Unique method
for
wound healing
and
pain relief

- Significantly shorter healing times
- Medically proved efficacy
What does BIODREON Light Therapy actually do?

BIODREON Light Therapy System is a medical device, with expanding clinical evidence that it is beneficial in the treatment of wounds and pain conditions and in the treatment of select skin disorders (wound management).

BIODREON Light employs a combination of infrared and visible light wavelengths considered to be beneficial in the treatment of different types of problems and injuries. Both visible and infrared light have been shown to affect different positive changes at cellular level.

**Biosimulative effects of BIODREON Light are the result of synergy between different mechanisms of action:**

1. **HARMONIZE METABOLIC PROCESSES**
2. **REINFORCE THE HUMAN DEFENCE SYSTEM**
3. **STIMULATE REGENERATIVE AND REPARATIVE PROCESSES OF THE ENTIRE ORGANISM**
4. **PROMOTE WOUND HEALING**
5. **RELIEVE PAIN OR DECREASE ITS INTENSITY**

**Main mechanisms of the action of light therapy:**

The scientific mechanisms underlying various light therapy treatments are still under investigation. However, in general, scientists have identified various biological effects that can be initiated and achieved as a result of light stimulation. These include:

1. Stimulation of neangiogenesis. Improvement of microcirculation.
2. Increasing the process of phagocytosis.
3. Stimulation and activation of ATP production.
4. Enhancement of important specific enzymes involved in cell regeneration.
5. Increasing the activity of lymphatic system.
6. Activation of fibroblast activity and increasing the production of collagen.
7. Increasing DNA and RNA production.
8. Reducing the excitability of nervous tissue and increasing the muscle relaxation.

BIODREON Light penetrates the skin with minimum heating effect, no damage to skin, and no known side-effects.

**Wound healing**

**ULCUS CRURIS (LEG ULCERS)**

Chronic wounds are underestimated by physicians and general public alike, yet their prevalence continues to increase dramatically because of the steady growth of the elderly population and because the elderly are at increased risk in respect of the chronic condition predisposing to chronic wounds.

The need to care for population with chronic wounds is a growing challenge that requires innovative approaches. We believe that the use of BIODREON Light Therapy alone and in conjunction with existing procedures could greatly enhance the natural wound-healing process. Furthermore, improved wound healing could reduce the risk of infection for the patient, decrease the number of costly dressings required, and more swiftly return the patient to a pre-injury/illness level of activity.

**BIODREON Light Therapy System** provides new insight into the management of leg ulcers, diabetic foot ulcers, burns and wounds following operation and injury. Patients are now able to receive innovative wound-care management. BIODREON Light Therapy could offer significant support in conjunction with standard wound-care.

**POST-TRAUMATIC WOUNDS**

**POST-SURGICAL WOUNDS**

What is BIODREON Light?

BIODREON Light Therapy System emits light characterized by:

1. **Polarization**
   - BIODREON Light is polarized light, its waves move (oscillate) on parallel planes.
   - Linear polarization by reflection (the multi-layer mirror system, Brewster mirror), is very efficient and attains a polarization degree of 95%.

2. **Polychromacy**
   - BIODREON Light Therapy System encompasses the wavelength range from 480 nm to 3400 nm. This spectrum contains the visible light range and a proportion of infrared radiation.
   - The electromagnetic spectrum of BIODREON Light does not contain ultraviolet (UV) radiation.

3. **Incoherence**
   - BIODREON Light is incoherent or "out-of-phase" light. In other words, the light waves are not synchronized.

4. **Low-energy**
   - BIODREON Light Therapy System has a low energy density (fluency) of an average of 2.4 J/cm². BIODREON Light reaches the area to be treated with a constant, steady intensity.
   - This energy density has biosimulative effects.

With BIODREON Light Therapy, the energy density dosage can be precisely determined. Furthermore, the effect exerted by light is also defined by its power density. As it is measured at the skin’s surface, it varies depending both on the intensity of the light source and its distance from the area to be treated.

The specific power density of BIODREON Light is approximately 40 mW/cm² at a treatment distance of 10 cm. This is equivalent to an energy density (fluency) of an average of 2.4 J/cm² per minute.

These properties of BIODREON Light allow it to penetrate the surface of the skin with minimum heating effect, no damage to skin, and no known side-effects.

**Pain treatment**

**PHYSIOTHERAPY**

The success of light therapy on pain and functions may be due to a number of mechanisms, one of which may be through its positive effect on chondrocyte proliferation and matrix’s synthesis. Also, significant stimulatory effect on fibroblast action and enhanced connective tissue repair were noted. These effects seem to be related to the biosimulative effect of light therapy at the cellular level. Normalization of microcirculation and speed of nerve transmission achieved have been reported to interrupt the vicious circle of origin and development of pain.

**RHEUMATOLOGY**

**SPORTS MEDICINE**

BIODREON Light Therapy in wound healing and tissue repair

Care for population with chronic wounds is a growing challenge
Venous leg ulcers

It is widely known that light therapy could accelerate the healing of wounds and superficial skin ulcers. The favorable effect of BIOPTRON Light Therapy on the healing rate of venous leg ulcers may be explained by the stimulation of epithelial growth and granular tissue regeneration.

Histo-pathology findings

The complex process of wound healing can be influenced by BIOPTRON Light Therapy. In spite of the positive clinical experiences reported in numerous publications, the mechanism of the biological effect of polarized light is still under investigation. It is assumed that, in the cell membranes, the polar heads of the lipid bilayer are reordered by polarized light and that, as a consequence, functional changes take place.

Different biological effects have been observed after light therapy, including the stimulation of cell proliferation, especially in fibroblasts, the release of growth factors and the enhancement of collagen synthesis. A number of clinical studies have revealed accelerated wound closure with increased wound epithelization and improved tensile strength of scar.

One proposed mechanism of action of photobiostimulation is the absorption of visible light by mitochondria. This may cause a chain of reactions on molecular level, leading to an increase in cell energy and activation of the nucleic acid synthesis, which is essential for wound repair. The second proposed mechanism is obtained by the infrared portion of the light spectrum. This initiates the response at the membrane level, probably through photophysical effects on Ca++ channels.

Growth factors stimulate angiogenesis, extracellular matrix production and degradation and cytokine release. The key cells in skin ulcer contraction and collagen synthesis are fibroblasts and keratinocytes. A number of studies have demonstrated their activation and proliferation in response to low-energy laser/photon stimulation. Other mechanisms that may be responsible for the light’s therapeutic effect is the local peripheral vasodilatation, which may enhance skin blood flow and supply of oxygen to the ulcer area, thereby facilitating the transportation of the nutrients required for ulcer healing.

References

Wound healing

Deep second degree burns

BIOPTRON Light Therapy has been used to treat diabetic foot ulcers and clinical results have confirmed its positive influence on the affected and treated area. The ulcers gradually cleared, granulated and epithelialized during treatment. Healing time was substantially shortened and ulcer pain was lower compared to treatment without BIOPTRON irradiation.11

Post-traumatic wounds

BIOPTRON Light Therapy is a very simple and effective additional therapy in treatment of surgical wounds.

Diabetic foot ulcers

BIOPTRON Light Therapy has been used to treat diabetic foot ulcers and clinical results have confirmed its positive influence on the affected and treated area. The ulcers gradually cleared, granulated and epithelialized during treatment. Healing time was substantially shortened and ulcer pain was lower compared to treatment without BIOPTRON irradiation.11

Post-surgical wounds

BIOPTRON Light Therapy is a very simple and effective additional therapy in treatment of surgical wounds.

Decubitus (pressure sores)

Clinical studies have demonstrated the effectiveness of polarized light therapy in healing 1st, 2nd and 3rd grade pressure ulcers. When polarized light treatment was added to conventional ulcer therapy, rapid changes in appearance and size with complete healing in half of the cases and accelerated partial healing in the remaining cases appeared within 1–2 weeks.12

Start BIOPTRON Therapy after amputation

After 3 months of BIOPTRON Therapy

Follow-up after 8 months of BIOPTRON Therapy

Start therapy

After 15 days

After 19 days

After 29 days

After 9 months

Start BIOPTRON Therapy

After 12 days of BIOPTRON Therapy

After 27 days of BIOPTRON Therapy

Before BIOPTRON Therapy

After 12 days of BIOPTRON Therapy

After 27 days of BIOPTRON Therapy

BIOPTRON Light Therapy has been used to treat diabetic foot ulcers and clinical results have confirmed its positive influence on the affected and treated area. The ulcers gradually cleared, granulated and epithelialized during treatment. Healing time was substantially shortened and ulcer pain was lower compared to treatment without BIOPTRON irradiation.11


Pain treatment

Pain is an unpleasant sensation associated with actual or potential tissue injury. Pain occurring after tissue injury has a protective role, alerting the body to damage and causing rest to allow tissue regeneration. Chronic persistent pain that is not detrimental to normal function may be compromised. The pathophysiology of pain involves alterations of pain-transmission pathways. Thus knowledge of the normal physiology of these pathways is an essential prerequisite for understanding the mechanisms of acute and chronic pain.18

BIOPTRON step by step

Simple operation makes it easy to provide your patients with BIOPTRON Light Therapy:

1. Prepare the area to be treated by cleaning (for wounds by cleaning as prescribed by the treating physician).
2. Point the light beam at the area to be treated, holding the device at right angle (90°) and maintaining a distance of approx. 10 cm.
   - Apply the BIOPTRON Light Therapy for 4–10 minutes once or twice a day.
   - Cover larger areas by treating them point by point.
   - For wounds: apply the wound dressing as prescribed by the treating physician.
3. Unplug the device after use.
   - It is advisable to prolong the BIOPTRON Light Therapy for one to two weeks after closure of the wound in order to strengthen the treated area.

Thanks to the ability of BIOPTRON Light Therapy to penetrate into live tissue, this unit is suitable for the treatment of various conditions in RHEUMATOLOGY, SPORTS MEDICINE and PHYSIOTHERAPY. It has been reported that significant pain reduction in chronic painful conditions (rheumatoid arthritis, shoulder and neck pain) could be achieved. In all these instances light therapy could help relieve pain and improve functionality. Very good results could be achieved in combination with classical treatment methods. Its beneficial influence could affect the patient’s general condition, bringing relief from pain syndromes.

BIOPTRON Light Therapy is ideally suited as a complementary treatment in rehabilitation. It is often required with standard physiotherapeutic procedures and can be successfully used as an integral part of complex physiotherapeutic procedures for sports injuries, burns, ankle and knee injuries, shoulder and elbow problems, stretching of tendons, bruises. Musculoskeletal pain can be caused by inflammation, degeneration, or trauma to the skeletal or myofascial tissues. Recent investigation in the field showed that BIOPTRON Light Therapy could be used for providing temporary relief of minor chronic and shoulder pain of musculoskeletal origin.

The BIOPTRON Light Therapy can be used both as a complementary treatment to support conventional medical methods and as a monotherapy for specific indications.

Needless to say, you are recommended to assure the clinical suitability of the BIOPTRON Light Therapy for your patient, by monitoring the effects of the treatment.

Fields of application

SURGERY • REHABILITATION • RHEUMATOLOGY • HOME CARE • SPORTS MEDICINE • TRAUMATOLOGY • GERIATRIC MEDICINE • DERMATOLOGY • NURSING HOMES • PHYSIOTHERAPY
BIOPTRON summary

Advantages of BIOPTRON Light Therapy

- Wide range of applications
- Conclusive therapeutic results
- Short treatment time
- Cost-effective (shortening hospitalization and rehabilitation periods; decreased use of wound-care materials)
- No known side effects
- Easy to use
- Continuation (rental/home care)
- Can be used both in the clinical setting and in the patient’s home

BIOPTRON Light Therapy

- A single unit emitting a broad range of light wavelengths at constant intensity for safe light therapy, thereby providing effective, clinically proved solutions in wound healing and pain treatment.
- Innovative new technology with clinically proved efficacy and visible results that encourage patient compliance.
- Mobile, easily manageable and maintenance-free device.
- High patient throughput: rapid 4–10 minutes full treatment can be administered by staff.
- Developed and produced by BIOPTRON AG, Switzerland.
- Technology endorsed and used by leading physicians in major universities and clinics across five continents.
- It can be applied both in the medical practice and in the patient’s home.

Increasing health-care costs dictate the necessity of promoting the safe and effective treatments without long-term costs.

We could offer the use of the BIOPTRON Light Therapy in order to reduce health-care costs in wound healing and pain treatment.

Technical characteristics

The three devices BIOPTRON Compact III, BIOPTRON Pro 1 and BIOPTRON 2 differ in size, design and setting, but are featuring identical physical light characteristics. They are being used by medical professionals in hospitals and private surgeries as well as by home-users and patients themselves. The different types assure to find the best fitting solution for every individual need.

BIOPTRON Compact III

- Filter diameter approx.:
  - BIOPTRON Compact III: 4 cm
  - BIOPTRON Pro 1: 11 cm
  - BIOPTRON 2: 15 cm
- Power supply:
  - BIOPTRON Compact III: 100–240 V, 50/60 Hz
  - BIOPTRON Pro 1: 100–240 V, 50/60 Hz
  - BIOPTRON 2: 100–240 V, 50/60 Hz
- Power consumption:
  - BIOPTRON Compact III: 58 W
  - BIOPTRON Pro 1: 180 VA
  - BIOPTRON 2: 1.4–1.9 A
- Rate of polariation:
  - BIOPTRON Compact III: –
  - BIOPTRON Pro 1: –
  - BIOPTRON 2: 70% / 90% V
- Radius of halogen:
  - BIOPTRON Compact III: 20 W
  - BIOPTRON Pro 1: 50 W
  - BIOPTRON 2: 90 W
- Protective class:
  - BIOPTRON Compact III: Class II, IP 20
  - BIOPTRON Pro 1: Class II, IP 20
  - BIOPTRON 2: Class I, IP 20
- Weight:
  - BIOPTRON Compact III: 0.5 kg
  - BIOPTRON Pro 1: 3.4 kg
  - BIOPTRON 2: 7.8 kg
- Ambient temperatures:
  - Operating: +10°C to +40°C
  - Storage: +5°C to +40°C
- Wavelength:
  - 480–3400 nm
- Degree of polarization:
  - >95% (590–1550 nm)
- Specific power density:
  - 40 mW/cm²
- Light energy per minute:
  - 2.4 Joule/cm²
- Filter diameter approx.:
  - BIOPTRON Compact III: 4 cm
  - BIOPTRON Pro 1: 11 cm
  - BIOPTRON 2: 15 cm

BIOPTRON Pro 1 with table stand

- Filter diameter approx.:
  - BIOPTRON Compact III: 4 cm
  - BIOPTRON Pro 1: 11 cm
  - BIOPTRON 2: 15 cm
- Power supply:
  - BIOPTRON Compact III: 100–240 V, 50/60 Hz
  - BIOPTRON Pro 1: 100–240 V, 50/60 Hz
  - BIOPTRON 2: 100–240 V, 50/60 Hz
- Power consumption:
  - BIOPTRON Compact III: 58 W
  - BIOPTRON Pro 1: 180 VA
  - BIOPTRON 2: 1.4–1.9 A
- Rate of polariation:
  - BIOPTRON Compact III: –
  - BIOPTRON Pro 1: –
  - BIOPTRON 2: 70% / 90% V
- Radius of halogen:
  - BIOPTRON Compact III: 20 W
  - BIOPTRON Pro 1: 50 W
  - BIOPTRON 2: 90 W
- Protective class:
  - BIOPTRON Compact III: Class II, IP 20
  - BIOPTRON Pro 1: Class II, IP 20
  - BIOPTRON 2: Class I, IP 20
- Weight:
  - BIOPTRON Compact III: 0.5 kg
  - BIOPTRON Pro 1: 3.4 kg
  - BIOPTRON 2: 7.8 kg
- Ambient temperatures:
  - Operating: +10°C to +40°C
  - Storage: +5°C to +40°C
- Wavelength:
  - 480–3400 nm
- Degree of polarization:
  - >95% (590–1550 nm)
- Specific power density:
  - 40 mW/cm²
- Light energy per minute:
  - 2.4 Joule/cm²

BIOPTRON 2

- Filter diameter approx.:
  - BIOPTRON Compact III: 4 cm
  - BIOPTRON Pro 1: 11 cm
  - BIOPTRON 2: 15 cm
- Power supply:
  - BIOPTRON Compact III: 100–240 V, 50/60 Hz
  - BIOPTRON Pro 1: 100–240 V, 50/60 Hz
  - BIOPTRON 2: 100–240 V, 50/60 Hz
- Power consumption:
  - BIOPTRON Compact III: 58 W
  - BIOPTRON Pro 1: 180 VA
  - BIOPTRON 2: 1.4–1.9 A
- Rate of polariation:
  - BIOPTRON Compact III: –
  - BIOPTRON Pro 1: –
  - BIOPTRON 2: 70% / 90% V
- Radius of halogen:
  - BIOPTRON Compact III: 20 W
  - BIOPTRON Pro 1: 50 W
  - BIOPTRON 2: 90 W
- Protective class:
  - BIOPTRON Compact III: Class II, IP 20
  - BIOPTRON Pro 1: Class II, IP 20
  - BIOPTRON 2: Class I, IP 20
- Weight:
  - BIOPTRON Compact III: 0.5 kg
  - BIOPTRON Pro 1: 3.4 kg
  - BIOPTRON 2: 7.8 kg
- Ambient temperatures:
  - Operating: +10°C to +40°C
  - Storage: +5°C to +40°C
- Wavelength:
  - 480–3400 nm
- Degree of polarization:
  - >95% (590–1550 nm)
- Specific power density:
  - 40 mW/cm²
- Light energy per minute:
  - 2.4 Joule/cm²

References