. Dog should be put down.

2) Healed state after 5 weeks of laser acupuncture. The arrows show the original size of the wound. The main problem in wound healing was the extreme traction on the popliteal fold, which was reduced by taping.

Address: Dr.med.vet. Uwe Petermann
Schmale Str. 20
49326 Melle, Germany
Phone: +49/5428/93003
Email: druwepetermannmelle@t-online.de

Analysis of the Systemic Effect of Red and Infrared Laser Therapy on Wound Repair

Simone Marja Rodrigo,¹ Alexandre Cunha,² Daniel Humberto Pozza,³ Diego Segatto Blaya,⁴ Joaõ Feliz Moraes,⁵ Joaõ Batista Blessmann Weber,¹ and Mari´lia Gerhardt de Oliveira¹

Abstract

Objective: To evaluate, using histological analysis, the systemic action and repair process of wounds produced on the back of rats and treated with red, infrared, or both lasers applied directly or indirectly to the wounds.



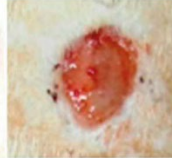


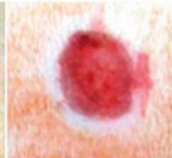




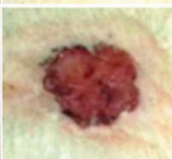






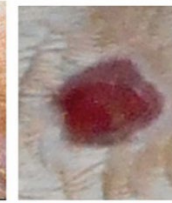


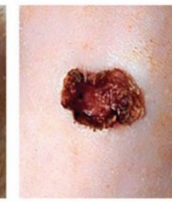
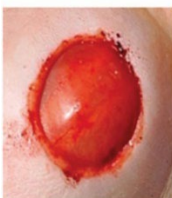
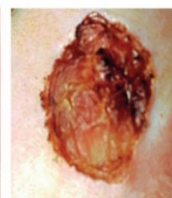
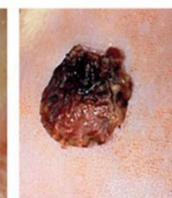
Background Data: Skin tissue repair and wound healing are complex processes that involve a series of dynamic events. Many benefits are associated with biomodulation using laser therapy.

Methods: Thirty-six male Wistar rats were divided into four groups: control (without laser), red laser (aluminium gallium indium phosphide (AlGaInP); $\lambda=685$ nm; $\phi=0.0314$ cm²; CW; P=30mW; D=20 J, time of irradiation=667 sec), infrared laser (gallium-aluminum-arsenide (GaAlAs): $\lambda=830$ nm; $\phi=0.0314$ cm²; CW; P50mW; D=20 J, time of irradiation= 401 sec), and both lasers (infrared laser: GaAlAs; $\lambda=830$ nm; $\phi=0.0314$ cm²; CW; P=50mW; D=10 J, time of irradiation=201 sec. red laser: AlGaInP; $\lambda=685$ nm; $\phi=0.0314$ cm²; CW; P=30mW; D=10 J, time of irradiation=334 sec; total dose=20 J). Three subgroups were formed according to observation time points. Three wounds were produced on the back of each animal. Only the wound closest to the head was irradiated in the experimental groups. For the evaluation of skin reaction and wound healing, three animals of each group were killed at 3, 5, and 7 days postoperatively. The irradiation protocol established 48-hour intervals between applications, with the first application immediately after the surgical procedure.

Results: In the red and infrared laser group, healing was more advanced in the wound located furthest from the point of laser application. The most effective healing of a proximal wound was verified in the control group on the 7th postoperative day.

Conclusion: The combined application of red and infrared lasers resulted in the most evident systemic effect on the repair of skin wounds produced in rats.

Research wavelength/frequency modulation

Continuous beam	Day 0	Day 4	Day 8
Control group			
810 nm / cw			
810 nm / 10 Hz (best result)			
810 nm / 100 Hz			
Standard wound care			
Pulsed			
Control group			
904 nm (200 nsec.) / 100 Hz (best result)			
Standard wound care			

Installation



The modulation of the laser has an influence on the treatment result.

Photobiomodulation with Pulsed and Continuous Wave Near-Infrared Laser (810 nm, Al-Ga-As) Augments Dermal Wound Healing in Immunosuppressed Rats

Gaurav K. Keshri, Asheesh Gupta*, Anju Yadav, Sanjeev K. Sharma, Shashi Bala Singh
 Defence Institute of Physiology and Allied Sciences (DIPAS), DRDO, Timarpur, Delhi, India
 * asheeshgupta2001@gmail.com

Abstract

Chronic non-healing cutaneous wounds are often vulnerable in one or more repair phases that prevent normal healing and pose challenges to the use of conventional wound care modalities. In immunosuppressed subject, the sequential stages of healing get hampered, which may be the consequences of dysregulated or stagnant wound inflammation. Photobiomodulation (PBM) or low-level laser (light) therapy (LLLT) emerges as a promising drugfree, non-invasive biophysical approach for promoting wound healing, reduction of inflammation, pain and restoration of functions. The present study was therefore undertaken to evaluate the photobiomodulatory effects of 810 nm diode laser (40 mW/cm²; 22.6 J/cm²) with pulsed (10 and 100 Hz, 50% duty cycle) and continuous wave on full-thickness excision type dermal wound healing in hydrocortisone-induced immunosuppressed rats. Results clearly delineated that 810 nm PBM at 10 Hz was more effective over continuous and 100 Hz frequency in accelerating wound healing by attenuating the pro-inflammatory markers (NF- κ B, TNF- α), augmenting wound contraction (α -SM actin), enhancing cellular proliferation, ECM deposition, neovascularization (HIF-1 α , VEGF), re-epithelialization along with up-regulated protein expression of FGFR-1, Fibronectin, HSP-90 and TGF- β 2 as compared to the non-irradiated controls. Additionally, 810 nm laser irradiation significantly increased CCO activity and cellular ATP contents. Overall, the findings from this study might broaden the current biological mechanism that could be responsible for photobiomodulatory effect mediated through pulsed NIR 810 nm laser (10 Hz) for promoting dermal wound healing in immunosuppressed subjects.

Superpulsed (Ga-As, 904 nm) low-level laser therapy (LLLT) attenuates inflammatory response and enhances healing of burn wounds

Asheesh Gupta*, Gaurav K. Keshri, Anju Yadav, Shefali Gola, Satish Chauhan, Ashok K. Salhan, and Shashi Bala Singh

Defence Institute of Physiology and Allied Sciences, DRDO, Lucknow Road, Timarpur, Delhi

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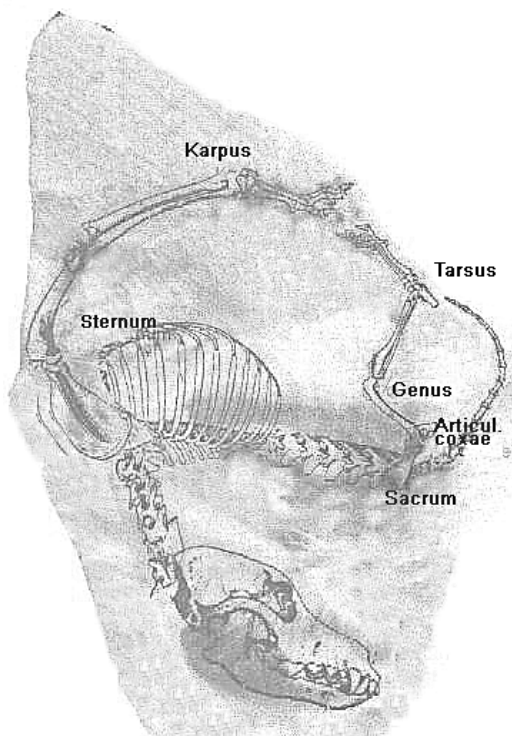
Key words: Burns, hypoxia inducible factor-1 α , nuclear factor- κ B, low-level laser (light) therapy (LLLT), photobiomodulation, superpulsed laser (904 nm)

Reference of the organ projection in the ear (dog)

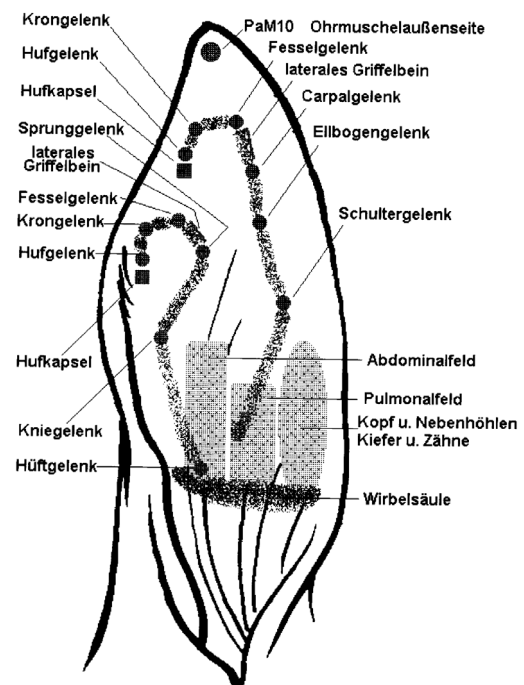
Local therapy is important, but the indirect stimulation as well (especially for inner organs which are difficult directly). The ear is perfect to stimulate organs and body parts indirectly (ear-brain-organ). It is easy to perform and will improve the healing process. Procedure:

1. Detect (palpation or electronically) the most painful spots and/or areas which show uncommon color e.g. redness, vessels, pimples, dandruff
2. Irradiate these points/zones additional to the local therapy. Each point requires just a few seconds, approximately 3-5J.
3. Biopolar therapy: The Physiolaser offers the possibility to treat direct/indirect at the same time.

Hund



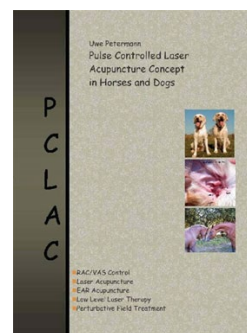
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Schmale Str. 20, 49326 Melle, Germany

druwepetermannmelle@t-online.de

Book: PCLAC Concepts in horses/dogs (Petermann)



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Applicator heads (brush= third from left)



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Tel. +49-7681-4934149 Fax +49-7681-4934150

service@rj-laser.com

www.rj-laser.com



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