This booklet contains a brief overview how to perform LLLT on some common indications. Please refer to the scientific literature to get to know more details about this therapy.

Disclaimer
The facts provided by RJ—LASER, REIMERS & JANSSEN GmbH are general information based on the public researches and may be subject to change at any time when more research trials are being published. Some of these facts belong to the complementary medicine and are scientifically not verified. These facts are provided for medical practitioners only and should not be considered as medical advice. Contact your physician for diagnosis and treatment. RJ—LASER, REIMERS & JANSSEN GmbH, Germany, is not responsible for the application of laser therapy in patients, which should be performed at the therapist's/doctor's discretion and his own responsibility. March 2008
Contents
Medical lasers ........................................................................................................... 5
LLLT, Low Level Laser Therapy ............................................................................. 5
Biological effect of LLLT ....................................................................................... 6
Penetration into the tissue .................................................................................. 8
How to apply the laser in general ..................................................................... 9
Treatment duration and dosage (energy, J/cm²) ........................................ 13
Recommended anti-inflammatory dosage for Low Level Laser Therapy (according to WALT) .............................................................. 17
Therapy interval ................................................................................................... 21
Frequency modulation / frequency application........................................ 22
Oscillations, frequencies of the body ............................................................... 25
  Microvibrations of the muscular system .................................................. 26
Planetary frequencies – a holistic approach ............................................. 27
NOGIER frequencies ........................................................................................... 28
Frequency zones according to NOGIER ......................................................... 30
RAC (VAS) or NOGIER'S pulse ........................................................................ 31
  Detection of hidden focus using laser, 3V hammer and RAC diagnosis .......... 33
  Hidden focus in ear acupuncture ............................................................ 34
BAHR frequencies ............................................................................................... 35
REININGER frequencies ...................................................................................... 38
Indications, contra indications ..................................................................... 41
Safety precautions ............................................................................................... 42
Micro systems, reflectory therapy ................................................................. 43
Acupuncture ......................................................................................................... 44
  Laser acupuncture, laserpuncture .......................................................... 45
  Eight advantages of laser acupuncture .................................................. 47
Acupuncture meridians ..................................................................................... 50
  How to apply the laser in acupuncture .................................................. 57
The LightNeedle System (laser needle) ................................................... 58
Terminal points – VOLL diagnosis.......................................................... 61
How to measure the acupoints and terminal points? .................... 62
Ear acupuncture – Auriculo medicine.................................................. 65
How to apply the laser in ear acupuncture .................................... 66
How to measure the ear points? ......................................................... 66
Ear chart ................................................................................................. 69
Addiction therapy .................................................................................. 70
Scull acupuncture .................................................................................. 72
Hand acupuncture .................................................................................. 73
Head zones ............................................................................................. 74
Organ zones ............................................................................................ 75
Trigger points ......................................................................................... 76
NPSO zones ............................................................................................ 78
Foot reflex zones .................................................................................... 79
Macro system, local therapy ................................................................. 80
Skin ........................................................................................................... 81
Herpes simplex, hordoleum, inflammations ..................................... 81
Acne ......................................................................................................... 83
Warts, fibroma ....................................................................................... 87
Anti-aging ............................................................................................... 89
Tissue ....................................................................................................... 91
Diabetic ulceration, gangraen/necrosis, wounds ......................... 91
Burns ...................................................................................................... 99
Vessel system, lymphatic system ......................................................... 102
Inflammation ......................................................................................... 104
Bones, joints, tendons, sports injuries ............................................. 105
Carpal tunnel syndrome .................................................................. 105
Sports injuries, traumata ................................................................. 107
Fracture healing ................................................................................... 109
RJ — Laser Therapy
Reference Book

Nerve system .................................................................................................................. 111
  Nerve injury ............................................................................................................. 111
  Paralysis .................................................................................................................. 113
Dentistry - Oral Application ......................................................................................... 114
  Fracture healing, bone repair, implant healing ..................................................... 115
  Bone necrosis (bisphosphonate associated) ............................................................. 117
  Gingiva healing ......................................................................................................... 122
  Pain management, hypersensitivity .......................................................................... 124
  Oral mucositis, aphthae .......................................................................................... 126
  Destruction of bacterials, periimplantitis, infections ............................................... 128
  root channel infections – Photo Dynamic Therapy .................................................... 128
  How to perform the PDT/PDD ................................................................................... 129
Alternative Therapy – Medicament applicator .............................................................. 135
Book recommendation ................................................................................................. 136
Laser Associations ........................................................................................................ 137
Laser warning signs ..................................................................................................... 138
RJ laser devices ............................................................................................................ 139
  Large area laser therapy .......................................................................................... 139
  Multi-functional LLLT diagnosis / therapy ............................................................... 141
  Handheld laser devices ............................................................................................. 143
  Polylaser family + multi-cluster probes (Physiolaser/Photonic) ................................. 144
RJ Service & Support .................................................................................................. 146
RJ-LASER  Germany .................................................................................................... 147
Medical lasers

Medical lasers divide into two main groups:

1. Laser for surgery

Surgical lasers belong to laser class 4 and offer between 2–50 W (continuous wave, cw).

2. Laser for biostimulation/biomodulation (LLLT)

These lasers belong to class 3B laser devices and sometimes to class 4 (without focus up to 5 W continuous beam).

LLLTT, Low Level Laser Therapy

The RJ-Laser devices cover the whole area of LLLT and offer a successful diagnosis and therapy for the beginner and the advanced practitioner.

The RJ-Laser devices are made for application to individual points, reflex therapy and for the treatment of larger areas. RJ laser devices are used for:

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

Diagnosis

Beside the therapy, RJ-Laser devices offer comprehensive diagnostic options for measurement of organ zones, ear acupuncture, body acupuncture and trigger points.

The diagnosis can be made by means of electric measurement of the skin resistance (VOLL) or by frequency application (RAC, pulse diagnosis according to NOGIER).
**Biological effect of LLLT**

The laser beam is a gentle but powerful therapeutic tool, consider that a laser with just $1 \text{ mW} / \lambda = 670 \text{ nm}$ will emit $3 \times 10^{15} \text{ photons/sec.}$

Appropriate laser application will lead to various reactions in living organisms. The laser energy will be absorbed by the tissue and cells, leading to an improvement of cellular metabolism via activation of the respiratory chain.

According to Tina Karu et al Cytochrome c oxidase is discussed as a possible photoreceptor when cells are irradiated with monochromatic red to near-IR radiation. Four primary action mechanisms are reviewed:

1. changes in the redox properties of the respiratory chain components
2. following photo excitation of their electron states, generation of singlet oxygen, localized transient heating of absorbing chromophores,
3. increased superoxide anion production with subsequent increase in concentration of the product of its dismutation, $\text{H}_2\text{O}_2$.
4. A cascade of reactions connected with alteration in cellular homeostasis parameters ($\text{pH}_i$, $[\text{Ca}^2+]$, $\text{cAMP}$, $\text{Eh}$, $[\text{ATP}]$ and some others) is considered as a photo signal transduction and amplification chain in a cell (secondary mechanisms).

*Tina Karu Institute of Laser and Informatic Technologies of Russian Acad. Sci., 142092 Troitsk, Moscow Region, Russian Federation*

For more information refer to the literature and studies of e.g. Herbert Klima, Atomic Institute of the Austrian Universities, Vienna, Austria Helmut Walter, Germany
Ga-AlAs (808 nm) Laser Irradiation Enhances ATP Production in Human Neuronal Cells in Culture
U. ORON, Ph.D., S. ILIC, M.D., L. DE TABOADA, M.S.E.E., and J. STREETER, M.D. 2005

Objective: The aim of the present study was to investigate whether Ga-AlAs laser irradiation can enhance adenosine triphosphate (ATP) production in normal human neural progenitor (NHNP) cells in culture.

Methods: NHNP were grown in tissue culture and were treated by Ga-AlAs laser (808 nm, 50 mW/cm², 0.05 J/cm²), and ATP was determined at 10 min after laser application.

Results: The quantity of ATP in laser-treated cells was 7513 ± 970 units, which was significantly higher ($p < 0.05$) than the non-treated cells, which comprised 3808 ± 539 ATP units.

Conclusion: Laser application to NHNP cells significantly increases ATP production in these cells. These findings may explain the beneficial effects of low-level laser therapy (LLLT) in stroked rats. Tissue culture of NHNP cells might offer a good model to study the mechanisms associated with promotion of ATP production in the nervous system by LLLT.
Penetration into the tissue

Depending on the wavelength, the laser energy will be absorbed by the tissue and cells. In order to penetrate deeply into the tissue the correct wave length is important. Depending on the medium to be penetrated it succeeds in sustaining relatively high power intensity. In principle, however, energy levels decrease the deeper the beam penetrates and the effect is weakened.

Each type of tissue has different optical reactions

The penetration depth is always dependent on the type of the tissue. Fat, muscles, bones react differently in terms of the absorption and reflection of the laser beam.

During therapy please take care that all clothing is removed from the area to be treated, as textiles weaken the effect of the laser considerably. Due to radiation loss, body parts with hair require longer application (use the brush cluster probe).

Wavelength

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 (1000 nm) absorption by water is greater and in lower ones, below 500 nm, absorption by red blood coloring and melanin is also greater.
How to apply the laser in general

The correct position of the laser probe is important in order to avoid loss of energy.

Reflection by the skin – apply with correct angle

The extent of reflection depends on the angle from which the laser beam is aimed, thus the beam should always be aimed from a 90° angle as shown in b), with minimum reflection. Use direct skin contact or just 1-2 mm above the skin.

In order to take advantage of the reflections RJ is using an innovative photon reflection foil on the Polylaser and multi-cluster probe.
Dispersion in the tissue

The laser beam is dispersed among the different constituents in the tissue and reflected. The main part of the beam penetrates directly.

Attention! Risk of burns in case of pigmented skin, birth marks, tattoo etc. because of the absorption of melanin or colors in the tissue (e.g. tattoos). In case of pigmented skin use low power or low energy density (e.g. 1-2 cm distance to the skin). The ideal wave length (less melanin absorption) is 904 nm (pulsed).
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 (635 - 904 nm) have excellent penetrative properties and there is minimal absorption by hemoglobin, water and average absorption by melanin.

- Dark, pigmented skin (melanin) will absorb more energy than white skin.

- Bone absorbs more energy than skin or muscles.

Melanin, blood, water
Three methods to apply to the body

1. **Energy deposits – the best method**
   Placing energy deposits offers best cell saturation and lowest reflection. Put the tip of the laser probe directly onto the skin and leave it until the required energy (e.g. 2–4 Joule) is reached. Point by point until the whole area was covered.

   This method is not suitable for the treatment of painful areas or open wounds and skin with high pigmentation (above 6 J/spot).

2. **Stroking**
   The laser is placed directly to the skin and runs over the entire surface to be treated, line by line. Move slowly in order to saturate the cells with energy.

3. **Application from a distance**
   The laser is applied from a distance of approximately 1–5 cm. Due to the divergence of the beam when it is emitted by the laser diode, a larger area is covered than that actually aimed at. This technique is recommended for wounds and painful conditions (e.g. herpes zoster). It is relatively demanding for the therapist as the distance should be kept constant, we recommend using the RJ tripod.

   With this method less energy (low energy density, higher reflections) is transmitted to each area and longer therapy duration is necessary.
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 “charge” the cells with photon energy. If therapy is undertaken at high power intensity for too long, blockages could prevent the acceleration of the healing process, especially in case of wound healing.

Dosage, energy (Joule/cm²)

Instead of talking about treatment duration it is better to express the required time in energy, Joule per cm². Because we want to transfer energy not time. Within a certain time we transfer energy on a specified area (Joule/cm²). Laser mathematics begins here - but don’t worry, you don’t need a computer to find it out! Simply set the energy value in the submenu of your RJ laser. The microprocessor of your RJ laser will do the rest. If you want to calculate please use the formula:

\[ \text{Joule} = \text{Watt} \times \text{Seconds} \times \text{Duty Cycle} \]

(Continuous mode (cw)= duty cycle 1)

2 Joule= 0.05 W x 40 sec. x 1 (or e.g. 0.5 W x 4 sec.)

On pulse mode e.g. square modulation please multiply by 0,5

1 Joule= 0.05 W x 40 sec. x 0,5 (or e.g. 0.5 W x 2 sec. x 0,5)

The energy calculation for cw laser diodes is quite simple (653–810 nm), because generally the pulse/pause relation is equal (sinus modulated). 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, square pulse 3 Hz**

→ Constant energy level (50%), pause and impulse have the relation 1:1.

**cw modulation, sinus pulse 3 Hz**

→ Constant energy level (50%), pause and impulse have the relation 1:1.

**pulse modulation, needle pulse 3 Hz**
In general the pulse width is 200 nsec. (nano seconds) and the power as high as 90 W/pulse, but still the average power in the mW range.

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

The Physiolaser olympic and the LaserPen is available with the pulsed laser diode of 904 nm, in superpulsed mode up to almost 40 000 Hz (A’`). A’ and A’` is recommended for treatment of focal disturbances.
Dosage is relative to target tissue

Please 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. the nerves in the spinal cord region.

With 1 cm penetration, you will roughly lose 40-50% of the photon energy. To supply sufficient energy into the target tissue, a longer duration is needed or with other words, more Joule (e.g. 12-16 cm²) 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 seems to be a good 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.

<table>
<thead>
<tr>
<th>Tendinopathy</th>
<th>Points or cm²</th>
<th>Joules</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpal-tunnel</td>
<td>2–3</td>
<td>12</td>
<td>Minimum 6 J/point</td>
</tr>
<tr>
<td>Lateral epicondylitis</td>
<td>1–2</td>
<td>4</td>
<td>Maximum 100mW/cm²</td>
</tr>
<tr>
<td>Biceps humeri c.l.</td>
<td>1–2</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Supraspinatus</td>
<td>2–3</td>
<td>10</td>
<td>Minimum 5 J/point</td>
</tr>
<tr>
<td>Infraspinatus</td>
<td>2–3</td>
<td>10</td>
<td>Minimum 5 J/point</td>
</tr>
<tr>
<td>Trochanter major</td>
<td>2–4</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Patellartendon</td>
<td>2–3</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Tract. Iliotibialis</td>
<td>2–3</td>
<td>3</td>
<td>Maximum 100mW/cm²</td>
</tr>
<tr>
<td>Achilles tendon</td>
<td>2–3</td>
<td>8</td>
<td>Maximum 100mW/cm²</td>
</tr>
<tr>
<td>Plantar fasciitis</td>
<td>2–3</td>
<td>12</td>
<td>Minimum 6 J/point</td>
</tr>
</tbody>
</table>

Arthritis

<table>
<thead>
<tr>
<th>Joint</th>
<th>Points or cm²</th>
<th>Joules</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finger PIP or MCP</td>
<td>1–2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Wrist</td>
<td>2–4</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Humeroradial joint</td>
<td>1–2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Elbow</td>
<td>2.4</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Glenohumeral joint</td>
<td>2–4</td>
<td>15</td>
<td>Minimum 6 J/point</td>
</tr>
<tr>
<td>Acromioclavicular</td>
<td>1–2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Temporomandibular</td>
<td>1–2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Cervical spine</td>
<td>2–4</td>
<td>15</td>
<td>Minimum 6 J/point</td>
</tr>
<tr>
<td>Lumbar spine</td>
<td>2–4</td>
<td>40</td>
<td>Minimum 8 J/point</td>
</tr>
<tr>
<td>Hip</td>
<td>2–4</td>
<td>40</td>
<td>Minimum 8 J/point</td>
</tr>
<tr>
<td>Knee medial</td>
<td>3–6</td>
<td>20</td>
<td>Minimum 5 J/point</td>
</tr>
<tr>
<td>Ankle</td>
<td>2–4</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>
Daily treatment for 2 weeks or treatment every other day for 3–4 weeks is recommended.

Irradiation should cover most of the pathological tissue in the tendon/synovia.

**Tendons**
Start with energy dose in table, then reduce by 30% when inflammation is under control (Does not apply for carpal tunnel tendosynovitis).

Therapeutic windows range from typically +/-50% of given values recommended doses are based on ultrasonographic measurements of depths from skin surface and typical volume of pathological tissue and estimated optical penetration for the different laser types in caucasians.

**Disclaimer**
The list may be subject to change at any time when more research trials are being published. World Association of Laser Therapy is not responsible for the application of laser therapy in patients, which should be performed at the therapist/doctor’s discretion and responsibility.

Revised August 2005

World Association of Laser Therapy

www.walt.nu
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.

<table>
<thead>
<tr>
<th>Tendinopathy</th>
<th>Points or cm²</th>
<th>Joules</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpal-tunnel</td>
<td>2-3</td>
<td>4</td>
<td>Minimum 2 J/point</td>
</tr>
<tr>
<td>Lateral epicondylitis</td>
<td>1-2</td>
<td>1</td>
<td>Maximum 100mW/cm²</td>
</tr>
<tr>
<td>Biceps humeri cap.long.</td>
<td>1-2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Supraspinatus</td>
<td>2-3</td>
<td>3</td>
<td>Minimum 2 J/point</td>
</tr>
<tr>
<td>Infraspinatus</td>
<td>2-3</td>
<td>3</td>
<td>Minimum 2 J/point</td>
</tr>
<tr>
<td>Trochanter major</td>
<td>2-3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Patellartendon</td>
<td>2-3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Tract. Iliotibialis</td>
<td>2-3</td>
<td>2</td>
<td>Maximum 100mW/cm²</td>
</tr>
<tr>
<td>Achilles tendon</td>
<td>2-3</td>
<td>2</td>
<td>Maximum 100mW/cm²</td>
</tr>
<tr>
<td>Plantar fasciitis</td>
<td>2-3</td>
<td>3</td>
<td>Minimum 2 J/point</td>
</tr>
</tbody>
</table>

| 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      |                              |
Daily treatment for 2 weeks or treatment every other day for 3–4 weeks is recommended.

Irradiation should cover most of the pathological tissue in the tendon/synovia.

**Tendons**

Start with energy dose in table, then reduce by 30% when inflammation is under control (does not apply for carpal tunnel tendosynovitis)

Therapeutic windows range from typically +/-50% of given values recommended doses are based on ultrasonographic measurements of depths from skin surface and typical volume of pathological tissue and estimated optical penetration for the different laser types in caucasians.

**Disclaimer**

The list may be subject to change at any time when more research trials are being published. World Association of Laser Therapy is not responsible for the application of laser therapy in patients, which should be performed at the therapist/doctor’s discretion and responsibility

Revised August 2005

**World Association of Laser Therapy**

**www.walt.nu**
### Therapy interval

The individual patient's symptoms are the decisive factor. There is no golden rule which can be applied to every case, each patient will react differently depending on such factors as age, sex, temperament, illness etc.

However, there are a certain number of criteria which can be used as a basic guideline and can be adapted to the individual case.

<table>
<thead>
<tr>
<th>Acute</th>
<th>1 – 3 times daily</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For herpes simplex labiales several sessions on one day are best for immediate healing. Treatment should be commenced as soon as possible.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chronic</th>
<th>2 – 3 times weekly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Keep the interval and see if improvement becomes apparent, if not, reduce it. Then you can gradually increase the interval between treatments.</td>
</tr>
<tr>
<td></td>
<td>Generally speaking, chronic conditions need longer treatment cycles and intervals, additional therapy measures as diet etc. are recommended.</td>
</tr>
</tbody>
</table>
RJ — Laser Therapy
Reference Book

**Frequency modulation / frequency application**

RJ laser devices offer a large range of comprehensive medical proven bio frequencies in order to transfer healing information and generate resonance in the body. To achieve this, the Signals need high coherence and must be clear/clean (monochromatic). Please refer to the research of Fritz Albert POPP, “Cell communication”.

Coherent and monochromatic signal

The signal (information, correct and exact bio frequency) must fit to the receiver (cell/nerve system) like the key to the lock.
The laser beam as a carrier of information

By using certain frequencies, the therapist will send the therapeutic information to the patient, in order to get cells and nerve system in resonance (Laser Resonance Therapy). The laser beam is used as the carrier of the information.

Example: Only the correct frequency will create resonance

**Laser Resonance Therapy:** If the perfect resonance is reached, there will be a high therapeutic effect with minimum energy requirement.

The frequencies are applied for:

1. Diagnosis (see RAC, Reflex Auriculo Cardial)
   - Pulse test according to NOGIER.

2. Therapy
   - Frequencies are applied to relevant parts of the body (information therapy, Laser Resonance Therapy).
   - To improve the effect in many cases the combination of various frequencies is beneficial (RJ therapy programs).
Continuous emission

The continuous emission function should be used when maximum energy is required quickly (e.g. 50 will supply 2 Joules/40 seconds). Continuous emission has no frequency modulation, no or better to say neutral information. The cells are stimulated through the introduction of photonic energy.

Combination of continuous beam and frequency

In many cases it can be effective if a combination of frequency modulation and continuous emission is used in therapy. Combine the two functions according to the patient’s reaction (e.g. at first 40 seconds frequency modulation, then 40 seconds continuous emission).

Frequencies in medicine

Today several frequency systems for medical application can be found. In the RJ laser devices only the proven bio frequencies which are used by European scientists since many years are pre-programmed and combined in special frequency programs.

If you want to apply or test other frequencies (e.g. VOLL, Rife), you may program it in the Physiolaser olympic or Photonic. More than 100 spaces are free for your own settings and research.

Pre-programmed (NOGERI)        Free programming
Oscillations, frequencies of the body

The human body is a vibrating and oscillating system, organs, cell systems, molecules etc. are constantly in cyclic movements and are emitting electromagnetic waves (frequencies). There are long and short cycles, for example:

- Life cycle (7, 14, 21, 28 years)
- Growth, adjustment to environment
- Reproduction
- Regeneration/healing
- Sleep/wake rhythm
- Vegetative tonus of the muscles
- Blood circulation
- Peristaltic of the intestine
- Blood circulation
- Respiration
- Heart beat
- EEG
- Brain frequencies

  e.g. alpha (10 Hz)
- Nerve action

The organ energy circulates/oscillates within 24 hours

The perfect time for the therapy is during the respective organ time.
Microvibrations of the muscular system

Muscle cells are vibrating permanently between 4–18 Hz (even in relaxed state). Main frequencies are between 7–13 Hz (range of Alpha waves).

Discovered 1944 by Hubert Rohracher (Austria).

Recommendation: Take advantage of the body’s frequencies, the microvibrations. Use it for the therapy.
Planetary frequencies – a holistic approach

In 1984 COUSTO published the book "The Cosmic Octave". In this book he clearly describes that finally our solar/planetary system is sound and frequency because the oscillations of the planets can mathematically be calculated and transferred into Hz. These facts lead to a new therapeutic approach for the holistic therapist. With knowledge of the birth chart of the patient and constellations of the planets, he can use the planetary frequency for the treatment in case the illness can be related to a planetary aspect or transit.

Synodic (earth in the center)

<table>
<thead>
<tr>
<th>Frequency/Hz</th>
<th>Planet</th>
<th>Tone</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>214,5</td>
<td>Mercury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>170,3</td>
<td>Venus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>127,5</td>
<td>Mars</td>
<td></td>
<td></td>
</tr>
<tr>
<td>124,6</td>
<td>Jupiter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>131,5</td>
<td>Saturn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>144,5</td>
<td>Uranus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>135,3</td>
<td>Neptune</td>
<td></td>
<td></td>
</tr>
<tr>
<td>135,6</td>
<td>Pluto</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sideric (sun, 126,22 Hz, in the center)

<table>
<thead>
<tr>
<th>Frequency/Hz</th>
<th>Planet</th>
<th>Tone</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>141,27</td>
<td>Mercury</td>
<td>D</td>
<td>Blue</td>
</tr>
<tr>
<td>221,23</td>
<td>Venus</td>
<td>A</td>
<td>Orange</td>
</tr>
<tr>
<td>136,10</td>
<td>Earth</td>
<td>CIS</td>
<td>Green</td>
</tr>
<tr>
<td>144,72</td>
<td>Mars</td>
<td>D</td>
<td>Blue</td>
</tr>
<tr>
<td>183,58</td>
<td>Jupiter</td>
<td>Fis</td>
<td>Red</td>
</tr>
<tr>
<td>147,85</td>
<td>Saturn</td>
<td>D</td>
<td>Blue</td>
</tr>
<tr>
<td>207,36</td>
<td>Uranus</td>
<td>GIS</td>
<td>Orange</td>
</tr>
<tr>
<td>211,14</td>
<td>Neptune</td>
<td>A</td>
<td>Orange</td>
</tr>
<tr>
<td>140,25</td>
<td>Pluto</td>
<td>D (CIS)</td>
<td>Blue</td>
</tr>
</tbody>
</table>
Dr. Paul Nogier may be considered as the *father of modern ear acupuncture* (auricular therapy) and frequency therapy. He studied Medicine in Lyon including homeopathy and acupuncture, brain stimulation.

Discovery of the auriculo therapy 1951
First publication 1956

Discovery of the RAC (VAS) 1966

New points in the auriculo medicine

Founding of the international school: l'Ecole Internationale Paul Nogier, 1996

Paul Nogier was born 1908 and died on the 15th of May 1996 in Lyon
The NOGIER frequencies are pre-programmed in the RJ-Lasers and are used since more than 30 years. There is a low and high potency, both octaves are used for the same indications. Below there is a brief summary of the NOGIER frequencies, which are displayed as:

\[ A' B' C' D' E' F' G' \]

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

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

Generally A’–G’ (A’’’) is used for diagnosis and therapy.
Low range A 2,28, B 4,56, C 9,12, D 18,25, E 36,48, F 73, G 146 Hz

Apply the NOGIER frequencies directly on the body part and if possible according to the RAC pulse reaction.
Frequency zones according to NOGIER

The picture below shows the frequency zones as discovered by NOGIER, modified by Bourdiol. As a general recommendation, apply the relevant frequency to the corresponding zone or according to the pulse reaction (advanced practitioner).
Auriculo medicine is a reflex method based on modifications of the NOGIER pulse in response to stimulation.

The NOGIER's pulse, called RAC (Reflex Auriculo Cardial) or Autonomic Circulatory Reaction), also called VAS (Vascular Autonomic Signal). In practice, the physician tests the skin of the patient's body or external ear. With one hand, he holds the laser, and with the other the patient's pulse. The patient's radial pulse is taken very carefully and requires a great deal of practice in order to be performed rigorously. The pulse is conventionally taken with the thumb placed perpendicularly to the radial artery against the styloid process. The VAS phenomenon is usually felt by the practitioner as a qualitative variation of perception of the pulse. It starts 1 to 3 cycles after application of a stimulus. This signal occurs without any alteration of heart rate and can last for 8 to 15 cardiac cycles. The NOGIER pulse involves the autonomic system (sympathetic and parasympathetic). Modification of the VAS is mediated by the unconscious autonomic nervous system and corresponds to a neurological reflex.

You can study the RAC pulse diagnosis on RJ seminars and

Deutsche Akademie für Akupunktur (DAA) e.V.
Ambazacstraße 4, 90542 Eckental, Germany
Tel. +49-295210, E-Mail daa@akupunktur-information.de
www.akupunktur-arzt.de

Österreichische Gesellschaft für kontrollierte Akupunktur (OGKA)
Glacisstraße 7, 8010 Graz, Austria
Tel. +43 (0)316 37 40 50, E-Mail office@ogka.at
www.ogka.at
How to perform the RAC?

Example: A patient complains about pains in the stomach region.

1. Check the radial pulse with your thumb (do not count it) and at the same time irradiate the aching area or the ear zone.

2. Change the frequency on the laser as you observe the pulse (pulse quality).

In case the frequency causes change of pulse wave (dislocation or increase in volume of a wave), you found the proper frequency to cure the patient's disorder rapidly. The frequency serves as diagnosis and therapy.

Change of pulse (RAC) due to:

A= acute process, inflammation (e.g. gastritis)
B= chronic process, metabolic disorder
C= blockage, reduced blood circulation, spasm etc.
E= nerve disturbance, etc.
F= psychic, emotional disturbance
The RAC therapy should be applied until the change of pulse subsides and the pulse wave is back to normal (in most cases after a few seconds).

The advanced practitioner is able to checking the pulse as well for medicaments (homeopathic remedies, Bach flowers, nutrition etc.). The RAC method is similar to the muscle test in kinesiology and the O-Ring test.

**Useful diagnostic tools**

There are various methods to test the pulse with the help of optional equipment (9V bar, 3V hammer etc.) in order to increase or improve the pulse reaction. It is recommended to take advantage of these tools.

3V hammer

To avoid interference by radiation of the surrounding and 50 Hz mains current, grounding of the patient is recommended.

**Detection of hidden focus using laser, 3V hammer and RAC diagnosis**

Often a disease is complicated or caused by hidden focal inflammations in the body. Quite common is the dental focus (chronic inflammation of the root, pulpa etc.), which is causing an instability in the immune and energy system of the body. It is very important for the healing process to detect the focus and remove it, but the main problem is the diagnosis, to find the focus.

With the knowledge of RAC-pulse testing, the RJ-Laser and a 3V hammer, you may be able to locate inflammatory focal disorders within seconds.
1. Put the laser on the extremities of the patient, e.g. lower arm, hand, leg or stomach.

2. Select NOGIER-frequency F or BAHR-frequency 7, use diagnostic power (5 mW with the diagnosis button).

3. Check the pulse reaction (RAC) with the 3V hammer when you move it over the area of lower/upper jaw or wherever you expect a focus.

In case of focal disorders you will get a RAC-reaction on frequency F/7 in e.g. the upper or lower jaw region. Thereafter a dental treatment of the tooth must be carried out.

Hidden focus in ear acupuncture

The NOGIER-frequency A (deep tissue layer) and BAHR-frequency 3 (middle tissue layer), 5 (upper tissue layer) are used in ear acupuncture for focus detection.

Attach the laser probe to the hand/arm, check the body parts and organs in the ear with the 3V hammer and use the relevant frequencies at the same time e.g. on the lower arm. An RAC-reaction indicates that there is a focal disturbance.

Book recommendation (available from RJ and Amazon):

Identifying and Treating Blockages to Healing: New Approaches to Therapy-Resistant Patients (Paperback)

Beate, M.D. Strittmatter (Author)

Publisher: Thieme Medical
ISBN-10: 1588901068
BAHR frequencies

The physician Dr. Frank Bahr, Germany, discovered various frequencies which are used since many years. Most important is BAHR 1, BAHR 2 and the Chakras. The frequencies are pre-programmed in the RJ laser devices and can be controlled by the RAC. New frequencies will be added to the RJ therapy software. Refer to the operation manual/software to get to know the actual range of frequencies. BAHR 1 is displayed as:

1, 2, 3, 4, 5, 6, 7

<table>
<thead>
<tr>
<th>Frequency/Hz</th>
<th>Disease, part of the body</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/599,5</td>
<td>Disruption in conversation of acquired energy, disruption in conversation of own energy resources, source of illness, affinity to sympathetic nerve system Lower tissue layer</td>
</tr>
<tr>
<td>2/1199</td>
<td>Transfer of energy, neuronal energy and distribution function, hormonal and nerve systems, affinity to parasympathetic nerve system Central tissue layer</td>
</tr>
<tr>
<td>3/2398</td>
<td>Boundary and tangential area between man and the environment, biotic points, Omega-Ren channel points Surface tissue structures Omega-Ren-channel</td>
</tr>
<tr>
<td>4/4796</td>
<td>Omega-Du channel points</td>
</tr>
<tr>
<td>5/9592</td>
<td>Oscillation frequency, Super omega</td>
</tr>
<tr>
<td>6/19184</td>
<td>Left axis, right points</td>
</tr>
<tr>
<td>7/38360</td>
<td>Right axis, left points</td>
</tr>
</tbody>
</table>

Frequencies 6, 7 are used in auricular medicine for lateral balance.
### BAHR 2

<table>
<thead>
<tr>
<th>Frequency/Hz</th>
<th>Disease, indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>963.5</td>
<td>Pain</td>
</tr>
<tr>
<td>1131</td>
<td>Hysteria</td>
</tr>
<tr>
<td>7708</td>
<td>Homeopathy</td>
</tr>
<tr>
<td>1927</td>
<td>Anti allergy</td>
</tr>
<tr>
<td>699</td>
<td>Defence</td>
</tr>
<tr>
<td>637</td>
<td>Yang-Energy</td>
</tr>
<tr>
<td>1102</td>
<td>Yin-Energy</td>
</tr>
</tbody>
</table>

### Chakra

<table>
<thead>
<tr>
<th>Frequency/Hz</th>
<th>Chakra</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.023</td>
<td>Root</td>
</tr>
<tr>
<td>3.123</td>
<td>Sacral</td>
</tr>
<tr>
<td>2.398</td>
<td>Solar plexus</td>
</tr>
<tr>
<td>1.589</td>
<td>Heart</td>
</tr>
<tr>
<td>990</td>
<td>Throat</td>
</tr>
<tr>
<td>573</td>
<td>Third eye</td>
</tr>
<tr>
<td>232</td>
<td>Crown</td>
</tr>
</tbody>
</table>

### Energy meridian

<table>
<thead>
<tr>
<th>Frequency/Hz</th>
<th>Meridian</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.695</td>
<td>Qi Master point</td>
</tr>
<tr>
<td>24</td>
<td>Shaman-Chakra 8</td>
</tr>
<tr>
<td>7.696,5</td>
<td>Shaman-Chakra 9</td>
</tr>
<tr>
<td>7.697</td>
<td>Protection-Chakra general</td>
</tr>
<tr>
<td>7.698</td>
<td>Pocks charge</td>
</tr>
<tr>
<td>7.699</td>
<td>Pest charge</td>
</tr>
<tr>
<td>7.700</td>
<td>Disturbance field / Thymus</td>
</tr>
<tr>
<td>7.707</td>
<td>Upper-Omega</td>
</tr>
<tr>
<td>7.708</td>
<td>Master of constitution (Homeopathy)</td>
</tr>
<tr>
<td>7.710</td>
<td>Inner mental core</td>
</tr>
<tr>
<td>7.713</td>
<td>Life/Karma</td>
</tr>
</tbody>
</table>
Position and spin of the seven main chakras

Brain, head

Pineal, eyes, temples thought, imagination

Hypothalamus, thyroid, throat, ears, jaw, neck

Heart, lungs, breasts, shoulders, arms, hands

Solar plexus, digestive system, liver, gall bladder, spleen, pancreas, adrenals

Ovaries, prostate, kidneys, bladder, sacrum

Testicles, coccyx, perineum, pubic bone, legs and feet

The drawing shows the rotation of the chakras on a male body, female rotates in opposite direction.

Apply the chakra frequency directly on the chakra in the correct movement. Example: Throat related problems, 990 Hz, turn the probe tip clockwise.
REININGER frequencies

Dr. Manfred Reininger, Austria, was the first who published frequencies of the meridians. In the previous years he found a large number of different frequencies related to the human body, diseases and the environment.

Reininger RI, RII, RIII, each with 7 frequencies, recommended for the advanced practitioner only. RJ can supply the data on request.

Level frequencies with 17 frequencies recommended for the advanced practitioner only.

Meridian frequencies

<table>
<thead>
<tr>
<th>Frequency/Hz</th>
<th>Meridian</th>
</tr>
</thead>
<tbody>
<tr>
<td>824</td>
<td>Lu, lung</td>
</tr>
<tr>
<td>553</td>
<td>LI, large intestine</td>
</tr>
<tr>
<td>471</td>
<td>St, stomach</td>
</tr>
<tr>
<td>702</td>
<td>SP, spleen pancreas</td>
</tr>
<tr>
<td>497</td>
<td>He, heart</td>
</tr>
<tr>
<td>791</td>
<td>SI, small intestine</td>
</tr>
<tr>
<td>667</td>
<td>Bl, bladder</td>
</tr>
<tr>
<td>611</td>
<td>Ki, kidney</td>
</tr>
<tr>
<td>530</td>
<td>Ci, circulation (pericard)</td>
</tr>
<tr>
<td>732</td>
<td>3H, triple heater</td>
</tr>
<tr>
<td>583</td>
<td>Gb, gall bladder</td>
</tr>
<tr>
<td>442</td>
<td>Li, liver</td>
</tr>
</tbody>
</table>

Apply the meridian frequencies to acupuncture points on the relevant meridian.
## Anti-frequencies

<table>
<thead>
<tr>
<th>Frequency/Hz</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>129</td>
<td>Psyche</td>
</tr>
<tr>
<td>4221</td>
<td>Anti-psyche</td>
</tr>
<tr>
<td>112</td>
<td>Vegetative</td>
</tr>
<tr>
<td>3665</td>
<td>Anti-vegetative</td>
</tr>
<tr>
<td>112</td>
<td>Addiction</td>
</tr>
<tr>
<td>3305</td>
<td>Anti-addiction</td>
</tr>
<tr>
<td>108</td>
<td>Carcinoma</td>
</tr>
<tr>
<td>3534</td>
<td>Anti-carcinoma</td>
</tr>
<tr>
<td>101</td>
<td>Pain</td>
</tr>
<tr>
<td>3894</td>
<td>Anti-pain</td>
</tr>
<tr>
<td>128</td>
<td>Inflammation</td>
</tr>
<tr>
<td>4189</td>
<td>Anti-inflammation</td>
</tr>
<tr>
<td>3648</td>
<td>Allergy</td>
</tr>
<tr>
<td>933</td>
<td>Anti-allergy</td>
</tr>
<tr>
<td>125</td>
<td>Tinnitus</td>
</tr>
<tr>
<td>4090</td>
<td>Anti-tinnitus</td>
</tr>
<tr>
<td>384</td>
<td>General</td>
</tr>
</tbody>
</table>

Use the pure frequency e.g. *Allergy* for RAC diagnosis and the Anti-frequency e.g. *Anti-allergy* for treatment.

Apply as long as the RAC is active or according to the general guideline for local therapy.
viral/bacterial

<table>
<thead>
<tr>
<th>Frequency/Hz</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1408</td>
<td>Viral</td>
</tr>
<tr>
<td>360</td>
<td>Anti-viral</td>
</tr>
<tr>
<td>1664</td>
<td>Bacterial</td>
</tr>
<tr>
<td>425</td>
<td>Anti-bacterial</td>
</tr>
</tbody>
</table>

Use the basic frequency for RAC diagnosis and the anti-frequency for the therapy.

Various

<table>
<thead>
<tr>
<th>Frequency/Hz</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>640</td>
<td>Regeneration</td>
</tr>
<tr>
<td>2503</td>
<td>Regeneration blocked by disturbance field</td>
</tr>
<tr>
<td>158</td>
<td>Kidney-Yin</td>
</tr>
<tr>
<td>5160</td>
<td>Kidney-Yang</td>
</tr>
<tr>
<td>182</td>
<td>Geopathogenic charge</td>
</tr>
<tr>
<td>7680</td>
<td>Toxic charge</td>
</tr>
</tbody>
</table>

More information about the REININGER frequency system at:

Österreichische Gesellschaft für kontrollierte Akupunktur (OGKA)
Glacisstraße 7, 8010 Graz, Austria
Tel. +43 (0)316 37 40 50, E-Mail office@ogka.at
www.ogka.at

Dr. Reininger’s books are is available in German language.
Indications, contra indications

Indications according to international research

The laser is used for the treatment of wounds and pain (FDA). Furthermore it is an option to use it for:

Skin: Dermatosis, herpes (herpes simplex labiales, zoster), acne, hordoleum, erythema, eczema, inflammation.

Tissue: Healing and alleviation of ulcerations, aftercare of operation wounds, aftercare of scars, burns, sunburns, frost bite, decubitus, necrosis.

Vessels: Improvement of blood circulation by means of collateral vessel regeneration (wound healing), improvement of lymphatic system, reduction of edema.

Inflammation: Alleviation of inflammation, rheumatism.

Bones/joints: Traumata, carpal tunnel syndrome, joint pain, fracture healing, improved callus formation and mineralization, bone necrosis.

Nerves: Improvement of nerve healing, nerve pain, lesions, ruptures, neuritis, paresis, neuritis, neuralgia.

Pain management: Pain reduction and alleviation.

Dentistry: Analgetic and anti-inflammatory, trophic effect especially after surgery.

Acupuncture: The laser device can be used for stimulation of acupuncture points and for all indications which can be treated with acupuncture according to the WHO (World Health Organization).
Contra indications

- irradiation of the eyes
- over the thyroid gland and endocrine glands, testicles
- on patients with pace makers
- no treatment on the head on patients with a tendency for epilepsy
- irradiation of the fetus and over the uterus during pregnancy
- irradiation of the epiphysis (children), open fontanella
- on patients taking zytostatics/immune suppressions
- over cancerous or malignant areas, tumor patients

Regarding the treatment of cancer existing different opinions and researches. The cellular reaction after irradiation is not described sufficiently, therefore precaution is important.

Safety precautions

Personnel
The laser should only be operated by trained medical personnel. The personnel must be instructed in safe handling procedures and also made aware of the potential risks of laser radiation.
Laser safety representative: The operator must be able to name a laser safety representative.

Radiation injuries
Do not look directly into the laser beam outlet. Laser radiation can cause eye damage. Protective gear must be worn inside the treatment room during treatment at all times, caution during therapy in the head area. Careful treatment on skin with tattoos, pigmentation, dark skin. The laser can cause burns.

Treatment room
The laser may only be operated in closed rooms. The treatment room in which laser therapy is performed must meet the requirements of the Accident Prevention Regulation BGV 11 "Laser radiation". Attach a warning sign to all entrances in accordance with DIN IEC 76 (CO) 6. Reflecting objects, mirrors and chrome parts must be removed.
For more detailed and comprehensive description of the laser safety rules refer to the manual of your laser.
**Micro systems, reflex therapy**

To the micro systems belong e.g.

- Body acupuncture
- Ear acupuncture
- Scull acupuncture
- Hand acupuncture
- Head zones
- NPSO zones
- Foot reflex zones
- Trigger points

**RJ-recommendation:** Perform the laser therapy on

1. micro system (reflex therapy)
2. macro system (local therapy)

RJ will provide in this booklet just a brief overview about the comprehensive reflex therapy. Please refer to the literature, up-to-date charts and seminars to get to know more details about the micro systems.
Acupuncture is a health science, which is used to successfully treat both pain, and dysfunction in the body. At first glimpse, acupuncture appears strange, as its primary notoriety is the utilization of needles placed in the skin at various locations to relieve pain or affect a body part. Early Chinese physicians discovered there is an energy network traversing just below the surface of the skin, which communicates, from the exterior to the interior organs and structures at over 360 acupuncture points on the body. This energy works in harmony with the body’s circulatory, nervous, muscular, digestive, genitourinary and all other systems of the body. When this vital energy becomes blocked or weakened, an effect in a body system or anatomic location becomes evident. Stimulation of one or a combination of key acupuncture points on the body may restore harmony to the affected area.

Today therapists differentiate between many types of acupuncture:

- **Body acupuncture** (modern e.g. VOLL/TCM)
- **Ear acupuncture** (NOGIER-BAHR/Chinese)
- **Scull acupuncture** (Yamamoto/Chinese)
- **Hand acupuncture** (Chinese, Bahr)
- **Nose, tongue acupuncture** and other sub systems
Laser acupuncture, laserpuncture

Laser acupuncture or laserpuncture therapy is the accepted name employed by those who practice the principle of acupuncture by using the stimulation of a laser beam instead of a penetrating needle. In some way the laser energy seems to be more suitable to the meridian system which is an "oscillating energy field" than the needle. The laser beam can produce low-heat light and is an electromagnetic wave, which can stimulate the acupuncture point of human body, and input an energy into it, so as to excite the channels and properties, regulate the function of organism, promote the metabolism, possessing the function of both acupuncture and moxibustion and via frequencies e.g. the information of the needle type (steel, gold/silver, left/right turn etc.).

According to the research of Reininger (Meridian frequencies), Bahr and Nogier, frequencies can be applied to the meridians and acupuncture points in order to improve the meridian energy.

What is the purpose of acupuncture?

The purpose of acupuncture is to prevent and treat disease, and to optimize health and well-being through balancing the body’s energies. Specifically, in western medical terminology, acupuncture can:

- achieve pain relief
- improve blood circulation
- relax muscles
- reduce inflammation
- normalize autonomic function
- promote regeneration of tissue
- promote healing
- restore homeostasis
- alleviate withdrawal symptoms
How does acupuncture work?

The body's energy flow courses over twelve meridians or channels that are normally well balanced. If a disruption of energy flow exists, it can alter the entire system, producing pain or symptoms in the body. This is acupuncture's goal - to restore normality to the body's energy balance by utilizing a combination of acupuncture points located on the fourteen meridians.

The monochromatic laser beam and correct frequency modulation will energize the meridian and acupuncture point, in order to will improve the oscillation of the meridians own frequency.

Acupuncture with single probe or fiber optics

There are two possiblities to perform laser acupuncture:

1. **With single probe** in order to stimulate point by point.

2. **With fiber optics** placed on various points simulataneously. Please refer to the LigthNeedle system.

LightNeedle
Eight advantages of laser acupuncture

1. Short therapy duration (10-30 seconds/point).

2. Points which are difficult or painful to treat with a needles (mouth/mucosa, wounds, joints, oral) can be included.

3. Painless and non-invasive therapy (particularly suited to the treatment of sensitive patients, children etc.).

4. Used in those cases for which classical acupuncture does not recommend the use of needles (asthenia).

5. Aseptic, no risk of infections.

6. Can be used to complement and extend the needle program, if additional points are required in order to optimize energy flow.

7. Can be used to supply therapeutic and diagnostic information (biofrequencies), so called “Laser Resonance Therapy”.

8. Lasting stimulation with the LightNeedle. It seems to be even more effective than conventional needle acupuncture. Because once the fibre is placed no further manipulation is required.

Near-infrared spectroscopy for objectifying cerebral effects of needle and laser needle acupuncture
Gerhard Litscher, Department of Biomedical Engineering and Research in Anaesthesia and Critical Care, University of Graz.
Specific Effects of Laserpuncture on the Cerebral Circulation
G. Litscher (1), L. Wang (1), M. Wiesner-Zechmeister (2)
(1) Biomedical Engineering, Department of Anesthesiology and Critical Care, University of Graz, Graz, Austria
(2) European Forum for Laser therapy and Fractal Medicine
Paper received 10 May 1999; accepted after revision 23 August 1999.

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.

Further more 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.
ICMART Symposium, 14.–17. of June 2001, Berlin

**Hyposensitization of Allegies with Laser Acupuncture**
Becke, H. Walter Rathenaustr. 106, 14974 Ludwigsfelde, Germany

Allergies are becoming more frequent, complex – for example cross allergies and complicated. As a rule the diagnosis is costly (for instants: prick test) and arduous. Food allergies are mainly controlled by IgE, rarely by IgG. Allergies which cause skin and mucoso membrane reactions are treated symptomatically with multitude antihistamines and/or cortisones.

The classical hyposensitization is not rarely unsuccessful, but is costly and tainted with side effects. In the presented method diagnosis and cheek up are carried out kinesiologically. The tested medium will be placed on the patient's navel. Than the 1. Meridian will be treated with laser beam at 10 Hz per dot for 12–15 seconds (tonicized) at its beginning and end points.

38 patients with various allergies have been treated successfully. Four patients needed an additional interference field treatment through neuraltherapy. Food and animal hair obtain the best and most impressive results. The continual healing effect lasts for months and even years. A repitition of the treatment produces the same effect.

**Needle Acupuncture Versus Laserpuncture: Synergism or Opposition**
Küblböck, J., Zeughausgasse 4a, 6020 Innsbruck, Austria

Needle acupuncture is well established as a classical method, whereas Low Level Laser is used as acupuncture treatment, too. It is a known fact that different methods, which basically have the same result will always give rise to the question of which is better. Both methods have influence on live tissue and the energetic system of meridians – the needle by the stimulus, which triggers a reaction in the body, and the Laser by light energy and photons.

Needs and Laser, both have similar, but also different effects on body functions because of ist special influence on live tissue (harmonizes, neutralizes, tonifies and reduces) it is advisable to use Laser with patients who are either hyper-sensitive, have anticoagulants or very painful areas on the skin. Acupuncture triggers reactions in the body's nervous system, the same does Laser light. The possibility to use lesser needles by combining needling with Laser treatment could be employed very effectively and we can also prevent anxiousness of needles with patients.

Needle acupuncture and laserpuncture will complete each other. They are both able to be a useful combination depending on the situation. Each method can be used by itself, but will never replace the other method completely.
Acupuncture meridians

Lung  824 Hz

Large intestine  553 Hz
530 Hz

Circulation

Triple heater 732 Hz
Liver 583 Hz

442 Hz

Gall bladder
No frequency determined yet
No frequency determined yet

How to apply the laser in acupuncture

1. Choose the correct frequency from the group of NOGIER, BAHR or REININGER (meridian frequency)

2. Apply point by point, one after the other, each for approx. 10–30 seconds, 2–4 Joule or longer if required.

3. Apply by meridian, put the tip of the laser probe (or Photonic) on the starting point of the meridian and move gently along the whole meridian in order to manage and improve the energy flow.

4. Using the LightNeedle, 5–10 minutes per point.

5. If possible perform pulse controlled acupuncture (RAC) according to NOGIER/BAHR/REININGER.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule point</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acupuncture</td>
<td>4–6</td>
<td>Meridian Nogier</td>
<td>2–4</td>
</tr>
<tr>
<td>X</td>
<td>If possible use the RAC or detect the points by symptom, palpation or via electronic measurement (Handylaser, Physiolaser).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The LightNeedle System (laser needle)

The LightNeedle system offers a large variety of therapeutic applications. It is easy to use: Select the time and attach the patented tip of the fiber optic to the body or acupuncture points for 5 to 15 minutes.

The LightNeedle acupuncture is relaxing and painless it offers a long lasting stimulus and is widely accepted by the patients*. Additional can be treated with the probe (p.e. ear points).

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule point</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acupuncture</td>
<td>10–30</td>
<td>Meridian, cw</td>
<td>2–4</td>
</tr>
</tbody>
</table>

Simply attach the tip of the fibre to the point with standard tape.

Patented applicator with micro mirror.

*La sensación de los pacientes durante y después de la Aguja láser versus el tratamiento de aguja metálica*. van Amerongen KS, et al

RESULTS: The common metal needle technique was well known by the patients in comparison to the laser needle method (p<0.0001***). Laser needle acupuncture is a method which is painless (p<0.0001***), energy inducing and relaxing (p=0.0257*) which leads to a warming sensation (p=0.0009***) during treatment.
Combination therapy: laser + needle

1. Use the laser as a stand-alone therapy or in combination with the needle program in order to manage/manipulate the energy flow.

2. Irradiate the needle to supply additionally photon energy to the point (Hybrid therapy).

3. Irradiate the needle to transfer frequency information to the point (Hybrid therapy).

4. Irradiate each point after the needle has been removed for approx. 5-10 seconds to increase the healing process of the needle damage to the skin.

Irradiation of the needle with the meridian frequency (according to REININGER).
Stimulation of the Governor meridian with the Photonic

The laser beam will stimulate the energy flow of the whole meridian and additionally activate the points (organ points).
The terminal points are easy to treat with the laser and with some routine, even the beginner can balance the meridians with quite good results.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule point</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body acupuncture Terminal points</td>
<td>5-7</td>
<td>Meridian Nogier</td>
<td>2-4</td>
</tr>
<tr>
<td>X</td>
<td></td>
<td>Perform the electric diagnosis with the Physiolaser and determine the meridian with too low or too high energy or use the TCM diagnostic.</td>
<td></td>
</tr>
</tbody>
</table>

Terminal points of the meridians according to the TCM and additionally the new meridians according to VOLL, Germany.
How to measure the acupoints and terminal points?

The electronic measurement of the Physiolaser will produce data that enables an analysis and will provide an overview of the patient's electrical condition of the terminal points of the meridians.

According to the electro acupuncture (VOLL) you can localize and measure the trigger/organ/acupuncture points (ear and body) and also obtain values to assist in prevention and in controlling the progression of therapy.

Results are indicated in three ways:

1. acoustically (rising tone)
2. visually (bar graph)
3. numerically (1–100), sample and hold function.

Terminal points
Put the tip of the diagnostic probe onto the points, use always the same pressure for every point. Perform a gentle measurement, no force. The skin on all points should have the same condition (humidity etc.).
According to the theory of VOLL values around 50 are considered as normal below 40 indicate a lack of energy (chronic and degenerative process) and above 60 a surplus of energy (acute, inflammatory process).

Check the individual skin and energy condition before the final measurement. The values are relative and depend on the patient’s individual condition. This means that the “normal” average value could be as well e.g. around 40 or 60.

Begin with a brief pre-test on middle sensitivity and check a few meridian points to get an overview about the reaction and individual level. Thereafter determine the sensitivity, do the measurement and store the data.
The VOLL diagnosis offers for the advanced practitioner many details for interpretation how the individual point reacts during the measurement e.g. fast/strong or slow increase or decrease of the value.

The data can be stored in the Physiolaser’s memory
Ear acupuncture – Auricular medicine

The laser beam is a perfect tool for ear acupuncture. RJ laser devices are specialized for auricular diagnosis (RAC, electrical measurement) and therapy of ear points. By means of special bio frequencies which are preprogrammed in the RJ laser devices, all levels of modern ear acupuncture can be performed successfully.

In principal there are two different types of ear points:

1. **Organ specific points**
   The organ points are related to organs and are painful in case of illness. The organ points can be found generally on the side of the affected organ (e.g. liver point on the right side). Organ points have influence on the local disorder.

2. **Functional points**
   The functional points are related to gold/silver points, hormone points, medicament related points. The functional points can be found on the lateral dominant side (for left-handed persons on the left and for right-handed persons on the right). Functional points have influence on the local and entire system.

In order to get to know more details about modern ear acupuncture, please refer to the literature of STRITTMATTER, BAHR, NOGIER. Book recommendation (available from RJ or e.g. Amazon):

**Ear Acupuncture**
Dr. Beate Strittmatter

Publisher: Thieme Verlag, Stuttgart, New York
ISBN: 3131319615
How to apply the laser in ear acupuncture

At first perform the diagnosis:

1. Inspection (spots, vessels), palpation (pain, hardness)
   and/or

2. RAC diagnosis via frequencies with low diagnostic power of 5-10 mW (automatic setting in all RJ lasers)
   and/or

3. Electric measurement (Handylaser trion, Physiolaser olympic)

How to measure the ear points?

In ear acupuncture specific points represent e.g. inner organs body parts etc.. The value of the points refers to the condition of the organ and can be evaluated with the Physiolaser. You can determine:

- electric active points
- degree of deviation (point to neutral skin)
- most active points.

Put the tip of the diagnostic probe onto the ear and move gently with very low pressure. Signals indicate electric active points/organs. If an organ is in a "normal" condition, it will not differ from the surrounding skin. If it is active it should be considered for the therapy (the higher the value, the more severe the condition).

Check the individual skin and energy condition. The values are relative and depend on the patient’s individual condition.
Diagnosis of the head and brain

Diagnosis of the large intestine

Diagnosis of the esophagus and stomach area
Thereafter follows stimulation of ear points

1. Put the laser tip directly on the relevant ear points, apply gentle pressure.

2. We recommend to use the NOGIER and BAHR frequencies according to the RAC pulse diagnosis or related to the general zone frequency.

3. Irradiate each point with approx. 2–4 Joule or until the pulse gets back to normal.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule point</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ear acupuncture</td>
<td>2–4</td>
<td>Nogier</td>
<td>2–3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bahr</td>
<td></td>
</tr>
</tbody>
</table>

If possible use RAC diagnosis for point detection and frequency. If not use the zone frequency and electronic diagnosis, inspection, palpation.
The RJ ear chart displays the most common locations of acupuncture points in the ear. According to the school, some can be found on different locations. The ear poster is available from RJ-LASER on customer's request.
Addiction therapy

Addiction therapy with laser is quite popular today and used in many countries. Below you will find three standard programs.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule point</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scull acupuncture</td>
<td>4–6</td>
<td>Nogier</td>
<td>2–4</td>
</tr>
</tbody>
</table>

X Use the organ frequency and electronic diagnosis, inspection, palpation.

Additional therapy as psychotherapy, life style coaching, diet etc. is helpful.

---

**Nicotine Addiction Points**

- 51 Vegetative system I
- Frustration
- 84 Throat
- 331 Breathing
- 31 Asthma
- Anti-Aggression
- Desire

**Food Addiction Points**

- 51 Vegetative system I
- 84 Throat
- 331 Breathing
- Anti-Aggression
- Vegetative system II
- Food desire

△ Continuous needle + laser

● laser
To improve the result we recommend to include additional acupuncture points on the body. RJ can provide a complete addiction program on request, including ear and body points and more comprehensive treatment recommendations.
Scull acupuncture

Two main fields of scull are existing, classical Chinese and the modern scull acupuncture according to Yamamoto.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule point</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scull acupuncture</td>
<td>4–6</td>
<td>Nogier</td>
<td>2–3</td>
</tr>
</tbody>
</table>

X Use the organ frequency and electronic diagnosis, inspection, palpation.

Apply energy deposits or stroking.

Some basic zones:

1 Thorax zone
2 Stomach zone
3 Organs lower abdomen
4 Language 2
5 Zone of visual disorders
6 Vertigo
7 Sensoric, upper point (4 deities)
8 Motoric zone, movement (foot/leg)
The hand acupuncture is ideal for laser therapy. New hand points and organ systems (incl. frequencies) were found from Dr. Bahr as well, contact RJ-LASER for more details.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule point</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand acupuncture</td>
<td>4–6</td>
<td>Nogier</td>
<td>2–3</td>
</tr>
</tbody>
</table>

Use the organ frequency and electronic diagnosis, palpation and the patient’s symptoms.
**Head zones**

These zones are named to Henry Head and correspond to inner organs.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule zone</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head zones</td>
<td>30–40</td>
<td>Nogier Reininger</td>
<td>2–3</td>
</tr>
</tbody>
</table>

Use the organ frequency, inspection, palpation and according to the patient’s symptoms.

1. diaphragma (C4)
2. heart (Th3-Th4)
3. esophagus (Th4-Th5)
4. stomach (Th8)
5. liver/gall bladder (Th8-Th11)
6. small intestine (Th10)
7. large intestine (Th11-L1)
8. bladder (Th11-L1)
9. kidneys and testicles (Th10-L1)
Organ zones

The organ zones are representation of the inner organs on the back of the body.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule zone</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organ zones</td>
<td>30–40</td>
<td>Nogier</td>
<td>2–3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reininger</td>
<td></td>
</tr>
</tbody>
</table>

X Use the organ frequency in order to treat the most painful zone/spot found by inspection, palpation.
### Trigger points

Trigger points are painful spots on/in muscles. The laser is a perfect tool for the treatment of the trigger points.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule point</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger points</td>
<td>8–12</td>
<td>Nogier</td>
<td>2–3</td>
</tr>
</tbody>
</table>

- Use the organ frequency and electronic diagnosis, palpation.
The picture shows the laser treatment of a typical triggerpoint on the back. In most case you will find not only painful spots, but as well electric active points using the diagnostic probe of the Physiolaser.
The German physician Rudolf Siener detected organ zones on the leg and used it successfully for the first time in therapy (NPSO= Neuro Puncture Siener Organ zones).

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule point</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPSO zones</td>
<td>4–6</td>
<td>Nogier Reininger</td>
<td>2–3</td>
</tr>
</tbody>
</table>

Use the organ frequency and electronic diagnosis, inspection, palpation and according to the patients symptoms.
Foot reflex zones

The foot reflex zones are a complex mirror of the body. We recommend to use the zone chart according to MARQUARDT.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule point</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foot reflex zones</td>
<td>4–8</td>
<td>Nogier, Reiniger</td>
<td>2–3</td>
</tr>
</tbody>
</table>

Use the organ frequency in order to treat the most painful zone/spot found by inspection, palpation.
Beside the RJ recommendations, we attached abstracts from the international research. RJ can supply the complete research data on demand.

According to our experience, it is useful to do a combination of local therapy and reflex therapy. Especially for the treatment of chronic conditions a holistic view covering the whole patient is crucial. With the help of the reflex therapy, may it be acupuncture or reflex zone therapy, the central system of the body will be regulated and with local therapy the infected or damaged cells will receive more energy to recover and perform the metabolism.

The following pages give a brief overview how to treat:

Skin
Muscles
Vessels
Bones/joints,
Nerves
Inflammation
Pain management
Oral/dental application
Skin

Dermatosis, herpes (herpes simplex labiales, zoster), acne, hordoleum, erythema, eczema, inflammation, warts.

Herpes simplex, hordoleum, inflammations

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herpes simplex inflammations</td>
<td>10–15</td>
<td>Nogier A Reininger RJ-Program</td>
<td>1–2</td>
</tr>
</tbody>
</table>

Apply the laser at very short distance. Pay attention to the immune system, digestion, psychic disorder.

Treatment day one to three (refer to the abstract)
Laser Therapy of Human Herpes Simplex Lesions

Arturo Guerra Alfonso, Pedro José MuZoz
Clinic “Leonardo Fernández Sánchez”, Cienfuengos, Cuba

Introduction: Herpes Simplex is an illness caused by the human herpes virus types 1 and 2 that generally present a primary lesion, with periods of latency and a tendency to relapse. It is also known as Button of fever or Bladder of fever. According to the World Health Organisation (WHO) an international prevalence of about 60% is observed (1, 2).

An experimental study was carried out, where 232 patients affected by the Herpes Simplex type 1 virus were treated. All patients attended the clinic “Leonardo Fernández” in Cienfuengos during the period of January 2001 to January 2003, with the objective of determining the time of recurrence of labial herpes in the groups, studied before and after treatment, and to evaluate the effectiveness of low power laser in the treatment of the infection of the virus.

Materials and methods: Two groups were selected (study and control) with 116 patients in each group, distributed and classified according to the clinical stage in which they went to consultation. In the study group the patients were offered treatment with a GaAlAs diode laser (670 nm / 30 mW - 40 sec) in the prodromal stage and the stage of vesicles; or (670 nm /20 mW - 2 min) in the crust stage and in infections infected secondarily. To all these patients radiation among vertebras C2 - C3, where the resident ganglion of the virus is located during the latent periods (670 nm / 30 mW - 30 sec), was also applied. Control group was offered indicated treatment with antivirals (Aciclovir in cream and in pills) and other paliative therapies.

Conclusions: Periods of annual recurrence in the study group were prolonged considerably after having received treatment, whilst in the control group such evident changes were not shown. In the prodromal period the patients treated with laser all healed up in the first 48 hours, whilst those treated conventionally needed from 3 to 4 days to cure.

In the vesicular period and the period of crust, those of the study group cured in majority in the first 48 hours, whilst those of the control group needed more than 5 days.

In infected lesions those treated with laser cured mainly in 3 to 4 days, whilst those treated with medication needed more than 7 days to cure.
### Acne

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments weekly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acne vulgaris</td>
<td>10–15</td>
<td>Nogier A/C/F Reininger RJ-Program</td>
<td>2–3</td>
</tr>
</tbody>
</table>

- Apply the laser at short distance.
- Pay attention to the digestion, psychic disorder.

Red and infrared works well, but regarding latest research a combination with blue light is recommended for acne.
Treatment day 1 to 20

Before

After

British Journal of Dermatology 2000; 142: 973±978

Phototherapy with blue (415 nm) and red (660 nm) light in the treatment of acne vulgaris

P.PAPAGEORGIOU, A.KATSAMBAS* AND A.CHU
Unit of Dermatology, Imperial College of Science, Technology and Medicine, Hammersmith Hospital, DuCane Road, London W12 0NN, U.K.
*Adreas Sygros Hospital, Athens, Greece
Accepted for publication 7 December 1999

Summary: In this study we have evaluated the use of blue light (peak at 415 nm) and a mixed blue and red light (peaks at 415 and 660 nm) in the treatment of acne vulgaris. One hundred and seven patients with mild to moderate acne vulgaris were randomized into four treatment groups: blue light, mixed blue and red light, cool white light and 5% benzoyl peroxide cream.

Subjects in the phototherapy groups used portable light sources and irradiation was carried out daily for 15 min. Comparative assessment between the three light sources was made in an observer-blinded fashion, but this could not be achieved for the use of benzoyl peroxide. Assessments were performed every 4 weeks.
After 12 weeks of active treatment a mean improvement of 76\% (95\% confidence interval 66±87) in inflammatory lesions was achieved by the combined blue±red light phototherapy; this was significantly superior to that achieved by blue light (at weeks 4 and 8 but not week 12), benzoyl peroxide (at weeks 8 and 12) or white light (at each assessment). The final mean improvement in comedons by using blue±red light was 58\% (95\% confidence interval 45±71), again better than that achieved by the other active treatments used, although the differences did not reach significant levels.

**Results:** We have found that phototherapy with mixed blue±red light, probably by combining antibacterial and anti-inflammatory action, is an effective means of treating acne vulgaris of mild to moderate severity, with no significant short-term adverse effects.
Laser device recommendation for acne therapy:

**Polylaser** trion with mix of blue UV light + laser

**Physiolaser** olympic + multi-cluster (mix of blue UV light + laser), point applicator and diagnostic probe
Warts, fibroma

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warts, fibroma</td>
<td>12–16</td>
<td>Nogier A</td>
<td>3–4</td>
</tr>
</tbody>
</table>

X Apply the RJ laser at short distance.

Treatment table – Therapy example with the RJ laser
The male patient (age 62 years) complained about a wart on the right side of his temple, resistant for several years.

<table>
<thead>
<tr>
<th>Time</th>
<th>5 minutes per wart, 3 x week, thereafter 2 x daily, total 2 weeks.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Continuous beam</td>
</tr>
<tr>
<td>Power</td>
<td>500 mW/810 nm</td>
</tr>
<tr>
<td>Device</td>
<td>Physiolaser olympic</td>
</tr>
<tr>
<td>Additional</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>September 2006</td>
</tr>
<tr>
<td>Clinic</td>
<td>Aktiv Helse</td>
</tr>
<tr>
<td></td>
<td>Nina Svendsen/Hartmut Wehmeier</td>
</tr>
<tr>
<td></td>
<td>Vibevej 16, Bremdal, 7600 Struer, Danmark</td>
</tr>
<tr>
<td></td>
<td>Tel. 75 25 65 35 / 22 95 78 12</td>
</tr>
<tr>
<td></td>
<td>e-mail <a href="mailto:info@aktiv-helse.com">info@aktiv-helse.com</a></td>
</tr>
</tbody>
</table>
After 2 days laser therapy.
30.10.2006

After 7 days laser therapy.
06.11.2006

After 14 days laser therapy.
14.11.2006
Anti-aging

Combination therapy of laser and hyaluronic acid in order to saturate the body’s hyaluronan deposits of elderly skin.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments weekly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-aging</td>
<td>10–15</td>
<td>cw</td>
<td>Start x 2 thereafter 1x monthly</td>
</tr>
</tbody>
</table>

Apply the laser at short distance. Follow strictly additional therapy information for the Polylaser derma or Physiolaser.

Treatment before and long term result with one monthly treatment, age 64. RJ data 2006

Treatment before and short term result after one treatment, age 53. RJ data 2007
The anti-aging therapy with the Polylaser derma/Physiolaser consists of: 1. RJ-Hyaluronan gel + 2. Laser stimulation.

Hyaluronan is a glycosaminoglycan distributed widely throughout connective, epithelial, and neural tissues. It is one of the chief components of the extra cellular matrix. While it is found in large numbers in extra cellular matrices, hyaluronan also contributes to tissue hydrodynamics. Hyaluronan injections for filling soft tissue defects such as facial wrinkles are commonly used, but have side effects and are not recommended for every patient. The result of RJ-Hyaluronan gel is somehow analogous to injections but has additional advantages of longer lasting effects, large area application and decreased risk of allergic reaction.

a) Wrinkle reduction
b) Skin vitalization and firming, refining of pores

**Step 1. Skin preparation:** cleaning, open the pores with a hot towel (vaporiser).
**Step 2. massage:** apply the warm RJ-Hyaluronan gel.
**Step 3. therapy:** irradiation for 10-20 minutes
**Step 4. deepening:** aftercare
Tissue

Healing and alleviation of ulcerations, aftercare of operation wounds, acute and chronic wounds, aftercare of scars, burns, sun burns, frost bite, decubitus, necrosis.

Diabetic ulceration, gangraen/necrosis, wounds

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic ulceration</td>
<td>6–10</td>
<td>Nogier B/C Reininger</td>
<td>2–4</td>
</tr>
<tr>
<td>Wound healing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Apply the RJ laser at a distance of 1–3 cm.

Treatment table – Therapy example with the RJ laser

Patient, mal, 63 years

Gangrena of the third toe of the left foot. The conventional therapy did not lead to healing of the tissue and an amputation was carried out. After amputation new gangrena occurred.

<table>
<thead>
<tr>
<th>Time</th>
<th>5 minutes daily for the first 14 days, thereafter 3–4/week.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>A/B</td>
</tr>
<tr>
<td>Power</td>
<td>500 mW/810 nm</td>
</tr>
<tr>
<td>Device</td>
<td>Physiolaser olympic</td>
</tr>
<tr>
<td>Additional</td>
<td>Lavasept, Dline Cooling Creme</td>
</tr>
<tr>
<td>Date</td>
<td>March–April 2004</td>
</tr>
<tr>
<td>Clinic</td>
<td>Center of Wound Competence (Wundkompetenz–Center WFI) Linz, Austria / <a href="http://www.wfi.ch">www.wfi.ch</a>, 2004</td>
</tr>
</tbody>
</table>
Before laser therapy. 
05.3.2004

After two weeks laser therapy.

After one month laser therapy 
complete healing.
Ulceration, decubitus – Therapy example with the RJ laser

Patient, male, 27 years. Suffering from temporarily paralisis.

Aparte de la terapia de laser se require para el exitoso tratamiento de ulceraciones de decubito el frecuente cambio de la postura del paciente y también la reduccion de infecciones.

Para tartar infecciones RJ recomienda tambien la Disinfección Fotodinámica (DFD) con láser de la onda de longitude 638 nm/150 mW y el cloruro de tolonio.

<table>
<thead>
<tr>
<th>Time</th>
<th>Daily 5–10 minutes the first months, thereafter 3–4/week.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>B</td>
</tr>
<tr>
<td>Power</td>
<td>500 mW/810 nm and 90 W/904 nm</td>
</tr>
<tr>
<td>Device</td>
<td>Physiolaser olympic</td>
</tr>
<tr>
<td>Additional</td>
<td>Silver coloid</td>
</tr>
<tr>
<td>Date</td>
<td>January – February 2010</td>
</tr>
<tr>
<td>Clinic</td>
<td>Dr. Ravindra Mistry&lt;br&gt;Omkareshwer Yogic Acupuncture Ctr Int&lt;br&gt;MorabhagalStreet, Rander, Surat – 5&lt;br&gt;Gujarat State Pin: - 395 005&lt;br&gt;India <a href="mailto:dr_ravindra99@rediffmail.com">dr_ravindra99@rediffmail.com</a></td>
</tr>
</tbody>
</table>
Before laser therapy.
20.01.2010

After 2 weeks laser therapy.

After almost 5 weeks laser therapy. Dry skin and closed wound.
Wound healing competence with RJ–LASER devices

Patient, female, age 45 years

The patient had a traffic accident on the evening of the 11th of June followed by acute care in the local hospital. The patient suffered under severe soft tissue damages on the mouth and lip nose area, a deep laceration inside the upper lip was closed by the surgeon with three stitches. Four frontal teeth were destroyed. Bone and soft tissue trauma on cheeks and face area. Joint injury on the hands and knee. Because of the injury the patient could not move lips or open the mouth prior to laser therapy. The joints on both hands where swollen and hard to move. It was important to reduce the risk of scars in the facial area. The laser therapy was the method of choice to perform fast and stable wound management, pain free condition and scare free tissue healing.

<table>
<thead>
<tr>
<th>Time</th>
<th>15 minutes (approx. 190 Joule) 3x daily during the first 2 days, thereafter 2x daily and the last 4 days 1x daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Derma program, wound acute</td>
</tr>
<tr>
<td>Power</td>
<td>500 mW/810 nm + 50 mW/650 nm</td>
</tr>
<tr>
<td>Device</td>
<td>Photonic 500</td>
</tr>
<tr>
<td>Additional</td>
<td>No wound dressing or extra treatment</td>
</tr>
<tr>
<td>Date</td>
<td>12.–18. June 2008</td>
</tr>
<tr>
<td>Clinic</td>
<td>RJ–LASER Research Department Leonhardtstr. 5, 14057 Berlin, Germany</td>
</tr>
</tbody>
</table>

Irradiation of the joints with rotation and the mouth lip area in rectangle mode (X/Y axis).
Acute injury after accident

Day 1: The morning after the accident, before laser therapy. The wound was still wet without any closure, severe pain. The lip mouth area was swollen and jaw movement obstructed.

Day 2–3: Completely covered with scurf, dry wound less edema.

Day 7: The crust already started to fall off. Beside some redness the skin was normal.

Day 9 (last two days no laser therapy): Except of a tiny spot which is still fading away, the skin and deeper tissue layers are normal in color and size and –very important– scar free.
Low-Level Laser Therapy (LLLT) Efficacy in Post-operative Wounds, 2005
NICOLETA HERASCU,1 BOGDAN VELCIU,2 MIHAELA CALIN,1 DAN SAVA STRU,1 and CAMELIA TALIANU1

Objective: The aim of this paper was to investigate the efficacy of low-level laser radiation (LLLR) with wavelength of 904 nm on the stimulation of the healing process of postoperative aseptic wounds (early scar).

Background Data: Low-level laser therapy (LLLT) has been increasingly used to treat many disorders, including wounds. However, despite such increased clinical usage, there is still controversy regarding the efficacy of this wound treatment in current clinical practice.

Methods: LLLT has been used to treat cutting plague in the right instep and on the left foot. Both resulted from sutured wounds. The clinical evaluation by semiquantitative methods is presented.

Results: Clinical evaluation showed that the healing process of these postoperatively treated wounds has occurred and that the functional recovery of the patients (i.e., return to their ordinary life) was faster than without treatment.

Conclusion: LLLR with wavelength of 904 nm to stimulate postoperative aseptic wounds (early scar) is efficient in both cases of cutting plague.

Nicoleta Herascu
National Institute of Research and Development for Optoelectronics INOE 2000
1 Atomistilor St.
PO Box MG5, 077125, Magurele–Bucharest, Romania
Objective: The purpose of this study was to evaluate, from the histological point of view, the effect of diode laser irradiation on skin wound healing in Sprague-Dawley rats. Background Data: Various biological effects have been described in different studies after low-level laser therapy (LLLT). Methods: Two parallel full thickness skin incisions were performed on the back of each rat (n = 49) and immediately sutured. After surgery, one wound of each rat was exposed to laser irradiation (continuous mode, 670 nm, daily dose 30 J/cm²), whereas the parallel wound was not irradiated and served as control. Both wounds were removed 24, 48, 72, 96, 120, 144, and 168 h after surgery and routinely fixed and embedded in paraffin sections, stained with hematoxylin and eosin, van Gieson, periodic acid Schiff + periodic acid Schiff diastase, Mallory's phosphotungstic hematoxylin, and azur and eosin, and histopathologically evaluated. Results: As compared to nonirradiated control wounds, laser stimulation shortened the inflammatory phase as well as accelerated the proliferative and maturation phase, and positively stimulated the regeneration of injured epidermis and the reparation of injured striated muscle.

Conclusion: LLLT at 670 nm positively influences all phases of rat skin wound healing.

Peter Gál, Department of Medical Biophysics
Prof. Jan Sabo, Ph.D., Department of Forensic Medicine
Faculty of Medicine
Pavol Jozef Saffarik University in Kosice
Trieda SNP 1 040 66 Kosice, Slovak Republic
Burns

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burns</td>
<td>6–8</td>
<td>Nogier B/C Reininger</td>
<td>3–4</td>
</tr>
</tbody>
</table>

Apply the RJ laser at short distance.

Treatments table – Therapy example with the RJ laser
The female patient (age 25 years) suffered under acute burns (2nd and 3rd degree) caused by gas explosion at home. She was admitted to the hospital for first aid three days after the accident. Already after the first day the patient was almost pain free and regeneration of the skin started (the patient felt soft healing sensations in the skin) and she was able to start to move her arm freely. The therapy was gentle and fast and led to complete healing.

| Time | 10 minutes per area, 3x daily for the first 3 days, thereafter 2 x daily for the next 3 days, thereafter 1 x daily |
| Frequency | A, continuous beam |
| Power | 4x55 mW/785 nm+4x40 mW/655 nm+4x5 mW/655 nm, 400 mW/810 nm |
| Device | Polylaser trion, Physiolaser olympic |
| Additional | Contratubex gel |
| Date | June 2005 |
| Clinic | Ben Hayan Medical Center, Dr. Abdel Tawil, Amman 11194, Jordan, Shmaisani, dr_tawil@yahoo.com, www.clients.johealth.com/tawil |
Before laser therapy, arrival in the hospital. The skin was red, swollen and painful.

30.06.2005

After 12 days laser therapy even deep parts were covered completely but still needed some more days to normalize.

10.07.2005
Effectiveness of Laser Photobiomodulation at 660 or 780 Nanometers on the Repair of Third-Degree Burns in Diabetic Rats
GYSELLE C.S. MEIRELES, Ph.D.1 JEAN N. SANTOS, Ph.D.1 PRISCILA O. CHAGAS, D.D.S.,1 ADRIANA P. MOURA, D.S.1 and ANTONIO L.B. PINHEIRO,

Objective: The aim of this investigation was to compare by light microscopy the effects of laser photobiomodulation (LPBM) at 660 nm and 780 nm on third-degree burns in diabetic Wistar rats.

Background Data: Burns are severe injuries that result in fluid loss, tissue destruction, infection, and shock, that may result in death. Diabetes is a disease that reduces the body's ability to heal properly. LPBM has been suggested as an effective method of improving wound healing.

Materials and Methods: A third-degree burn measuring 1.5 x 1.5 cm was created in the dorsum of each of 55 animals, and they were divided into three groups that were or were not treated with LPBM (660 nm or 780 nm, 35 mW, 2 mm, 20 J/cm²). The treatments were started immediately post-burn at four points within the burned area (5 J/cm²) and were repeated at 24-hour intervals over 21 d. The animals were humanely killed after 3, 5, 7, 14, and 21 and by an overdose of intraperitoneal general anesthetic. The specimens were routinely cut and stained and analyzed by light microscopy.

Results: We found that healing in the animals receiving 660-nm laser energy was more apparent at early stages, with positive effects on inflammation, the amount and quality of granulation tissue, fibroblast proliferation, and on collagen deposition and organization. Epithelialization and local microcirculation were also positively affected by the treatment.

Conclusion: The use of 780-nm laser energy was not as effective as 660-nm energy, but it had positive effects at early stages on the onset and development of inflammation. At the end of the experimental period the primary effect seen was on the amount and quality of the granulation tissue. The 660-nm laser at 20 J/cm², when used on a daily basis, was more effective than the 780-nm laser for improving the healing of third-degree burns in the diabetic rats beginning at the early stages post-burn.

Prof. Antonio Luiz Barbosa Pinheiro
Laser Center
Faculdade de Odontologia, Universidade Federal da Bahia
Av. Araújo Pinho, 62, Canela Salvador, BA CEP 40140-110, Brazil
Vessel system, lymphatic system

Improvement of blood circulation by means of collateral vessel regeneration (wound healing), improvement of lymphatic system, reduction of edema.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessel, lymph formation</td>
<td>4–8</td>
<td>Nogier B/C Reininger</td>
<td>2–4</td>
</tr>
</tbody>
</table>

X Apply the RJ laser at short distance or directly on the edema after e.g. injury.

Edema, which is the swelling or natural splinting process of the body, has two basic components. The first is a liquid part which can be evacuated by the blood system and the second is comprised of the proteins which have to be evacuated by the lymphatic system. Research has shown that the lymph vessel diameter and the flow of the lymph system can be doubled with the use of LLLT.
The venous diameter and the arterial diameters can also be increased. This means that both parts of edema (liquid and protein) can be evacuated at a much faster rate to relieve swelling. Especially after injuries, traumata, plastic surgery, the laser irradiation will help to reduce the swelling and speed up the healing process.


The effect of HeNe irradiation on the process of angiogenesis in the infarcted rat heart and in the chick chorioallantoic membrane (CAM), as well as the proliferation of endothelial cells in tissue culture, was investigated by Mirsky. Formation of new blood vessels in the infarcted rat heart was monitored by counting proliferating endothelial cells in blood vessels. In the CAM model, defined areas were laser-irradiated or non-irradiated and blood vessel density was recorded in each site in the CAM at various time intervals. Laser irradiation caused a 3.1-fold significant increase in newly formed blood vessels 6 days post infarction, as compared with non-irradiated rats. In the CAM model, a slight inhibition of angiogenesis up to 2 days post irradiation and a significant enhancement of angiogenesis in the laser-irradiated foci as compared with control non-irradiated spots were evident. The laser irradiation caused a 1.8-fold significant increase in the rate of proliferation in endothelial cells in culture over non-irradiated cells.
**Inflammation**

Alleviation of inflammation, rheumatism.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflammation</td>
<td>4–8</td>
<td>Nogier A Reininger</td>
<td>2–4</td>
</tr>
</tbody>
</table>

- **X** Apply the RJ laser at short distance or directly on the inflammed body parts or rheumatic joints.
Bones, joints, tendons, sports injuries

Traumata, carpal tunnel syndrome, joint pain, fracture healing, improved callus formation and mineralization, bone necrosis.

Carpal tunnel syndrome

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpal tunnel syndrome</td>
<td>7–10</td>
<td>Nogier A/C Reininger</td>
<td>2–4</td>
</tr>
</tbody>
</table>

Apply the laser with skin contact and if not possible, at short distance.

The treatment of Carpal tunnel syndrome was the first registered indication by the FDA, for a handheld laser with 3x50 mW/785 nm, treatment with continuous beam.

Low – Level– Laser Therapy In Mild And Moderate CTS – A Double Blind, Randomised Study
Th. Rappl, Ch. Laback, St Quasthoff, M. Auer-Grumbach, R. Gumpert, E. Scharnagl

The aim was to evaluate the LLLT in CTS (ENG: < 6,9 ms) monitored by EMG and VAS (Visual Analogous Scale) recordings. 72 hands with CTS treated by LLLT (15 sessions/30 min, over a period of 5 weeks) were evaluated by a double blind – randomised study. ENG and VAS (visual analogous scale) were performed prior to and after LLLT. LLLT (wavelength 830 nm, 400 mW) with an energy of 3J per point focused on the Carpal – tunnel, on trigger and acupuncture – points was performed in 38 cases, in 38 cases (control – group) we used a red light pen.
Follow-up ranged from 8 to 12 months. ENG and VAS improved in 66%, didn’t change in 8% and got worse in 26% in the LLLT group after a 12 month period. No improvement was recorded in the control group.
The results suggest that LLLT can be recommended in mild or average CTS (ENG < 4.9 ms) especially if a conservative treatment is required.

Successful management of female office workers with "repetitive stress injury" or "carpal tunnel syndrome" by a new treatment modality—application of low level laser
E. Wong G LEE J. Zu CHERMAN and D. P. MASON
Western Heart Institute and St. Mary's Spine Center St. Mary's Medical Center. San Francisco. CA. USA and Head and Neck Pain Center, Honolulu HL. USA
Abstract: Female office workers with desk jobs who are incapacitated by pain and tingling in the hands and fingers are often diagnosed by physicians as "repetitive stress injury" (RSI) or "carpal tunnel syndrome" (CTS). These patients usually have poor posture with their head and neck stooped forward and shoulders rounded; upon palpation, they have pain and tenderness at the spinous processes C5 - T1 and the medial angle of the scapula. In 35 such patients we focused the treatment primarily at the posterior neck area and not the wrists and hands. A low level laser (100 mW) was used and directed at the tips of the spinous processes C5 - T1.

The laser rapidly alleviated the pain and tingling in the arms, hands and fingers and diminished tenderness at the involved spinous processes. Thereby, it has become apparent that many patients labeled as having RSI or CTS have predominantly cervical radicular dysfunction resulting in pain to the upper extremities which can be managed by low level laser. Successful long-term management involves treating the soft tissue lesions in the neck combined with correcting the abnormal head, neck and shoulder posture by taping. Cervical collars, and clavicle harnesses as well as improved work ergonomics.
Sports injuries, traumata

The laser therapy is perfect for sports injuries. Use the Multi-cluster probe or single probe, depending on the size if the injury.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sports injuries</td>
<td>10–15</td>
<td>Nogier A/B/C</td>
<td>2–4</td>
</tr>
</tbody>
</table>

Apply the laser with skin contact and if not possible, at short distance.

Irradiation of the patella
The pictures show the physiotherapist of the German sports team during the treatment of the lumbal region. Using the Physiolaser olympic, multi-cluster probe Universade Bangkok 2007.
Fracture healing

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone, fracture healing</td>
<td>10–20</td>
<td>Nogier B/C Reininger</td>
<td>2–4</td>
</tr>
</tbody>
</table>

Biomodulatory effects of LLLT on bone regeneration

Antonio L.B. Pinheiro1, Marília G. Oliveira2, Pedro Paulo M. Martins3, Luciana Maria Pedreira Ramalho4, Marcos A. Matos de Oliveira5, Aurelício Novaes Júnior and Renata Amadei Nicolau

1 School of Dentistry, Department of Diagnostic and Therapeutics, Universidade Federal da Bahia, Salvador, BA, 40110–150, Brazil; 2 School of Dentistry, Post-Graduate Program on Oral and Maxillofacial Surgery, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, RS, Brazil;

Tissue healing is a complex process that involves local and systemic responses. The use of Low Level Laser Therapy (LLLT) for wound healing has been shown to be effective in modulating both local and systemic response. Usually the healing process of bone is slower than that of soft tissues. The effects of LLLT on bone are still controversial as previous reports show different results. This paper reports recent observations on the effect of LLLT on bone healing.

The amount of newly formed bone after 830nm laser irradiation of surgical wounds created in the femur of rats was evaluated morphometrically. Forty Wistar rats were divided into four groups: group A (12 sessions, 4.8J/cm2 per session, 28 days); group C (three sessions, 4.8J/cm2 per session, seven days). Groups B and D acted as non-irradiated controls. Forty eight hours after the surgery, the defects of the laser groups were irradiated transcutaneously with a
CW 40mW 830nm diode laser, (f~1mm) with a total dose of 4.8J/cm². Irradiation was performed three times a week. Computerized morphometry showed a statistically significant difference between the areas of mineralized bone in groups C and D (p=0.017). There was no significant difference between groups A and B (28 days) (p=0.383). In a second investigation, we determined the effects of LLLT on bone healing after the insertion of implants. It is known that dental implants need four and six months period for fixation on the maxillae and on the mandible before receiving loading. Ten male and female dogs were divided into two groups of five animals that received the implant. Two animals of each group acted as controls. The animals were sacrificed 45 and 60 days after surgery. The animals were irradiated three times a week for two weeks in a contact mode with a CW 40mW 830nm diode laser, (f ~1mm) with a total dose per session of 4.8J/cm² and a dose per point of 1.2J/cm². The results of the SEM study showed better bone healing after irradiation with the 830nm diode laser. These findings suggest that, under the experimental conditions of the investigation, the use of LLLT at 830nm significantly improves bone healing at early stages. It is concluded that LLLT may increase bone repair at early stages of healing.
Nerve system

Improvement of nerve healing (injuries), nerve pain, lesions, ruptures, paresis, neuritis, neuralgia, apoplexia.

Nerve injury

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nerve healing injury</td>
<td>300 – 400</td>
<td>Nogier B/E/F Reininger</td>
<td>2–4</td>
</tr>
</tbody>
</table>

Apply the laser with skin contact.

For nerve healing in the spinal cord a long therapy duration is required in order to administer sufficient energy to the deeper layers and nerve cells.

The long treatment duration for the spinal cord can only be performed with the tripod holding the point probe or scanning system (Photonic).
Laser Phototherapy (780 nm), a New Modality in Treatment of Long-Term Incomplete Peripheral Nerve Injury: A Randomized Double-Blind Placebo-Controlled Study
SHIMON ROCHKIND, M.D.,1,5 VIVIAN DRORY, M.D.,2 MALVINA ALON, M.D.,3 MOSHE NISSAN, Ph.D.,4 and GEORGES E. OUAKNINE, M.D.5

Objective: The authors conducted this pilot study to prospectively investigate the effectiveness of low-power laser irradiation (780 nm) in the treatment of patients suffering from incomplete peripheral nerve and brachial plexus injuries for 6 months up to several years.

Background Data: Injury of a major nerve trunk frequently results in considerable disability associated with loss of sensory and motor functions. Spontaneous recovery of long-term severe incomplete peripheral nerve injury is often unsatisfactory.

Methods: A randomized, double-blind, placebo-controlled trial was performed on 18 patients who were randomly assigned placebo (non-active light: diffused LED lamp) or low-power laser irradiation (wavelength, 780 nm; power, 250 mW). Twenty-one consecutive daily sessions of laser or placebo irradiation were applied transcutaneously for 3 h to the injured peripheral nerve (energy density, 450 J/mm2) and for 2 h to the corresponding segments of the spinal cord (energy density, 300 J/mm2). Clinical and electrophysiological assessments were done at baseline, at the end of the 21 days of treatment, and 3 and 6 months thereafter.

Results: The laser-irradiated and placebo groups were in clinically similar conditions at baseline. The analysis of motor function during the 6-month follow-up period compared to baseline showed statistically significant improvement ($p < 0.0001$) in the laser treated group compared to the placebo group. No statistically significant difference was found in sensory function. Electrophysiological analysis also showed statistically significant improvement in recruitment of voluntary muscle activity in the laser-irradiated group ($p < 0.006$), compared to the placebo group.

Conclusion: This pilot study suggests that in patients with long-term peripheral nerve injury noninvasive 780-nm laser phototherapy can progressively improve nerve function, which leads to significant functional recovery.
Paralysis

Murakami F. et al.
Laser Therapy 5; 131–135, 1993 © John Wiley & Sons, Ltd.
"Diode low reactive level laser therapy and stellate ganglion block compared in the treatment of facial palsy"

In 52 patients who presented with peripheral facial paralysis, 26 received stellate ganglion block therapy, 11 received infrared diode laser low reactive level laser therapy, and 15 received a combination of both of the above. The data were analyzed to compare the effectiveness of the three regiments.

Result: Those patients who received only LLLT or the combination of LLLT with SGB showed a similar overall recovery from the paralysis compared to those treated with SGB alone. The group who received LLLT only also demonstrated a slightly better initial improvement in paralysis scores. No serious side effects were reported in the LLLT group. Taking the above data into consideration, the authors recommend diode laser therapy as a suitable single or adjunctive therapy for facial paralysis which is relatively easy and painless to apply, requires less technical skill, compared with SGB, and has no side-effects.
Dentistry – Oral Application

Analgetic and anti inflammatory, trophic effect especially after surgery, necrosis.

Beside the local therapy reflectory therapy is recommended using NOGIER frequencies and RAC diagnosis. Please refer to the research and books of Dr. Mastalier, Germany.

For the dental therapy RJ offers various applicators and fiber optics, which can be attached to the laser probes.

RJ dental applicator with conical and flat tip.
Fracture healing, bone repair, implant healing

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implant healing</td>
<td>10–15</td>
<td>Nogier A/B/F Reininger</td>
<td>2–3</td>
</tr>
<tr>
<td>Bone repair</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The regenerative effect of laser therapy is proved in soft and hard tissue. Laser therapy is recommended after tooth extraction and for implant healing.

Infrared Laser Light Reduces Loading Time of Dental Implants: A Raman Spectroscopic Study
CIBELLE B. LOPES, M.S.,1 ANTÔNIO L.B. PINHEIRO, Ph.D.,3 SOKKI SATHAIH, Ph.D.,2 JANAÍNA DUARTE, M.S.,2 and MARIA CRISTINAMARTINS, D.D.S.,4

Objective: The aim of this study was to assess, through near-infrared Raman spectroscopy (NIRS), the incorporation of hydroxyapatite of calcium (CHA; ~960 cm⁻¹) on the healing bone around dental implants submitted or not to low-level laser therapy (LLLT) (830 nm).

Background Data: The process of maturation of the bone is important for the success of dental implants, as it improves the fixation of the implant to the bone, allowing the wearing of a prosthesis. LLLT has been suggested as a mean of improving bone healing because of its biomodulatory capabilities.
Methods: Fourteen rabbits received a titanium implant on the tibia; eight of them were irradiated with 830-nm laser (seven sessions at 48-h intervals, 21.5 J/cm² per session, 10 mW, ~0.0028 cm², 85 J/cm² treatment dose), and six acted as control. The animals were sacrificed at 15, 30, and 45 days after surgery. Specimens were routinely prepared for Raman spectroscopy. Twelve readings were taken on the bone around the implant. Results: The results showed significant differences in the concentration of CHA on irradiated and control specimens at both 30 and 45 days after surgery (p < 0.001).

Conclusion: It is concluded that LLLT does improve bone healing, and this can be safely assessed by Raman spectroscopy.
Bone necrosis (bisphosphonate associated)

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone necrosis</td>
<td>4–8</td>
<td>Nogier B/F</td>
<td>2–3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reininger</td>
<td></td>
</tr>
</tbody>
</table>

Apply the laser directly on the necrosis with dental applicator.

Dr. S. Hafner, Germany, was the first who treated the bone necrosis successfully using the Physiolaser olympic with power of 200 mW/670 nm and as well 500 mW/810 nm.

The laser therapy according to Dr. Hafner is currently the only known method to cure the necrosis following the cancer therapy.

A new effective treatment protocol for bisphosphonate associated osteonecrosis of the jaws by using Low-level-laser therapy combined with conservative dentoalveolar surgery

Hafner, S., Schiel, S., Breitfeld, M, Otto, S., Mast, G. Ehrenfeld, M.

Objectives: Osteonecrosis of the jaws is a well known issue adverse side effect of bisphosphonate therapy. Bisphosphonates are used to treat osteoporosis, Paget’s disease of bone, hypercalcemia syndrom, multiple myeloma and other patients with osteolytic bone metastasis. Their primary mechanism of action is inhibition of osteoclastic resorption of bone. Within the past 4 years many papers reported that bisphosphonate use, especially intravenous nitrogen-containing preparations, may be associated with osteonecrosis of the jaws. Oversuppression of bone turnover is probably the primary mechanism for the development of this condition, although there may be contributing comorbid factors. There are no sufficient current
treatment strategies to manage these osteonecrosis. Extensive resection has not consistently resulted in wound closure and may lead to worsening or progression of disease.

**Methods:** In our study we performed a treatment protocol by preferring a conservative débridement of necrotic bone combined with Low-level laser therapy (diodesoftlaser/ 200mW/670 nm, Physiolaser Olympic) including n=42 patients (49-83a, 32 female, 10 male) with bisphosphonate associated osteonecrosis of the jaws. We used softlaser application before and after surgery at the locations of osteonecrosis directly on the bone and the environing tissue. Bisphosphonate-treatment was discontinued if it was medically sustainable and supported our therapy by prescripting antibiotics (amoxicillin/clavulanic acid or clindamycin). Low-level laser therapy was started in short intervals (2-3 a week, 4-6 Joule/cm²). If we saw a good progress in healing we reduced the treatment to once a week until healing was completed.

**Results:** This new regenerative therapy concept – used in 42 cases with one or more sites of osteonecrosis – showed good clinical results with an effective infection management (no major complications such as mandibulectomy, abscess or systemic inflammation although some of the patients were in chemotherapeutical treatment during the LLLT, occurred). In addition an effective pain control was reported by the patients. Healing or significant improve of the local condition could be seen in 20 patients within the first weeks after starting the treatment. The other n=22 patients are still in therapy while a major part of these patients shows continuing progress in wound healing. Low-level laser therapy seemed to be most effective if the treatment is carried out immediately after surgery.

**Conclusions:** In our study we determined a effective treatment protocol for bisphosphonate associated osteonecrosis of the jaws by using softlaser combined with dentoalveolar surgery. The key of therapy could be the local reduction of oversuppression of bone turnover by stimulating osteoclasts using Low-level laser therapy (LLLT). The removal of the antiangiogenic effects of the drug on the soft tissues and periosteum combined with the angiogenetic and osteogenetic effect of the softlaser therapy may play a role in healing (3, 4, 6). Some studies indicate that bone irradiated with softlaser shows increased osteoclastic and osteoblastic proliferation, collagen
deposition, and bone neoformation (3, 6). Vascular responses to softlaser phototherapy were also suggested as one of the possible mechanisms responsible for the positive clinical results observed following LLLT (6). More clinical studies are needed to evaluate and optimize the mode of softlaser application and to improve the success of this regenerative therapy concept.

Abstract Osteology Monaco Poster Session 05/2007

Patient (66a, D: prostatic carcinoma) with osteonecrosis in the upper jaw (17-18) after bisphosphonate therapy (Zometa).
Sequestrotomy after one week of Low-level laser therapy.

Softlaser application after surgery (4–6 J/cm²) on the environing tissue.
Wound dehiscence 6 days after surgery, healing by granulation.

Wound healing is completed 4 weeks after surgery and in a stable condition 10 weeks after surgery.
Clinical Study of the Gingiva Healing after Gingivectomy and Low-Level Laser Therapy

JOSE CLAUDIO FARIA AMORIM, M.Sc.,1 GERDAL ROBERTO DE SOUSA, M.Sc.,1 LIVIO DE BARROS SILVEIRA, M.Sc.,1 RENATO ARAÚJO PRATES, M.Sc.,2 MARCOS PINOTTI, PH.D.,1 and MARTHA SIMÕES RIBEIRO, Ph.D.2

Objective: The purpose of this study was to investigate gingival healing after gingival ectomy and adjunctive use of low-level laser therapy (LLLT).

Background Data: LLLT has been used in animal experiments to examine the influence of laser radiation on the wound healing process since the 1960s. However, clinical trials in dentistry are scarce, and most of them refer to treatment after extraction of the third molars, with only a few reports in the area of periodontics.

Methods: Twenty patients with periodontal disease were selected, and treatment was planned for gingivectomy to bilateral maxillary and mandibular premolar teeth. After surgery, one side was submitted to LLLT using a 685-nm wavelength, output power of 50 mW, and energy density of 4 J/cm². The other side was used as the control and did not receive laser irradiation. Healing was evaluated, clinically and biometrically,
immediately post-surgery and at days 3, 7, 14, 21, 28, and 35. Results were submitted to statistical analysis.

**Results:** Biometrical evaluation indicated a significant improvement in healing for the laser group at 21 and 28 days. Clinical evaluation showed better repair for the laser group, mainly after the third day.

**Conclusion:** LLLT was an effective adjunctive treatment that appeared to promote healing following gingivectomy.
Pain management, hypersensitivity

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain management</td>
<td>6–15</td>
<td>Nogier A/E/F Reininger</td>
<td>2–3</td>
</tr>
</tbody>
</table>

Apply the laser with skin contact and dental applicator.

Low intensity Laser Therapy to treat Dentin Hypersensitivity

Rosane de Fátima Zanirato Lizarellia; Marcelo de Oliveira Mazzettob; Vanderlei Salvador Bagnatoa aInstituto de Física de São Paulo, São Carlos, SP 13560-900. Brazil. bFaculdade de Odontologia de Ribeirão Preto, Universidade de São Paulo, SP 14040-000, Brazil.

Dentin hypersensitivity is the most common patient’s complain related to pain. In fact, this is a challenge to treat specially if conventional techniques are used. The possibility to treat pain through a low intensity laser give us an opportunity to solve this important clinical problem without promote a discomfort to patient. The main point here is not if this kind of treatment is anti-inflammatory to pulp and/or biostimulatory to production of irregular secondary dentin. The most important point here is to understand how much energy is necessary to reach conditions where to tooth become insensible to external stimulus. Our double-blinded study compared a group without laser (Placebo) with five other groups where different doses at 660 nm low intensity laser were employed. The final conclusion is that for 660 nm laser therapy, the doses from 0.13 to 2.0 J/cm² were more effective than the others. The follow up care in this study was of 45 days.
Arthralgia of the Temporomandibular Joint and Low-Level Laser Therapy
H. FIKÁČKOVÁ, M.D.,1,2 T. DOSTÁLOVÁ, M.D., Ph.D., Dr.Sci., M.B.A.,3 R. VOSÍCKÁ, D.D.S.,3 V. PETEROVÁ, M.D., Ph.D.,4 L. NAVRÁTIL, M.D., Ph.D.,1,5 and J. LESÁK6

Objective: This case report describes the treatment of a patient with arthralgia of the temporomandibular joint (TMJ) caused by disc displacement. Background Data: The goal of the treatment of TMJ arthralgia is to decrease pain by promotion of the musculoskeletal system’s natural healing ability.

Methods: This report describes the complex treatment of TMJ arthralgia. Low-level laser therapy (LLLT) was chosen for its anti-inflammatory and analgesic effects. Laser therapy was carried out using the GaAlAs diode laser with an output power of 400 mW, emitting radiation with a wavelength of 830 nm, and having energy density of 15 J/cm²; the laser radiation was applied by contact mode on four targeted spots in 10 sessions. Physiotherapy was recommended to this patient to prevent the injury of intraarticular tissue caused by incorrect movement during opening of the mouth. Splint stabilization and prosthetic treatment were used to reduce overloading of the TMJ, resulting from unstable occlusion and to help repositioning of the dislocated disc.

Results: Five applications of LLLT led to decrease of pain in the area of the TMJ on the Visual Analog Scale, from 20 to 5 mm. The anti-inflammatory effect of the laser was confirmed by thermographic examination. Before treatment, the temperature differences between the areas of the normal TMJ and TMJ with arthralgia was higher than 0.5°C. However, at the conclusion of LLLT, temperatures in the areas surrounding the TMJ were equalized.

Conclusion: This study showed the effectiveness of complex non-invasive treatment in patients with arthralgia of the TMJ. The analgesic and anti-inflammatory effects of LLLT were confirmed by infrared thermography.
Oral mucositis, aphtae

Treatment of mucositis and aphtae etc. is very promising, it is as well recommended as a standard treatment during chemotherapy.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral mucositis</td>
<td>2–6</td>
<td>Nogier A/F</td>
<td>2–3</td>
</tr>
<tr>
<td>aphtae</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Apply the laser with skin contact and dental applicator.

In order find the cause of the oral disorder, always include the condition of the digestion system (stomach, small and large intestine) in your diagnostic evaluations. The immune system of the patient must be supported as well.

The use of low energy lasertherapy in oral mucositis

_C.Migliorati, C.Massumoto, F.P.Eduardo, K.P.Müller, T.C.Carrieri, P.Haypek, C.P.Eduardo_
_Hospital Sírio Libanes and SOL – Sociedade de Odontologia a Laser, Sao Paulo, Brasil_

**Purpose**: Oral mucositis is a severe and therapy limiting stomatotoxic side effect caused by systemic high-dose chemotherapy (CT) and by conditioning regimen for Bone Marrow Transplantation (BMT). This initial clinical observational study evaluated the possible efficacy of low energy lasertherapy in the treatment of oral mucositis.
Material and Methods: Eleven patients from the Oncology Center of the Hospital Sirio Libanes in São Paulo - Brazil, with a variety of oncological diseases, and who were going to receive either CT (2) or BMT (9) were treated with the Mucolaser™ (GaAlAs laser – MM Optics São Carlos - Brazil). All patients had the oral cavity examined by an oral medicine expert before the beginning of the oncological treatment. On the first day of the CT of Conditioning Regimen, the entire oral mucosa was laser-treated with continuous emission of the infrared light, which had 780nm wavelength, and output power of 60 mW, resulting in a final energy density of 2J/cm2. The tip of the laser device lightly touched the oral mucosa for about 35 minutes. Daily sessions were performed for an average of 10 applications for each patient. Mucositis was clinically evaluated based on the WHO scale and pain was measured by using a visual analogue scale.

Results: In general the patients tolerated the procedure well. In some cases days of application were missed because of nausea or vomiting, but there were no toxic effects related with the laser. Ten of the 11 patients developed mucositis varying from grade I – IV of the WHO classification. None of the patients had maximum pain score (10). Patients requested that lasertherapy was performed because of the immediate pain relief.

Conclusion: The authors of the present paper believe that low energy lasertherapy may play a role in the control of pain in oral mucositis. In order to evaluate prevention of mucositis and acceleration of the healing we have initiated a randomized controlled study.

Congress for Oral laser Therapy, Vienna 2001
**Destruction of bacterials, periimplantitis, infections, root channel infections – Photo Dynamic Therapy**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Joule cm²</th>
<th>Frequency</th>
<th>Treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destruction of bacterials</td>
<td>8–10</td>
<td>cw</td>
<td>1</td>
</tr>
</tbody>
</table>

- **Indication**: Apply methylene blue (670 nm) or tolonium chloride (635–640 nm) and irradiate the cavity/root channel directly with the laser using a special dental applicator, fiber optic.

For disinfection, the laser is used in combination with special drugs, for the so called **Photo Dynamic Therapy (PDT)** or in this case **Photo Dynamic Disinfection (PDD)**.

The PDT became available for use in both caries and infections of the soft tissue, endodontics.

**Principle of function:**

a) The photosensitizer molecules attach to the membrane of the bacteria.

b) Irradiation with light at a specific wavelength matched to the peak absorption of the photosensitizer leads to the production of singlet oxygen, which causes the bacterial cell wall to rupture, killing the bacteria.

Laboratory studies have shown that an important aspect of this system is that the two components when used independently of one another produce no effect on bacteria or on normal tissue. **It is only the combination of photosensitizer and light which produces the effect on the bacteria.**
How to perform the PDT/PDD

The PDT is fast, secure and easy to perform:

a) Connect the tip of the laser probe to a thin optical fiber, this can be a reusable or disposable hand piece.

b) After completion of canal preparation, the canal is inoculated with the photosensitizer solution which is left for a fixed period of time (60 seconds). Apply a 12.7mg/l solution of the Tolonium chloride or Methylen blue to the prepared tooth.

c) Irradiate with the laser the root canal for 120 seconds.

Aftercare: Place a non-setting calcium hydroxide paste (e.g. UltraCal) into the canal, cotton wool pledget (Roeko, Germany) in the pulp chamber and dress the tooth with IRM (Dentsply, DeTrey) in the case of posterior teeth or Chemfil Superior (Dentsply, DeTrey) in the case of anterior teeth.

This PDT system has been evaluated in the laboratory and destruction rate of bacterial is in the order of 10⁹, achieved under conditions comparable to those found clinically

PDT will destroy common bacteria associated with endodontic infections such as:

- Streptococcus mutans
- Total streptococcus
- Streptococcus sobrinus
- Streptococcus intermedius
- Actinomyces
- Lactobacillus
- Prevotella intermedia
- Peptostreptococcus micros
- Fusobacterium nucleatum
- Enterococcus faecalis
Apply the photosensitizer and insert the laser tip into the centre of the cavity, directly on the surface.

Apply the photosensitizer and insert the laser tip into the centre of the root channel.
Apply the photosensitizer and insert the laser tip into the centre of the pocket.

Remove the mucosa around the implant (micro surgery) and clean the wound. Apply the photosensitizer internal and external, let it take effect for 60 seconds and irradiate with laser 150 seconds.

Handylaser sprint with dental fibre for PDT
Treatment of Periodontal and Periimplant Diseases with the Photodynamic Therapy: an New Method

O.Dörzbudak, R.Haas, University of Vienna, Dept. of Oral Surgery

Bacteria, bacterial substances and their metabolites are considered the main cause of periodontal and periimplant diseases. The supplementary administration of a suitable antibiotic is an effective aid in the treatment of these diseases. However, it involves disadvantages such as bacterial resistance or side effects. A new treatment possibility has been found experimentally by applying a photodynamic therapy, combining soft laser irradiation and treatment with toluidine blue "O" dye. This study examined the clinical effectiveness of this combination in reducing these pathogens such as Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis and Prevotella intermedia. Following application of toluidine blue "O", samples were lased with a diode laser (75mW) with a wavelength of 690 nm for one minute. Before and after lasing, bacterial samples were obtained from dental and periimplant pockets and were analysed microbiologically. The initial value was compared with a control value. This combined treatment resulted in a significant bacterial reduction by up to 4 log steps (p<0.001). However, a complete elimination of all three microorganisms was achieved in none of the cases. However, it was found that this treatment seems to be more effective in reducing black pigmented microorganisms - Porphyromonas gingivalis and Prevotella intermedia. First results of this study allow the conclusion that photodynamic treatment is a valuable additional method without any side effects in the treatment of patients with periodontal and periimplant diseases.

Congress for Oral laser Therapy, Vienna 2001
Periimplantitis – The Goettingen Conception for Lasersupported Treatment

S. Sennhenn-Kirchner
Universitätsklinik Göttingen/Germany

Progressive bone loss around functioning dental implants is of special concern for the long term predictability. Some procedures reported for dealing with periimplant bone defects resulting from periimplant infections are antimicrobial, resective and regenerative therapies. Guided bone regeneration, when applied to peri-implantitis defects, has resulted in some success, however, results of studies are inconclusive.

The Goettingen conception for the therapy of periimplantitis prefers lasersupported antimicrobial therapy before and during the operative procedure in combination with defect filling (beta TCP) and GBR (ePTFE – membrane).

The diode laser – system with a wave length of 805nm. We decontaminate implant surfaces using the Implant-program of the laser (1.0 watts / cw for 20sec.).

Following the decontamination procedure the periimplant defects are filled with BIORESORB – a beta TCP- and covered with CYTOPLAST – non resorbable membran / ORALTRONICS.

The results show total absence of inflammation and clinical and radiological reduction of pocket – depth from average 7 mm to 3 mm.

We show cases to demonstrate the pre – and intraoperative procedure and the clinical and radiological results.

Congress for Oral laser Therapy, Vienna 2001
Repairing Process in Infected Wounds Dental Extraction, Treated with Photosensitizer Drug, Associated or no to the Low Intensity Laser: Histological Study in Mice


The objective of the present work was to study, histologically in mice, the repairing process in infected wounds of dental extraction treated with photosensitizer drug associated or not to the low intensity laser. 48 mice were used to submitted to the extraction of the under right incisor and induction of the clinical picture of experimental alveolites.

The mice were separated in 4 groups of 12 animals each, whose alveolus wounds received the following treatments: In Group I (n=12) also called Control, no treatments was realized intra or extra-alveolar; in those of the Group II (n=12) an alveolus irrigation with photosensitizer drug (methylene blue solution) took place; in the Group III (n=12, the alveolus were submitted at application of low intensity laser (635 nm, contact, 4 mW, 3 mm² (area), 0.96 J/cm², 0.132 J/cm²/s, 240s); in wounds of Group IV (n=12) had treatment similar to those of the group II, and 60 seconds after the intra-alveolar irrigation, a single application of low intensity laser with similar conditions to those of group III were accomplished. Three mice for each group were sacrificed on days 7, 15, 21 28.

The results of the histological analyses allowed to conclude that: Group I wounds demonstrated delay in the chronology of the alveolar repairing; the use of the photosensitizer drug didn't provoke undesirable effects in the alveolar repair; the wounds treated with laser demonstrated a more developed and differentiated repair process than those of the control Group; the association of the photosensitizer drug and laser demonstrated a more developed and differentiated repair process that verified in wounds treated only with laser, with photosensitizer and control characterized by bone news formation in more extensions and more ossification.

Congress for Oral laser Therapy, Vienna 2001
Alternative Therapy – Medicament applicator

1. **Homeopathic remedy** or other medicament in liquid state.
   Start the laser on cw mode and irradiate through the medicament to the body/organ (points or larger surfaces).

   *Theory:* The laser beam will transmit the information of the medicament to the organ.

2. Irradiate a medicament with the laser and bio-frequency.
   Thereafter the patient should take the energized medicament e.g. drops 3 x daily or as an injection.

3. Irradiate water with the laser and bio-frequency.
   Thereafter the patient should take the activated water e.g. drops 3 x daily.

   *Theory:* The laser beam energizes the medicament or water with the photon energy and “prints” the biofrequency information to the water molecules (energized water with cluster information).

   *Note:* This is an alternative therapy method and scientifically not recognized. It is based on practical experience as an additional treatment in holistic medicine to improve the well-being of the patient.

Attach the medicament applicator to the laser probe and insert the medicament or water into the opening.

The laser beam can now penetrate through the liquid.
Book recommendation

Laser Therapy and Laser Acupuncture  
Wolfgang Brinkmann, Anja Füchtenbusch
Laser Therapy and Laser Acupuncture on Horses  
Anja Füchtenbusch
Lasers in Medicine and Dentistry  
Z. Simunovic, Vitagraf 2000
Lasertherapie in der Allgemeinmedizin  
G. Danhof, WBV-Verlag, 1992, ISBN 3-921988-50-0
Lasertherapie in der Sportmedizin und Orthopädie  
G. Danhof, WBV-Verlag
Lasertherapie in der Zahnheilkunde  
G. Danhof, H. Breugel, J. Hesselink, H. Oudhof WBV-Verlag, 1995
Akupunktur und Lasertherapie für die Praxis  
Laserakupunktur  
J. Elias, Urban & Schwarzenberg Verlag, 1996
Soft-Laser in der Dermatologie  
Laserakupunktur  
R. Pothmann, Poentinen
Reflextherapie in der Zahn-, Mund-, und Kieferheilkunde  
O. Mastalier, Quintessenz-Verlag, 1987, ISBN 3 87652 624 8
Low Level Laser Therapy - A practical Introduction  
T. Oshiro, R.G. Calderhead
John Wiley & Sons Ltd., Chichester, GB, ISBN 0 471 9156 X
Progress in Laser Therapy  
T. Oshiro, R.G. Calderhead
John Wiley & Sons Ltd., Chichester, GB, ISBN 0 471 93154 3
Therapeutic Lasers Theory & Practice, Baxter G. D.
L’énergie douce face à la douleur, Coche P.
Photobiology of Low-Level-Laser Therapy, Karu T.I.
Scientific of Low-Power Laser-Tharpy, Karu T. I.
Laser-Therapie, Lievens P. C.
Low Level Laser Therapy as a med.Treatment Modality  
Pöntinen P.
Soft Laser-Therapy
Trelles M.
Laser para la salud y la estetica
Trelles / Mayayo
Laser Y Terapeutica En Medicina Y Cirurgia Cutanea
Trelles / Cisineros
Lasertherapie in dentistry & medicine
Tunér / Hode
Low Level Laser Therapy, Clinical Practice & Scientific Background
Tunér / Hode
The Laser Therapy Handbook,
Tunér / Hode
Lasertherapie in de medische Praktijk,
van Breugel H.H.F.I.
Tinnitus lindern durch Laserlicht
Wilden L.

---

**Laser Associations**

**WALT** (World Association for Laser Therapy)
www.walt.nu

**NAALT** (North American Association for Laser Therapy)
www.naalt.org

**SALT** (Swiss Association for Laser Therapy)
www.salt-laser.ch

**EMLA** (European Medical Laser Association)
www.emla-laser.com

**WALA** (World Association for Laser Application)
www.laser-wala.com
Laser warning signs

The following signs are placed on the laser device:

- **Laser symbol**
  - Must be attached as well on the door of the treatment room

- **Laser power and wave length and laser norm**

- **Laser warning sign**

- **Beam direction**
Large area laser therapy

Photonic 500

The Photonic 500 was designed primarily for area therapy. It easily irradiates a surface of any size, transmitting the focused laser energy quickly and effectively. Point therapy with the optional laser probe is also possible, such as for joints, trigger points, painful spots.
Photonic hair

The Photonic hair was especially designed to treat the hair and scalp. It is software controlled and offers easy operation by means of a touch panel. The light weight and compact design-dimensions are an additional benefit for the user, it can be easily installed in even the smallest treatment rooms.
Multi-functional LLLT diagnosis / therapy

Physiolaser olympic

The fully programmable Physiolaser olympic is a high-end laser that offers everything you need for comprehensive therapy and diagnosis. The previously unavailable range of functions in this compact package makes it the worldwide leading LLLT system.

- single and multi-cluster probes
- multi-fiber „LightNeedle“ system (12 channels with fiber optics)
- scanning head (similar to the Photonic)
- diagnostic modules
Physioláser olympic + LightNeedle

The LightNeedle device works always in conjunction with the Physiolaser or Photonic and takes advantage of all their therapy programs and settings. Simply connect it to the laser outlet and start the therapy. The patented safety tip of the LightNeedle is placed flat onto the skin and has a beam outlet of 90°.

For acupuncture, pain therapy, muscles, joints/tendons, nerves and many more indications.
Handheld laser devices

**Handylaser trion**
Compact handheld laser for acupuncture and auricular medicine.

**Handylaser sprint**
Compact handheld laser for classical acupuncture and physiotherapy.

**LaserPen Expert**
Compact handheld laser, programmable, for acupuncture, auricular medicine and physiotherapy.
Polylaser family + multi-cluster probes (Physiolaser/Photonic)

**Polylaser trion**

Multi-cluster stand-alone laser for treatment of larger surfaces.

**Polylaser derma**

Multi-cluster stand-alone laser for treatment of larger surfaces, especially anti-aging with Hyaluronic acid.

**Polylaser brush**

Multi-cluster stand-alone laser for treatment of larger surfaces in Physiotherapy and aesthetic medicine.
Multi-cluster

Multi-cluster stand-alone laser for treatment of larger surfaces.

Superpulsed with 5x30 W/904 nm, movable tips, perfect for physiotherapy and sports medicine.

Single probes

RJ single probes offer sophisticated handling with one fingertip. Various probes available:

- 70 mW/785 nm
- 150 mW/638 nm
- 500 mW/810 nm
- 90 W W/904 nm

Diagnostic probe

RJ diagnostic probe with hand electrode.
RJ Service & Support

RJ-Lasers put you in the forefront - giving you all the options and have been proven thousands of times over, enjoy 25 years of full confidence in laser therapy and diagnosis.

RJ-Lasers were designed in cooperation with experienced therapists and developed using the latest state of medical and technical research.

RJ offers comprehensive training seminars and laser support (acupuncture, dermatology, dentistry, physiotherapy).

Take advantage of RJ-Financing, we offer excellent financing options in addition to purchase - such as leasing with exceptionally attractive conditions, renting or paying in installments.

RJ offers a comprehensive customer service. Please visit our website: www.rj-laser.com to get the latest therapy and product information. You can download research data, clinical data, manuals.

You will find satisfied customers and distributors worldwide. Please visit our website: www.rj-laser.com to get in contact.

Our customer service in your area is ready to help at any time.

contact@rj-laser.com

service@rj-laser.com
REIMERS & JANSSEN GmbH
Medical — Laser — Technology

Frohnacker 8, 79297 Winden, Germany
Tel. +49-7682-6558 Fax +49-7682-6640
contact@rj-laser.com www.rj-laser.com

Quality Management EN ISO 13485: 2003

RJ-LASER devices are world registered

Australia
Argentina
Canada (CMDCAS)
Colombia
Europe (CE)
USA (FDA)
Iran
México
Taiwan
Thailand