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TREATMENT MANUAL
High Energy Inductive Therapy

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High Energy
Inductive Therapy

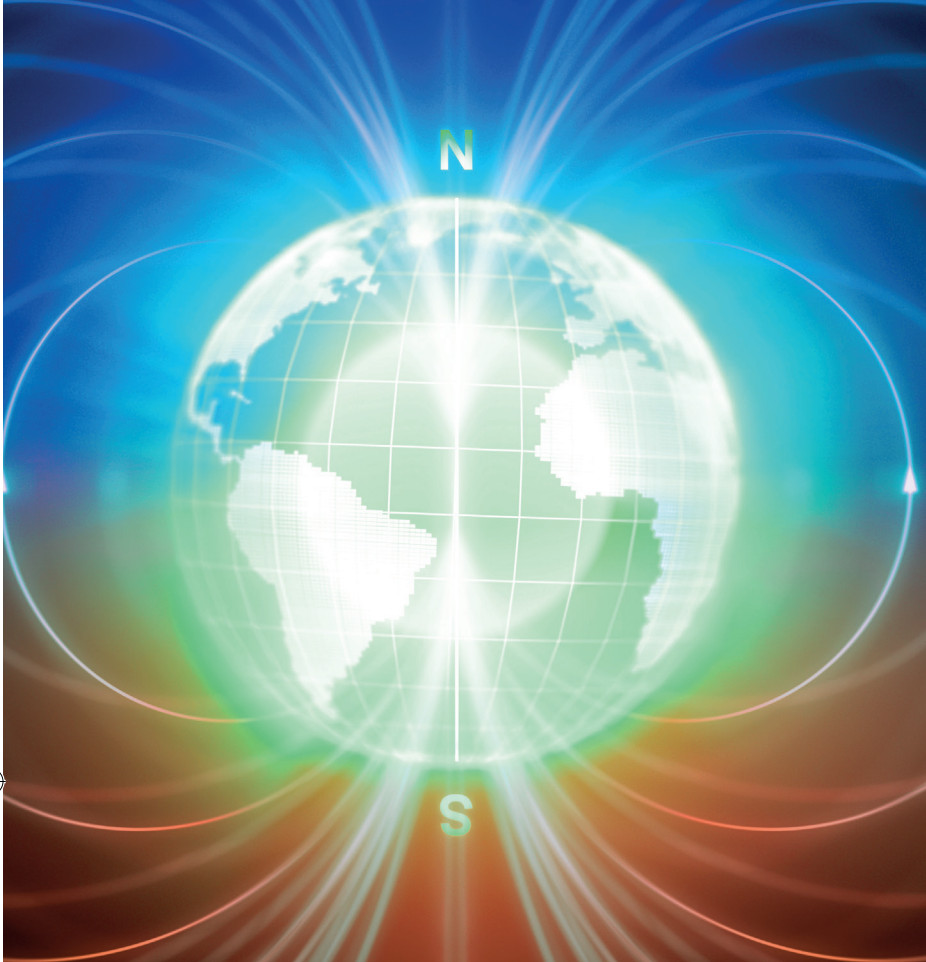
emField*Pro*



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High Energy Inductive Therapy



*„Life is an
electromagnetic event“*

High Energy Inductive Therapy

Research on the use of electronic fields for pain management focuses on the multiple mechanisms of pain production. These electromagnetic fields increase the threshold of pain sensitivity and activate the anticoagulation system. Besides that, strong electromagnetic fields stimulate the production of opioid peptides, activate mast cells and increase the electric capacity of muscular fibers.

It's a common observation that the benefits last considerably longer than the time of use. Analgetic effects were still observed at the 7th and even up to 14 days after the last treatment.

The emField *Pro* generates a magnetic field of 3 Tesla, which is about 600 times stronger than a normal magnet bar. This strong magnetic field stimulates nerve cells, muscles, and blood vessels consequently as this application of energy results in a physiological change and/or stimulation which is used to achieve therapeutic effects.

By providing both a static and mobile applicator, the possibility to use one of the pre-programmed recommendations, or to create and store own program the end-user is assured to have maximum results with the emField *Pro*.

The voltage induced in the tissue acts on the cell membranes whose lipid membrane is an insulating dielectric and which form a capacitor with the highly conductive fluid spaces adjacent to the membrane. Proteins which cross the entire cell membrane (tunnel proteins) are stored in this phospholipid bilayer, however sometimes only on the outside or inside. Glycolipids and cholesterol are other components of the cell membrane.

The membrane proteins have various tasks. The ion channels are for High Energy Inductive Therapy of greatest interest. While small molecules such as O_2 , CO_2 and H_2O can diffuse through the cell membrane along a concentration gradient and since lipophilic substances can also cross the cell membrane purely passively, the cell membrane is practically impermeable for most ions.

High Energy Inductive Therapy

In the extracellular space, the most common ion is Na^+ , and the most common ion of the intracellular space is K^+ . Because of the high concentration gradient, a Na^+ diffuses into the cell and a K^+ diffuses out of the cell from time to time. In this process, there is also a displacement of electrical charges each time.

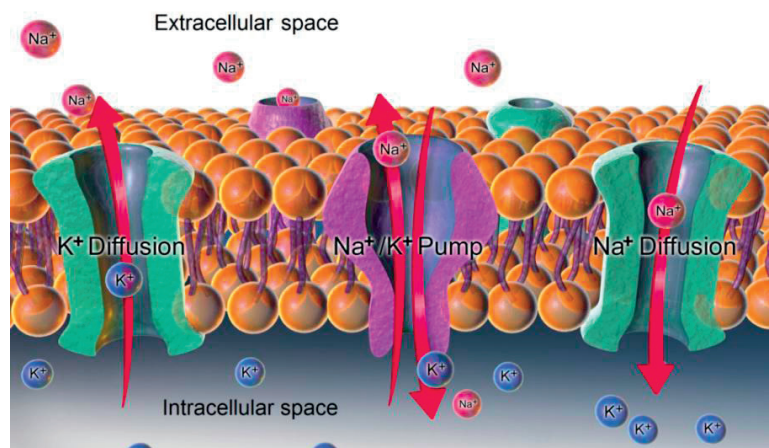
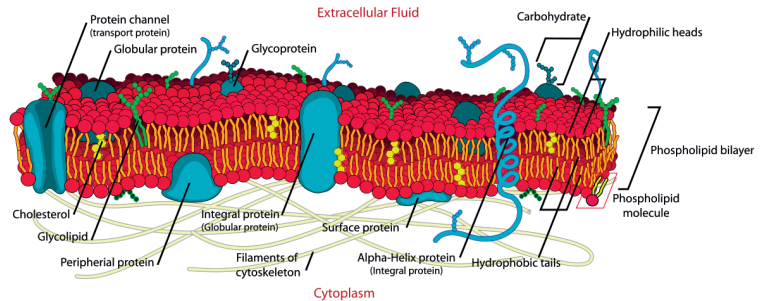
Since at rest in particular the K^+ channels are open and the Na^+ channels are closed, the inside of the cell becomes more negative as compared to the outside with each K^+ ion which diffuses out of the cell at rest. Because the electrical gradient which is changed in this way counteracts the concentration gradient, equilibrium is reached after a certain amount of time. Generally speaking, a membrane potential at rest goes from -80 to -90 mV in this way (resting membrane potential). The resting membrane potential is primarily a K^+ potential, but naturally also dependent on the other ions (if only K^+ were affected, the resting membrane potential would be 97 mV).

Over time, the concentrations would balance out purely passively, a condition which leads to cell death.

The concentration gradient for Na^+ and K^+ must therefore be maintained by an active, ATP-consuming process so that the cells can fulfil their tasks – in the nerve, for example, the electrical information transfer and processing. This is the task of the Na^+ / K^+ pump which consumes between 50% and 70% of the entire ATP requirement of the cells.

The Na^+ / K^+ pump can be influenced by various factors, such as toxins, drugs or a lack of energy. The resting membrane potential becomes increasingly positive and the cell functions are thus disrupted.

With the change in voltage induced by the High Energy Induction Therapy, the regeneration of a normal resting membrane potential is facilitated. Normally, the passively passing molecules can once again enter and leave through the cell membrane. The energy production in the mitochondria can once again start up and the normal function of the Na^+ / K^+ pump is supported. As a result, the preconditions for normalisation of the cell functions are restored.



Indications



Basics

Indications

Since obtaining approval worldwide, strong electromagnetic fields has been widely used to reduce pain for a wide range of indications. High Energy Inductive Therapy and more specific the emFieldPro has a wide range of disorder treatment recommendations:

Indications:

- Stimulation of muscular tissue
- Nerve regeneration
- General pain control
- Improvement blood circulation
- Urinary incontinence

Objectives:

- Pain relief
- Effect on muscle tone
- Activation of regeneration processes
- Enhanced blood circulation

Users:

- Orthopedic doctor / sports doctor / General Practitioner
- Physiotherapist
- Osteopath

Skeletal muscles

There are two different types of skeletal muscles fibers.

Type 1, also called red fibers contain a large amount of myoglobin and mitochondria. They carry out a high aerobic oxidation with accumulating much lactic acid. Therefore red muscles contract for a longer period without fatigue. So called red muscles have a low contraction rate, but can contract over a long period. Type 2, the so called white fibers, have a small amount of myoglobin and mitochondria. They depend much more on anaerobic oxidation and accumulate lactic acid in high amounts during work. Therefore they get soon fatigued. The white muscles have a fast rate of contraction for only a short period.

Energy

The differences between the white and red fibers became important, as the neurophysiologist Elwood Henneman (*1915, † 1996) described the relationships between properties of motor neurons and the muscle

Basics

fibers they innervate. Motor neurons with large cell bodies tend to innervate fast-twitch fibers, whereas motor neurons with small cell bodies tend to innervate slow-twitch muscle fibers. In order to contract a particular muscle, motor neurons with small cell bodies begin to fire action potentials before motor neurons with large cell bodies.

The size principle states further that as more force is needed, motor units are recruited in a precise order according to the magnitude of their force output, and with small units being recruited first, thus exhibiting task-appropriate recruitment. This has two very important physiological benefits. It minimizes the amount of fatigue an organism experiences by using fatigue-resistant muscle fibers first and only using fatigable fibers when high forces are needed.

A correct diagnosis, identifying which muscle fibers are affected, is therefore important for determining the correct dosage.

Frequencies

Low pulse frequencies allow muscles to relax after each twitch. By increasing the pulse frequency muscle tension will be build up. At high frequencies muscles doesn't relax between pulses any more.

In our treatment recommendations frequencies up to 9 Hz are functionally used for relaxation. Frequencies up to 30 Hz are used for muscle firming und up to 70 Hz for more volume. The higher frequencies, so up to 100 Hz are suitable for the development of muscle strength.

Treatment

Muscle contractions have an important role when it comes to the treatment of musculoskeletal problems. As stated before two parameters influence the effect: Energy and Frequency.

The emFieldPro has in total 20 standard programs, in which a wide variation of frequencies and proportionately energy levels are combined. You can find more details about these 20 programs in the chapter Treatment Protocols.

For more personalized protocols the end-user has to possibility to use pre-program (20) favourites or create treatment protocols (20) in the expert modus. See to chapter 8, Operation Instructions in the manual or pages 25 and 26 of this treatment manual.

	Type 1 (red)	Type 2 (white)
Size	small	large
Force	low	high
Fatigue	slow	quick
Speed	slow	quick
Capillaries	high	low
Mitochondria	high	low
Myoglobin	high	low
ATP synthesis	low	high
Oxidative capacity	high	low

Effect	Fequency (in Hz)
Improved blood flow	2 – 9
Endurance	10 – 20
Muscle firming	20 – 30
Muscle volume	40 – 70
Strength	75 –100
Explosive strength	120

Mechanism of action



Mechanism of action

High Energy Inductive Therapy has been found to have good results in a wide array of painful conditions. There is little risk when compared to the risk of toxicity, addiction and complications from medications.

Inflammation

The pulsed inductive field reduces inflammation by recharging the cell surface. This recharge prevents the chain of inflammation inside the cell. In addition, it supplies blood and oxygen to the specified area, which is supporting a quick recovery.

Pain

Pulsed Inductive Therapy is known to enhance the metabolism of fibroblasts, chondrocytes, osteoblasts, and the effects of hormones and neurotransmitters on the receptors of various cells. PEMF is used for the treatment of various pain such as back pain, neck pain, shoulder disease, knee osteoarthritis, postherpetic neuralgia, pelvic pain, multiple sclerosis, neuropathic pain. When you experience pain from a bump, a general reaction is an attempt to eliminate the pain by rubbing the painful bump.

If you experience an itchy bite, you will try to eliminate it by scratching. Two examples of how the Gate Control Theory works. The Gate Control Theory asserts that activation of nerves which do not transmit pain signals, called non-nociceptive fibers interfere with signals from pain fibers. A painful, nociceptive stimulus stimulates primary afferent fibers and travels via transmission cells. Increasing activity of the transmission cells results in increased perceived pain.

Contractions

Electromagnetic fields induce electrical currents and trigger the action potential on the motor nerve of muscles. This leads to the depolarization of the motor nerve with muscle twitches as result. A sequence of muscle twitches then develops muscle contractions.

Fibromyalgia, Arthritis, Chronic Fatigue

Pulsed Inductive Therapy is known to have immediate pain relief in treating pain in patients with fibromyalgia, arthritis, and chronic fatigue. Several studies showing significant improvements in test scores at the end of therapy and at several follow-up moments. High Energy Inductive Therapy also affects the delivery of calcium ions, promotes the uptake of calcium in the bone, and helps in the synthesis of cartilage cells.

Treatment with High Energy

Treatment with High Intensity Inductive Therapy

Before using High Energy Inductive Therapy on a patient, the user should become acquainted with the operating instructions and individual treatment methods as well as the indications / contraindications, warnings and application information. Additional sources of information about types of therapy should be consulted. The user must be trained in how to use the device properly and have the appropriate skills.

High Intensity Inductive Therapy with the emField Pro

Static treatment

Use for static treatments the large applicator, which is mounted on the applicator arm.

Pain points and trigger points for static treatment are initially palpated. The treatment is then administered with the power output. Every pain point or trigger point is treated. It should be borne in mind that trigger points frequently lie outside the pain area.

Dynamic treatment

Use for dynamic treatments the medium applicator.

No direct skin contact is needed. If skin contact is desired, make sure the skin is dry and clean.

Pain or treatment zones are initially palpated.

The treatment is administered with the power output.

Make sure the whole treatment zone is treated.

Combined application – static and dynamic

Very often, pain is not evenly distributed in the treatment area. With many pain syndromes, maximum points such as trigger or pain points lie within the painful region. Trigger points and principal pain points are treated statically whilst other painful areas are treated dynamically.

With combined treatment, care should be taken to ensure that static therapy is initially applied to the pain and trigger points. Extensive treatment can then be continued with dynamic application. The dynamic treatment with the emField Pro can be more intensified by an actively moving patient.

Treatment energy and time

The maximum energy to be transmitted should be not higher than mentioned in the treatment recommendations. Nevertheless make sure never to use higher energy than the patient can endure.

Daily treatment sessions are recommended.

The minimum course of treatment is two sessions per week.



Static treatment



Dynamic treatment



Combined treatment but no active patient



Combined treatment with active patient



Treatment recommendations



Transducer placement

You can adjust the position and angle of the transducer according to the patient and the stimulation area. The transducer arm supports can be moved up and down and left and right, and the angle of the transducer can be adjusted using the transducer holder. The height of the transducer arm is adjusted by the weight of the transducer using gas spring pressure. To adjust the angle of the transducer, hold the transducer holder in the unlocked position and adjust the angle. The holder must be locked after adjustment is complete.

For dynamic treatments use the medium transducer. It's possible to treat dynamic while the patient is in rest. It's also possible to treat an active moving patient.

The emFieldPro can be used at different sites of the body depending on the pain. The figure shows the use of the most common applications (Please note that there are some variations in the design of the transducer arm depending on the time of release).





Static treatment with emFieldPro

The emFieldPro can be used at different sites of the body depending on the pain. The figure shows the use of the most common applications (Please note that there are some variations in the design of the transducer arm depending on the time of release).



Static treatment neck



Static treatment shoulder



Static treatment arm



Static treatment hand



Static treatment foot



Static treatment patella



Static treatment hip



Static treatment hamstring





Dynamic treatment with emField*Pro*



Dynamic treatment shoulder



Dynamic treatment arm



Dynamic treatment back



Dynamic treatment hamstring



Dynamic treatment knee



Dynamic treatment foot





Dynamic/active treatment with emField*Pro*



Dynamic/active treatment arm



Dynamic/active treatment leg



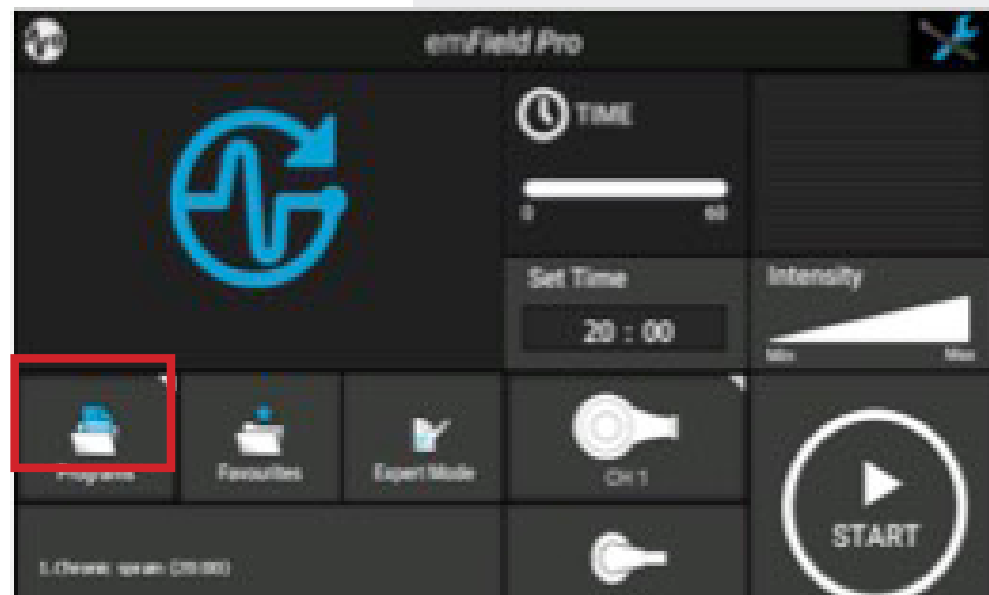
Dynamic/active treatment shoulder



Treatment protocols

Treatment protocols

In the emField *Pro* are 20 programs (treatment recommendations) programmed. For exact placement of the electrodes refer to chapter: Transducer placement.



Prior to using the device on a patient, the user should have sufficient medical and anatomical knowledge. The user should become familiar with the instructions for use and individual treatment methods as well as the indications / contraindications, warnings and application information.

The following treatment recommendations are programmed:

- Sprain (chronic and acute)
- Inflammation (chronic and acute)
- Pain (chronic and acute)
- Cervical pain (chronic and acute)
- Lower back pain (chronic and acute)
- Shoulder pain (chronic and acute)
- Elbow pain (chronic and acute)
- Hip or pelvic pain (chronic and acute)
- Knee pain or Arthritis (chronic and acute)
- Ankle pain (chronic and acute)

All the upcoming Treatment recommendations regarding treatment Location, duration and intensity require medical knowledge and should be given by authorised physicians, therapists and health paraprofessionals.

Treatment protocols

Sprain chronic

Therapy recommendation

Program 1

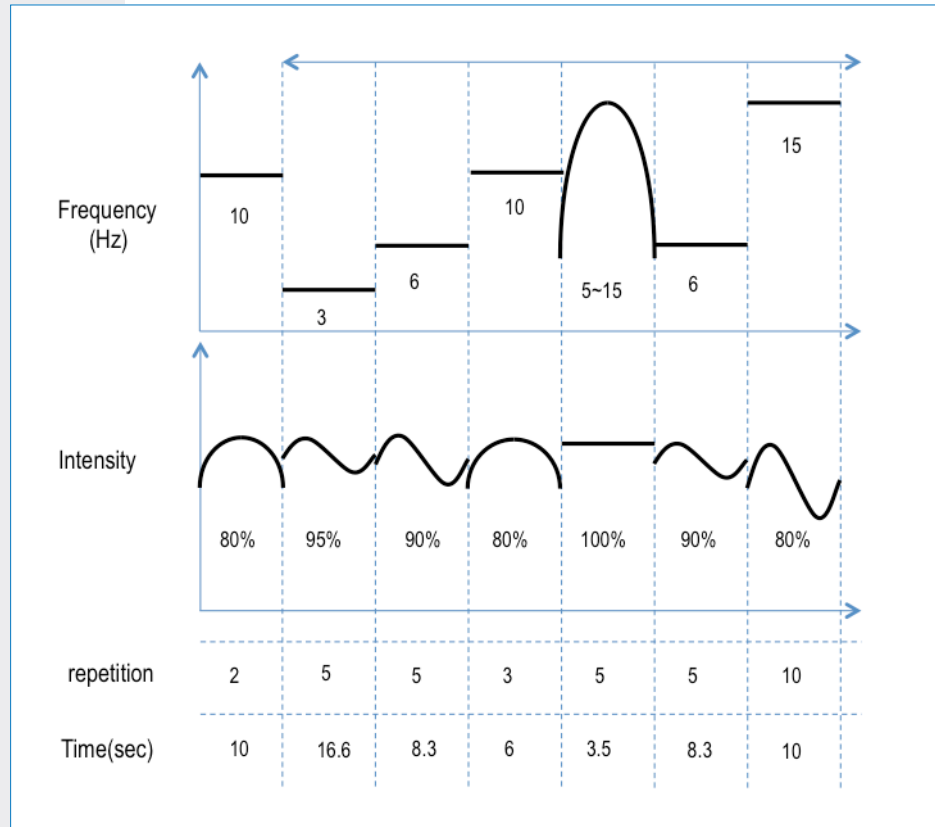
Therapy time 10-15 minutes

Dose level:

At start of the treatment:
up to maximum tolerable.

After familiarization:

(2 minutes)
maximum energy level 80-100%



Sprain acute

Therapy recommendation

Program 2

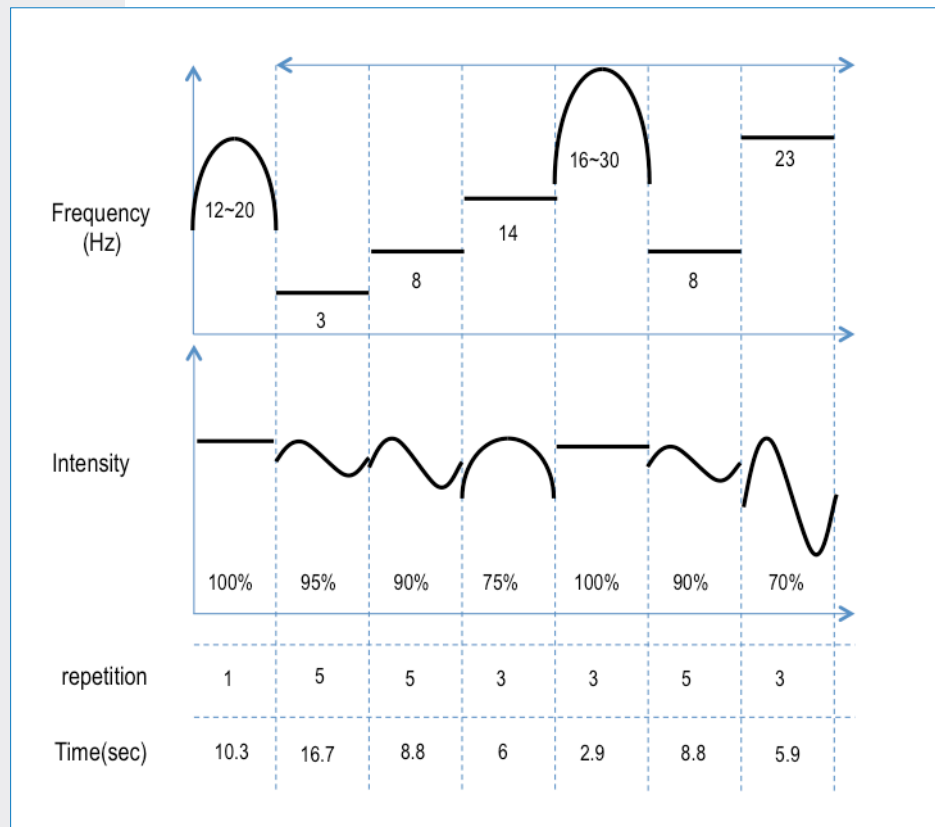
Therapy time 15-20 minutes

Dose level:

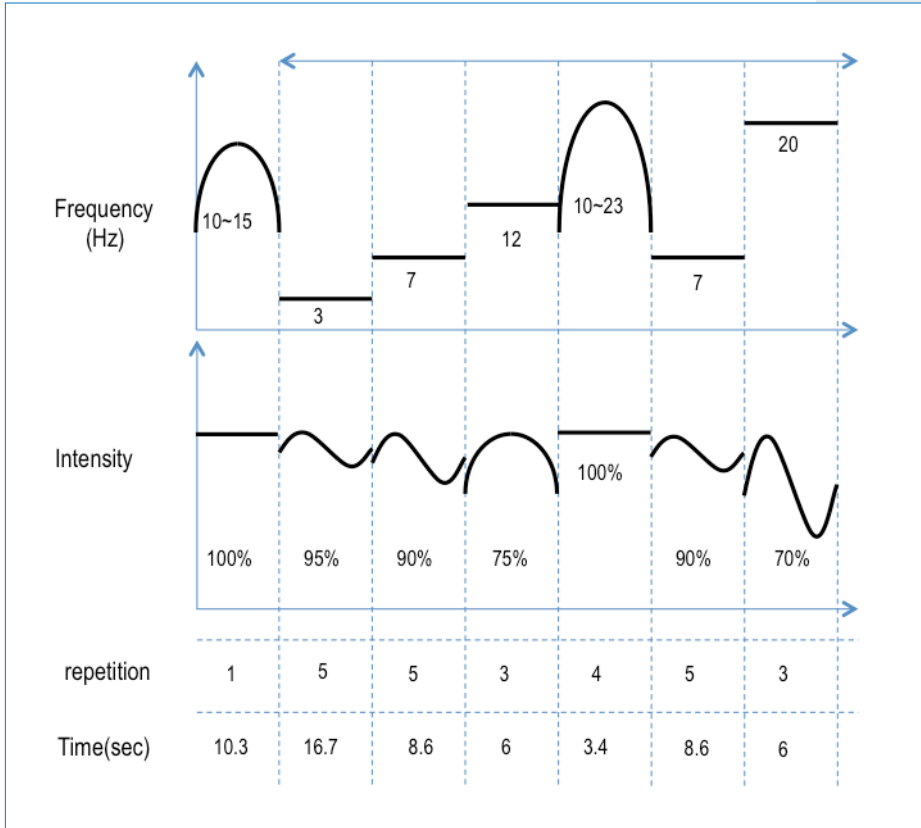
At start of the treatment:
up to maximum tolerable.

After familiarization

(2 minutes)
maximum energy level 75-100%



Treatment protocols



Inflammation chronic

Therapy recommendation

Program 3

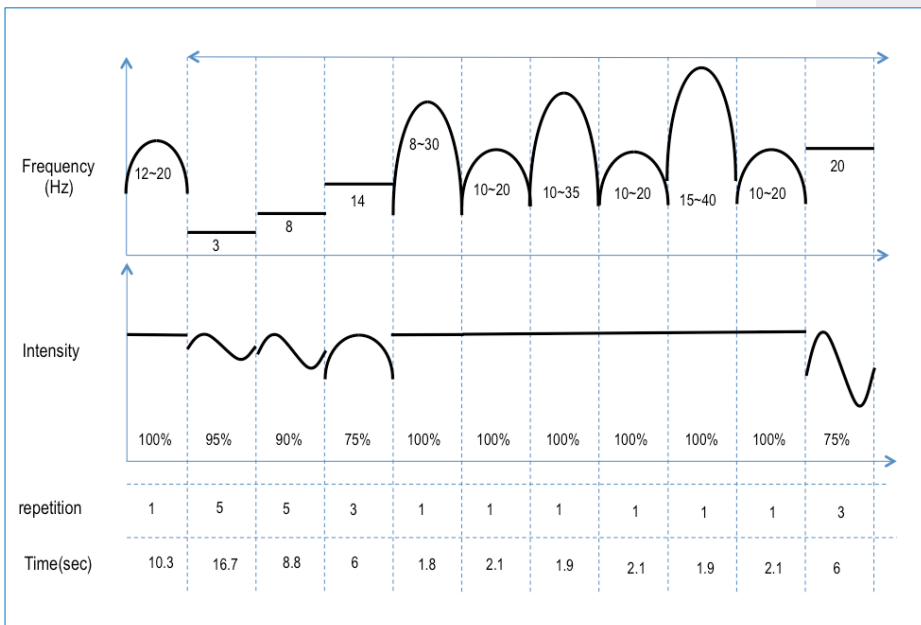
Therapy time 10-15 minutes

Dose level:

At start of the treatment:
up to maximum tolerable.

After familiarization:

(2 minutes)
maximum energy level 70-100%



Inflammation acute

Therapy recommendation

Program 4

Therapy time 15-20 minutes

Dose level:

At start of the treatment:
up to maximum tolerable.

After familiarization:

(2 minutes)
maximum energy level 75-100%

Treatment protocols

Pain chronic

Therapy recommendation

Program 5

Therapy time 10-15 minutes

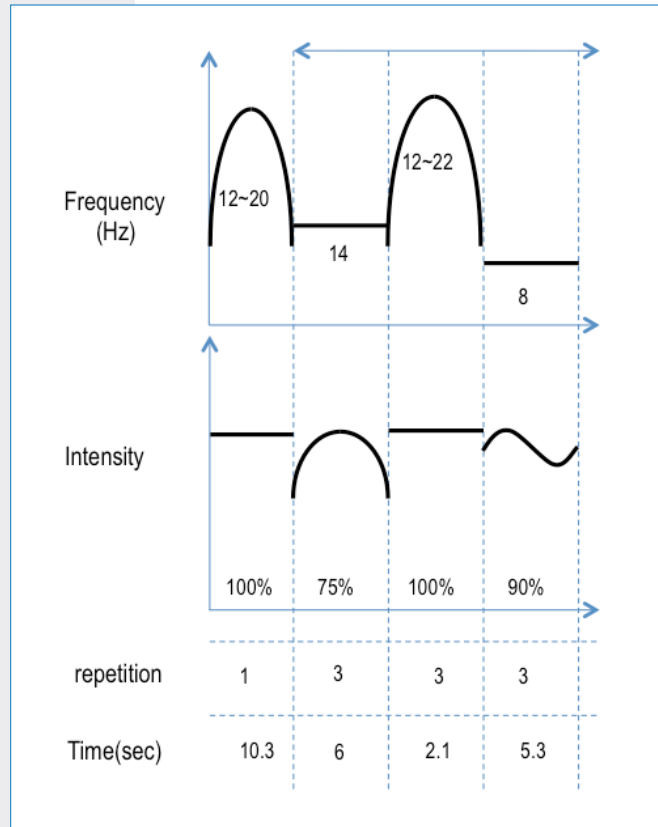
Dose level:

At start of the treatment:
up to maximum tolerable.

After familiarization:

(2 minutes)

maximum energy level 80-100%



Pain acute

Therapy recommendation

Program 6

Therapy time 15-20 minutes

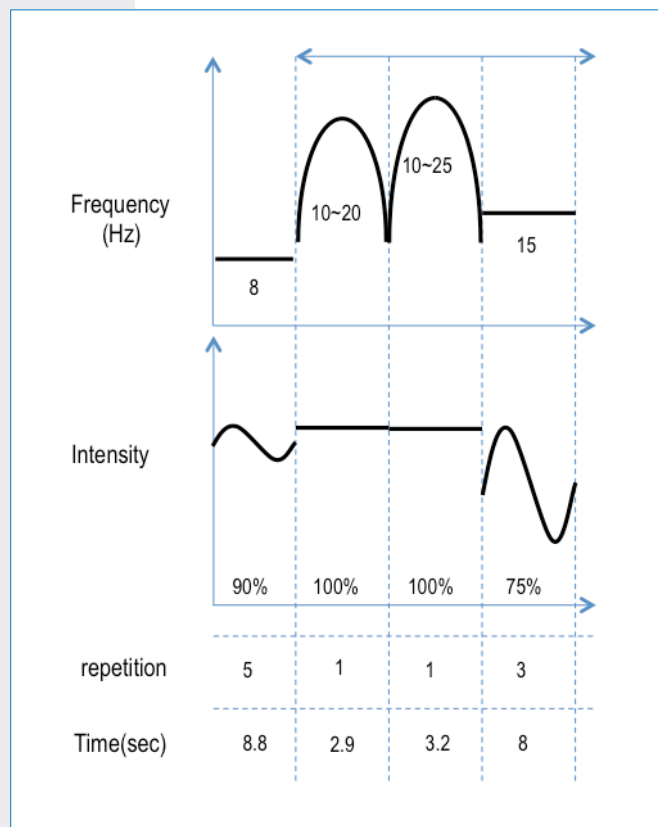
Dose level:

At start of the treatment:
up to maximum tolerable.

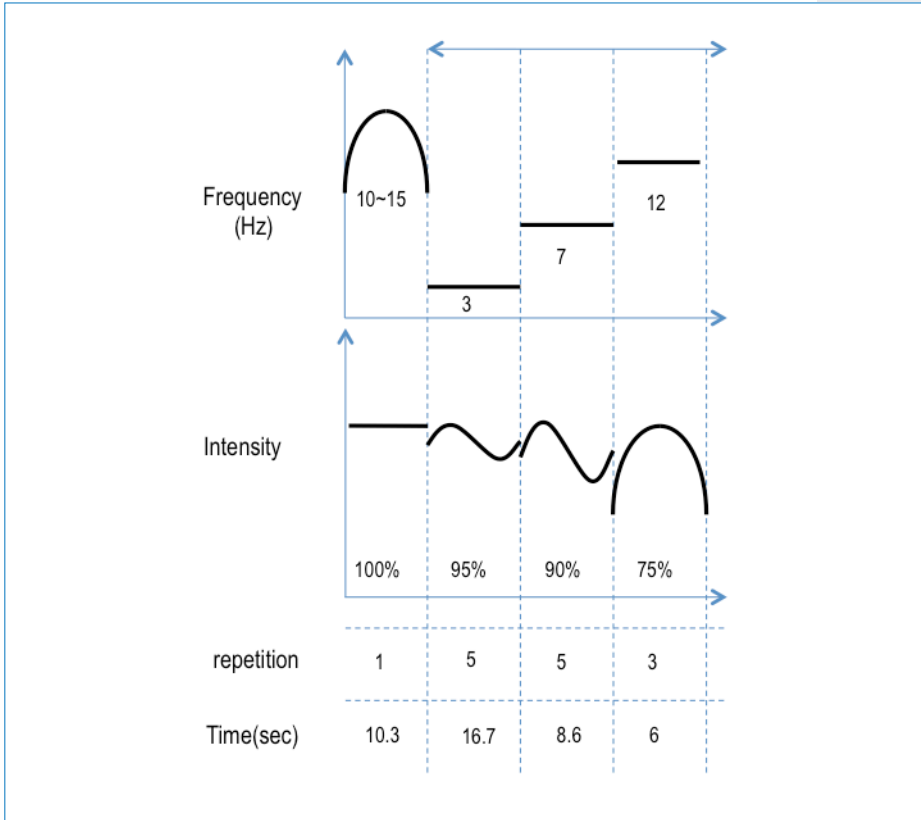
After familiarization

(2 minutes)

maximum energy level 80-100%



Treatment protocols



Cervical pain chronic

Therapy recommendation

Program 7

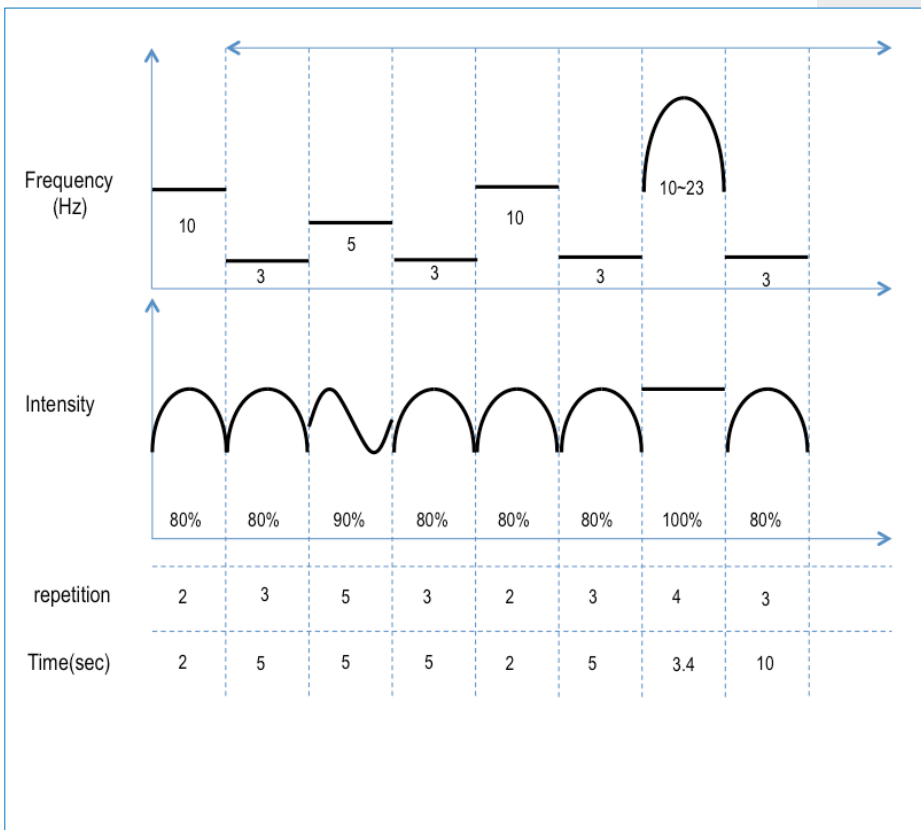
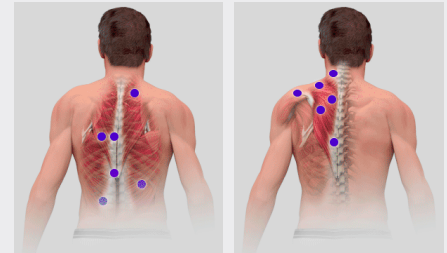
Therapy time 10-15 minutes

Dose level:

At start of the treatment:
up to maximum tolerable.

After familiarization:

(2 minutes)
maximum energy level 75-100%



Cervical pain acute

Therapy recommendation

Program 8

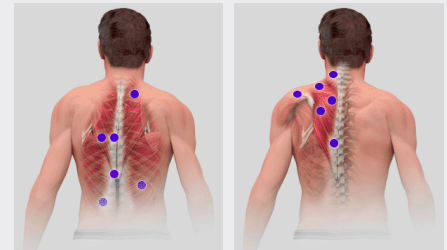
Therapy time 15-20 minutes

Dose level:

At start of the treatment:
up to maximum tolerable.

After familiarization:

(2 minutes)
maximum energy level 75-100%



Treatment protocols

Lower back pain chronic

Therapy recommendation

Program 9

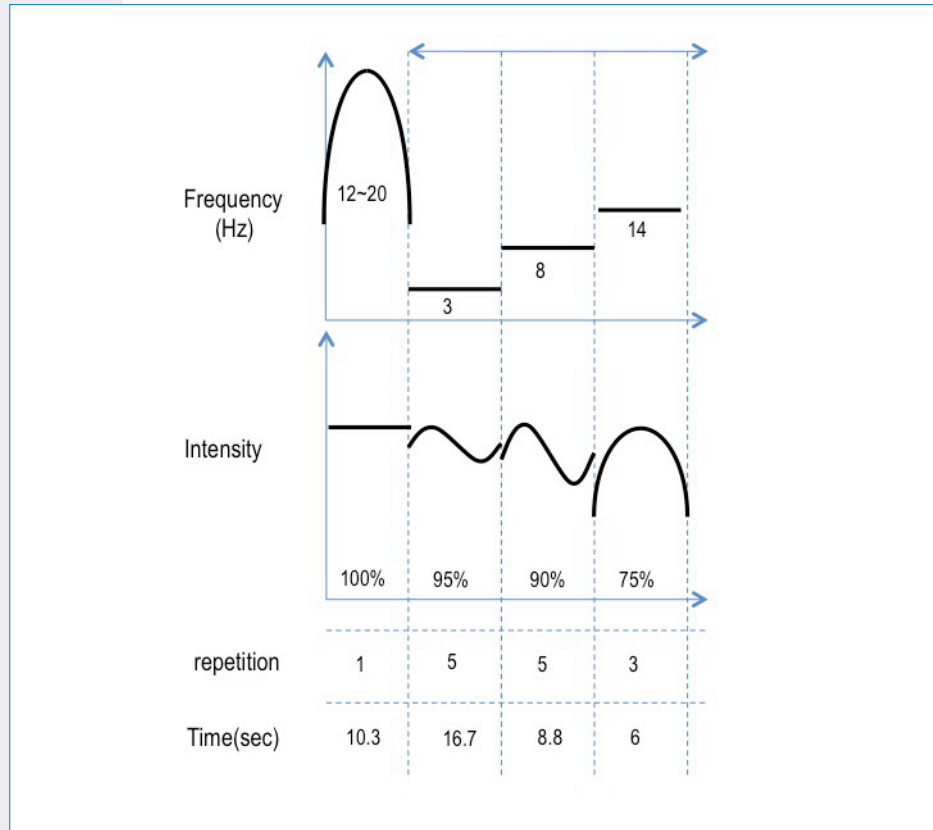
Therapy time 10-15 minutes

Dose level:

At start of the treatment:
up to maximum tolerable.

After familiarization:

(2 minutes)
maximum energy level 75-100%



Lower back pain acute

Therapy recommendation

Program 10

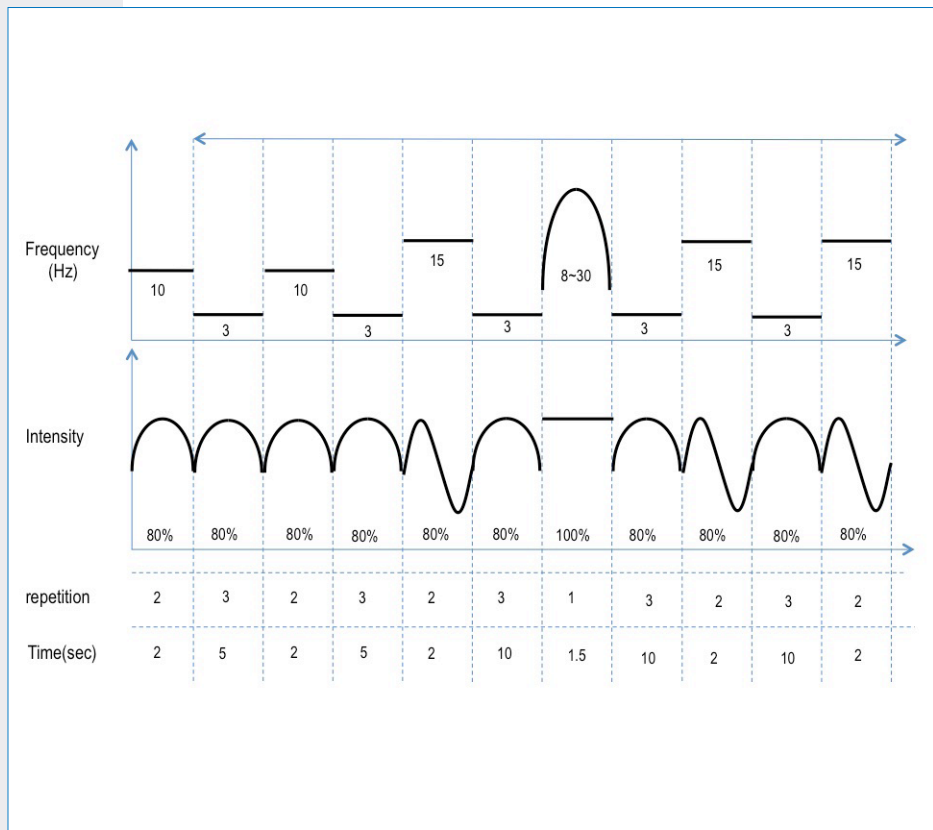
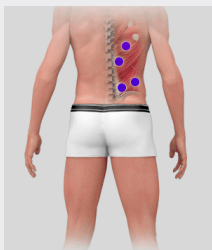
Therapy time 15-20 minutes

Dose level:

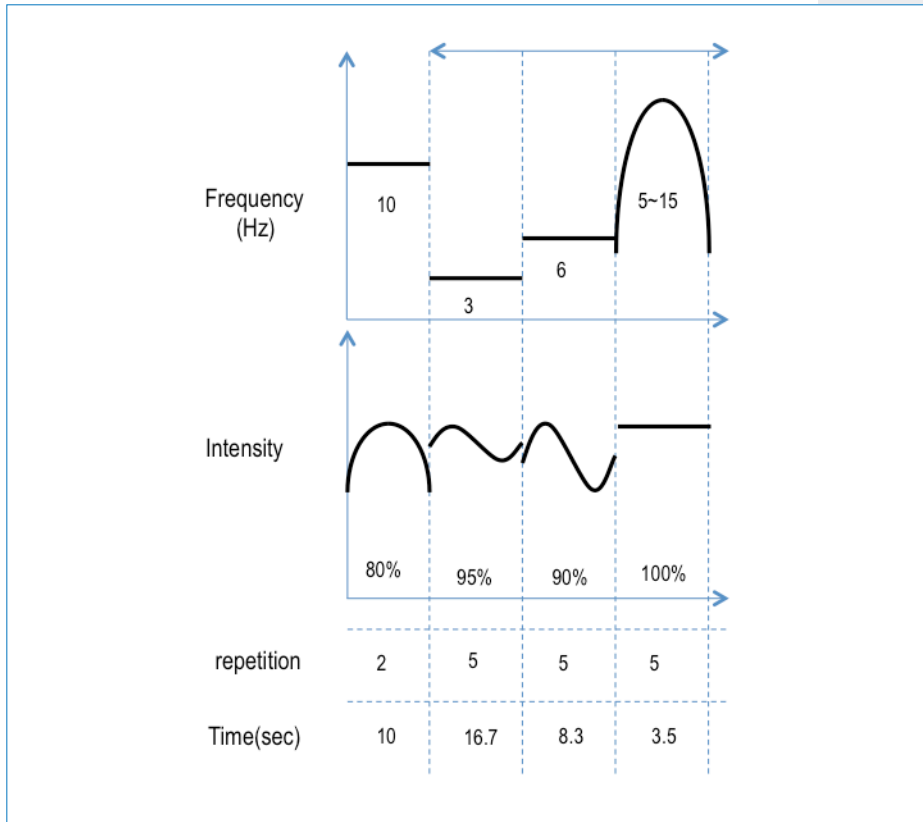
At start of the treatment:
up to maximum tolerable.

After familiarization

(2 minutes)
maximum energy level 75-100%



Treatment protocols



Shoulder pain chronic

Therapy recommendation

Program 11

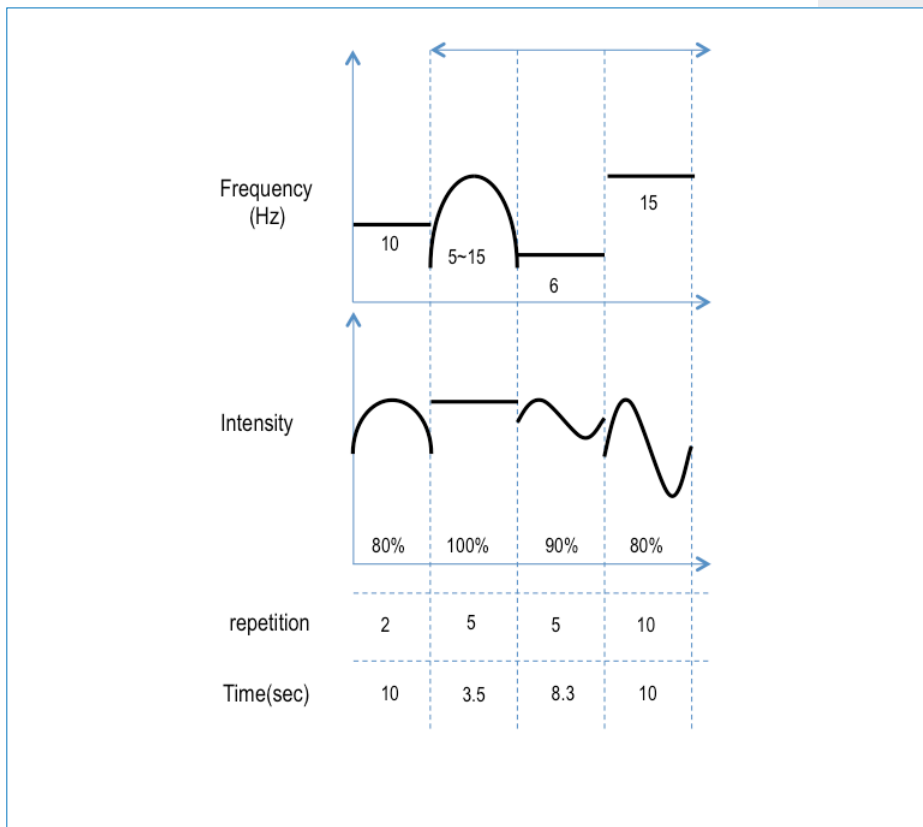
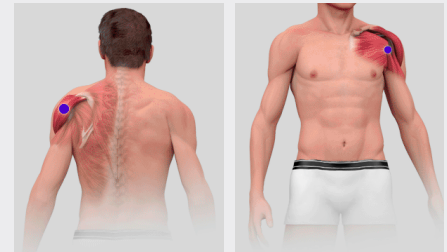
Therapy time 10-15 minutes

Dose level:

At start of the treatment:
up to maximum tolerable.

After familiarization:

(2 minutes)
maximum energy level 80-100%



Shoulder pain acute

Therapy recommendation

Program 12

Therapy time 15-20 minutes

Dose level:

At start of the treatment:
up to maximum tolerable.

After familiarization:

(2 minutes)
maximum energy level 80-100%



Treatment protocols

Elbow pain chronic

Therapy recommendation

Program 13

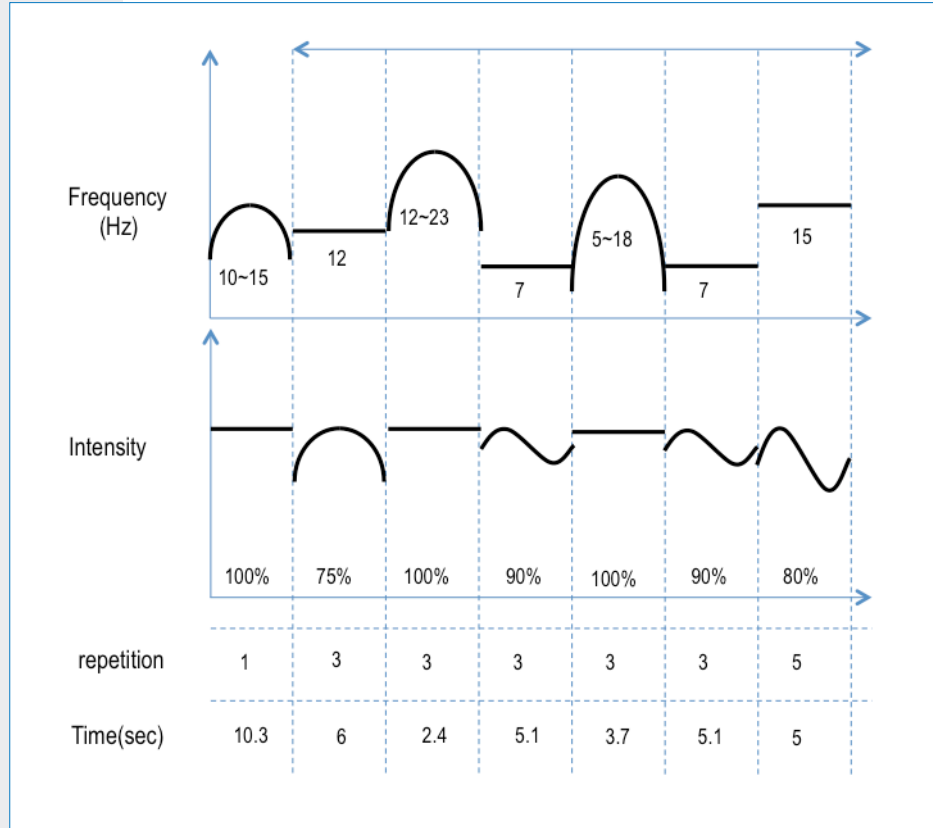
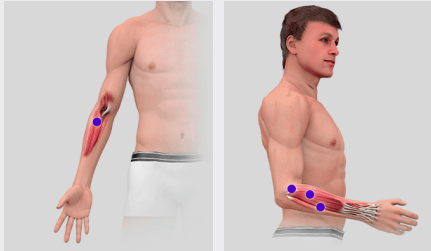
Therapy time 10-15 minutes

Dose level:

At start of the treatment:
up to maximum tolerable.

After familiarization:

(2 minutes)
maximum energy level 75-100%



Elbow pain acute

Therapy recommendation

Program 14

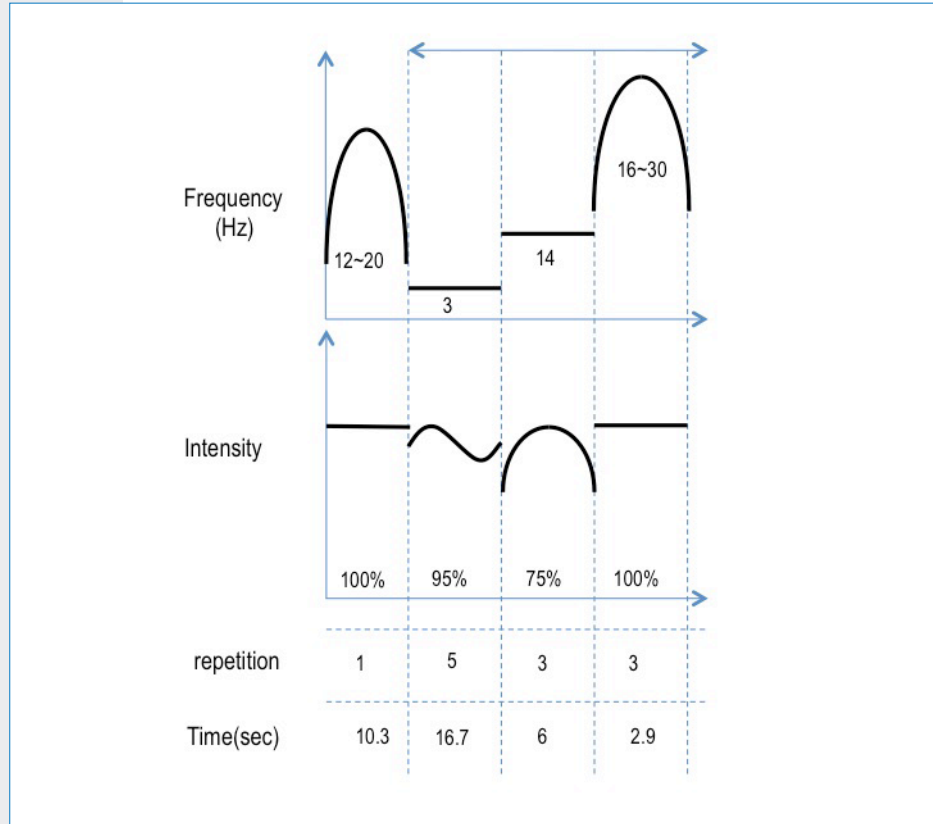
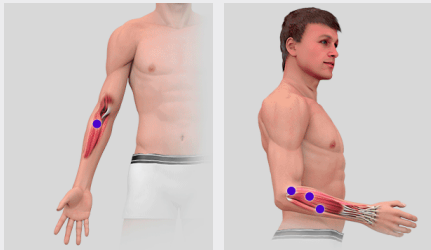
Therapy time 15-20 minutes

Dose level:

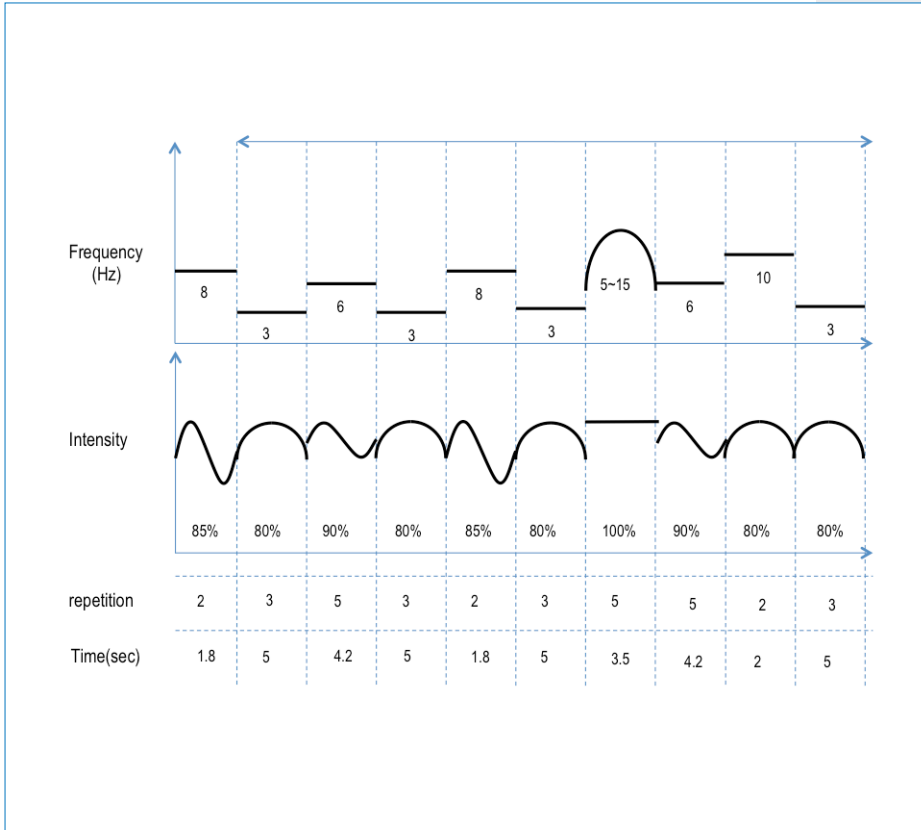
At start of the treatment:
up to maximum tolerable.

After familiarization

(2 minutes)
maximum energy level 75-100%



Treatment protocols



Hip or pelvic pain chronic

Therapy recommendation

Program 15

Therapy time 10-15 minutes

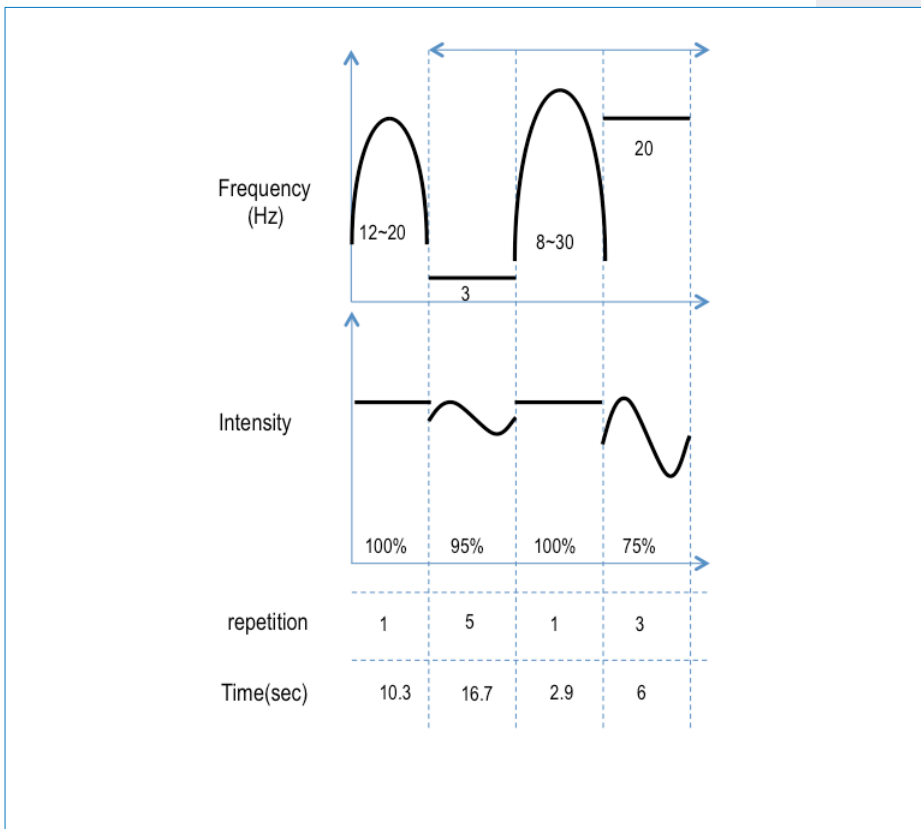
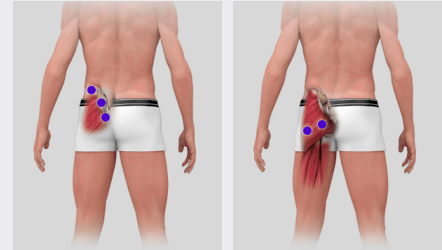
Dose level:

At start of the treatment:
up to maximum tolerable.

After familiarization:

(2 minutes)

maximum energy level 80-100%



Hip or pelvic pain acute

Therapy recommendation

Program 16

Therapy time 15-20 minutes

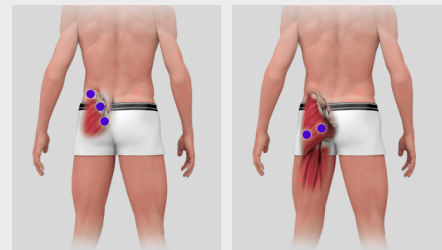
Dose level:

At start of the treatment:
up to maximum tolerable.

After familiarization:

(2 minutes)

maximum energy level 80-100%



Treatment protocols

Knee pain or Arthritis chronic

Therapy recommendation

Program 17

Therapy time 10-15 minutes

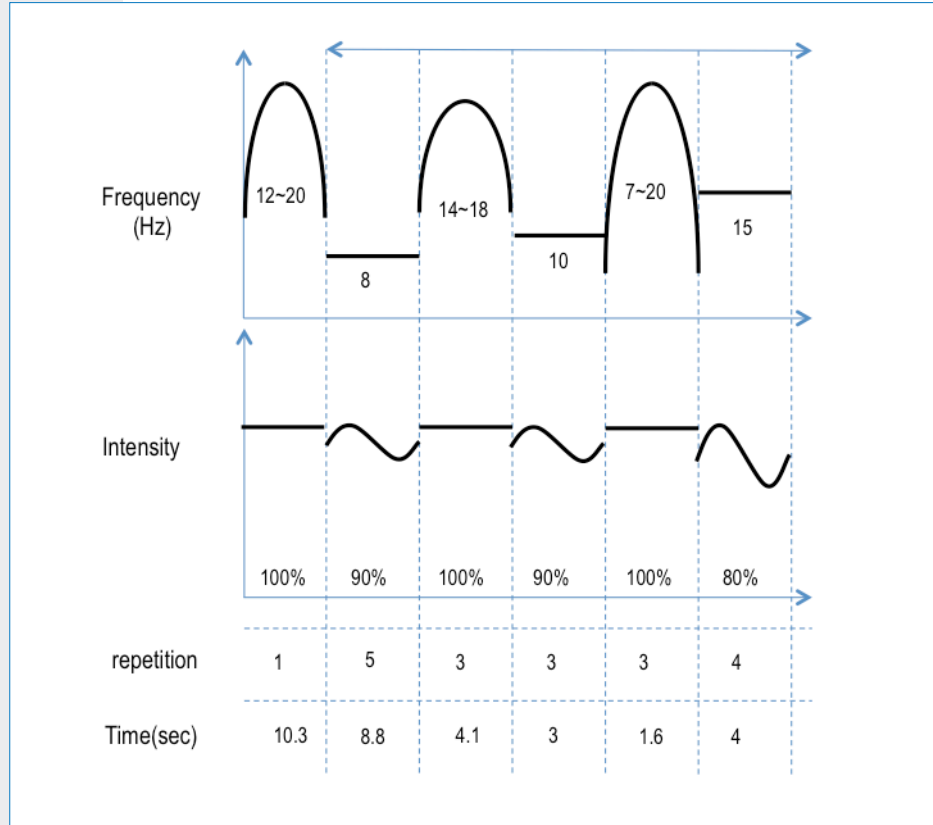
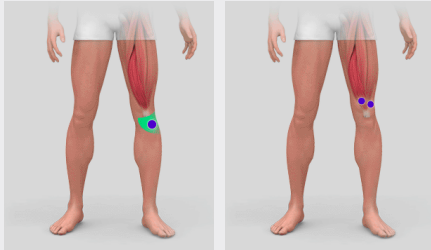
Dose level:

At start of the treatment:
up to maximum tolerable.

After familiarization:

(2 minutes)

maximum energy level 75-100%



Knee pain or arthritis acute

Therapy recommendation

Program 18

Therapy time 15-20 minutes

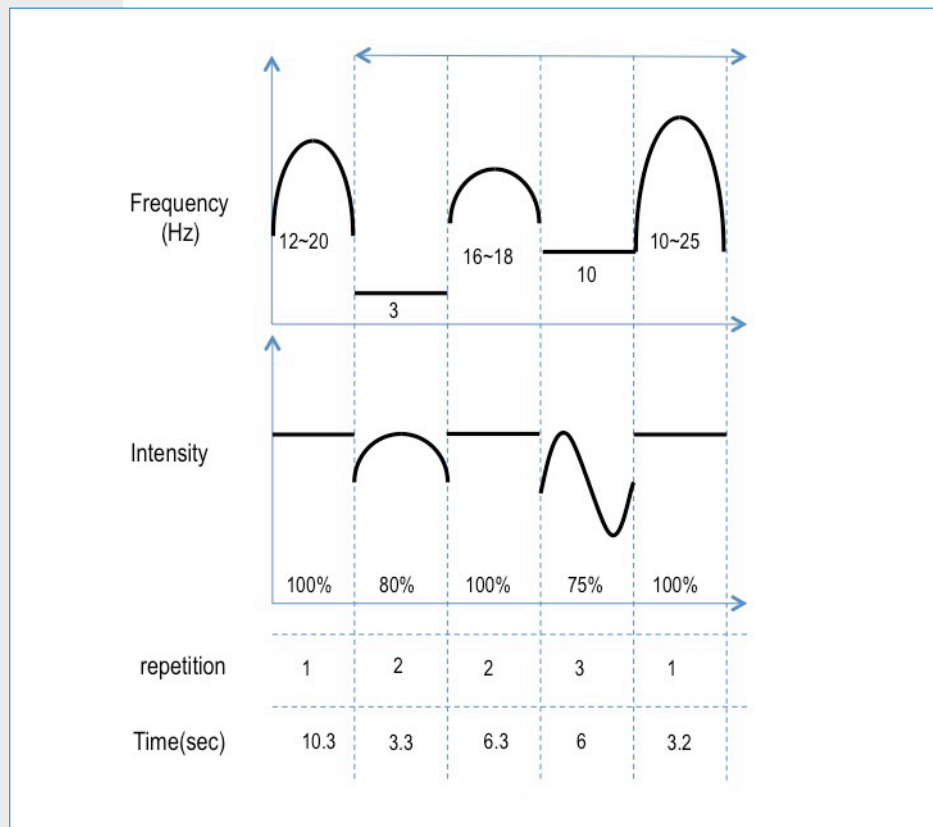
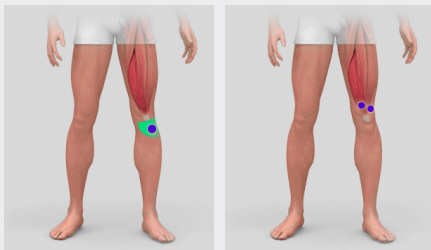
Dose level:

At start of the treatment:
up to maximum tolerable.

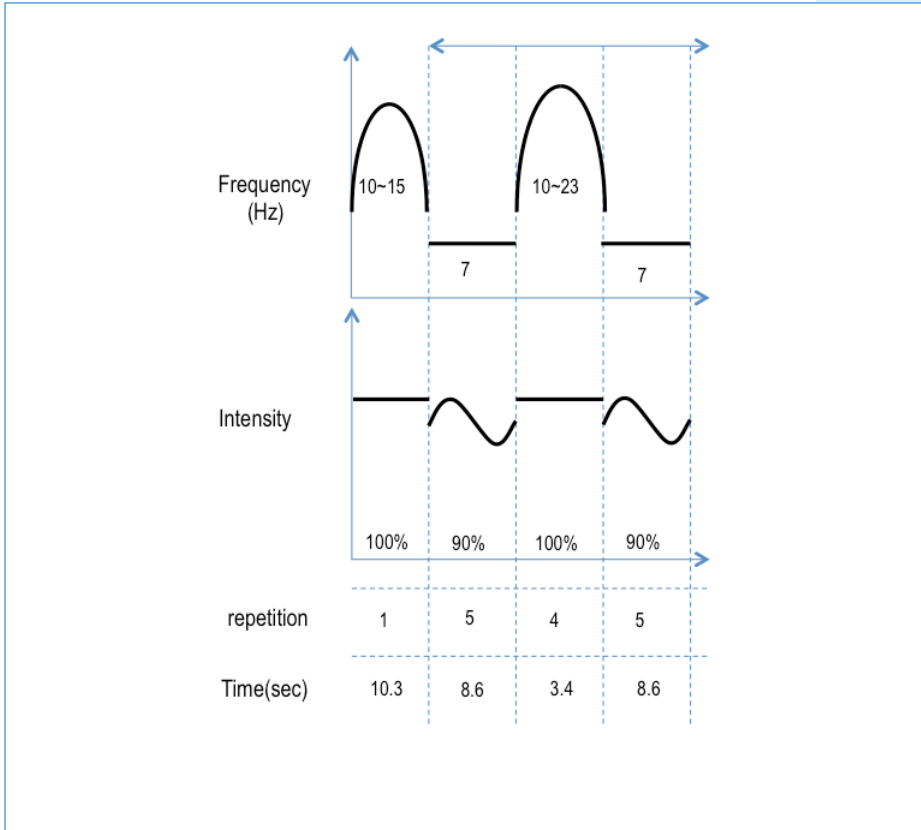
After familiarization

(2 minutes)

maximum energy level 75-100%



Treatment protocols



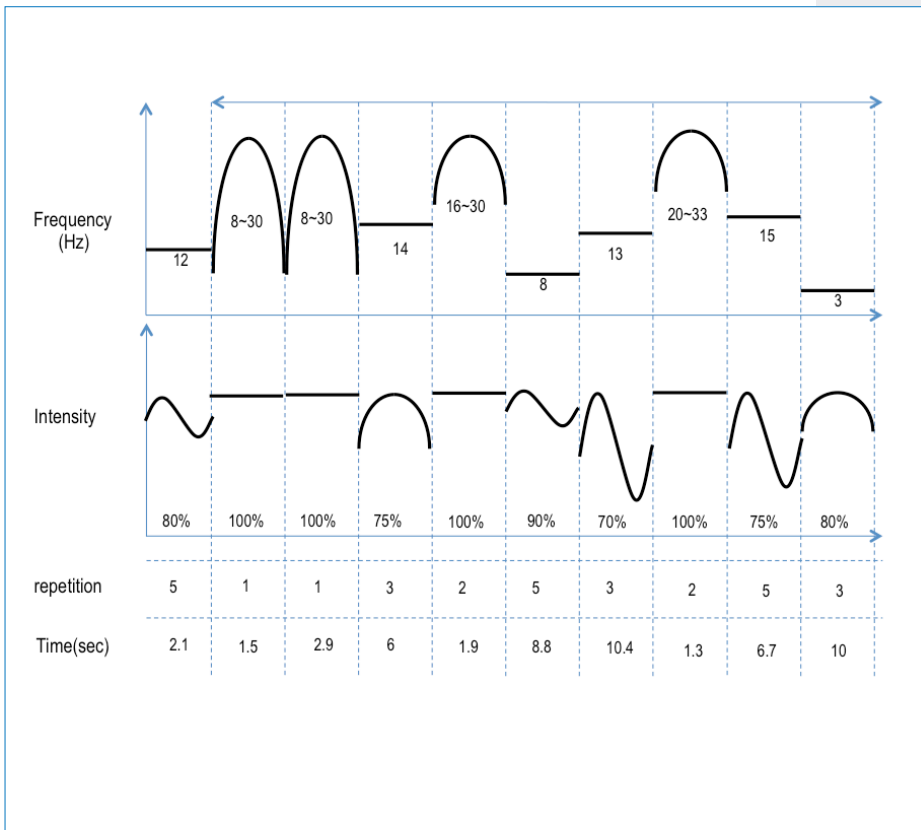
Ankle Pain chronic

Therapy recommendation

Program 20
Therapy time 10-15 minutes

Dose level:
At start of the treatment:
up to maximum tolerable.

After familiarization:
(2 minutes)
maximum energy level 70-100%



Ankle Pain acute

Therapy recommendation

Program 20
Therapy time 15-20 minutes

Dose level:
At start of the treatment:
up to maximum tolerable.

After familiarization:
(2 minutes)
maximum energy level 70-100%

Treatment protocols

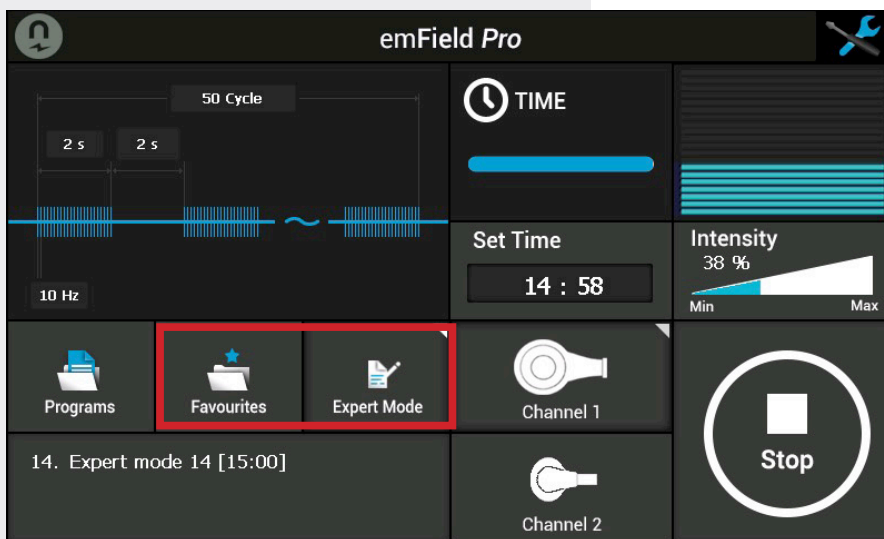
Treatment protocols

Besides 20 treatment recommendations the end user can store 20 favourites and create in the expert mode 20 own treatments.

The favourites mode has 20 „free to store“ programs. Frequency of the magnetic field, continuous output time and pause time are set in advance. The waveform of the selected mode is applied repeatedly during the operating time, set by the user.

The parameter setting ranges are as follows

- F1: 1 ~ 100 Hz
- F2: 1 ~ 100 Hz
- Ton: 1 ~ 4s
(The setting ranges are different according to the value of F1 and F2).
- Toff: 0 ~ 10s
(The setting ranges are different according to the value of F1 and F2).

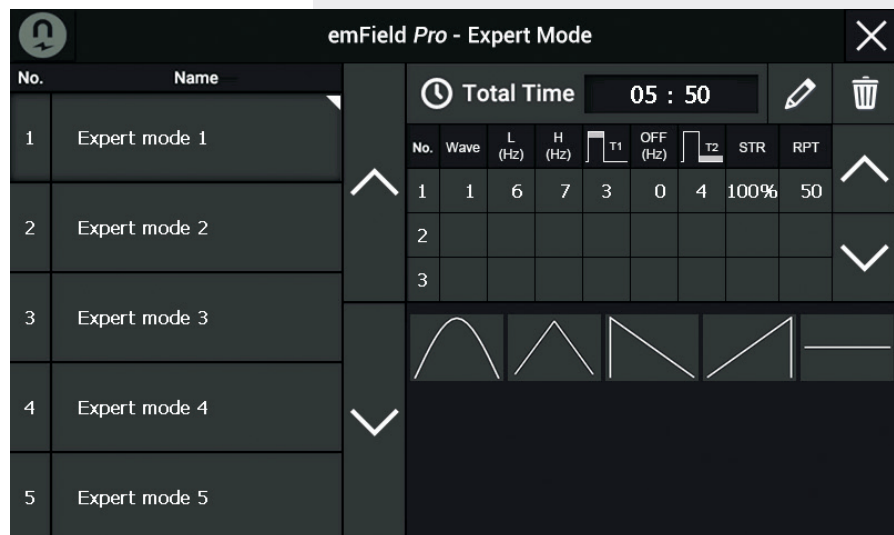


For more detailed information about change or delete treatments in favourites please refer to chapter 8, Operation Instructions in the Manual.

The Expert Mode has 20 free to store modes; the user can set the parameter values directly. Each parameter setting ranges are as follows.

Treatment protocols

- **Wave:**
Select one of the following waves:
Sinus; Triangle; Downward Triangle; Upward Triangle or Continues by selecting the according symbol.
- **L (Hz):**
L(ow) limit of waveform (6-149 Hz). This frequency has to be lower than H (Hz).
- **H (Hz):**
H(igh) limit of waveform (7-150 Hz). This frequency has to be higher than L (Hz).
- **T1:**
Duration of the stimulation phase (1 – 10 seconds).
The setting ranges are different according to the value of the frequencies.
- **OFF (Hz):**
Frequency during the Off phase (0 – 4 Hz).
- **T2:**
Duration of the Off phase. (4 – 10 seconds).
The setting ranges are different according to the value of the frequencies.
- **STR:**
1 – 100% (multiplying factor for the main magnetic field intensity)
- **Repetition**
Number of repetitions, 1 ~ 60 cycles



Each mode has 9 sub-modes with different parameter sets. The expert mode operates sequentially from sub mode 1.

A sub-mode is added by pressing a pencil figure at the end of the top right parameter sSetting screen.

For more detailed information about change or delete treatments in favourites please refer to chapter 8, operation instructions in the manual.

FAQ

Can the emFieldPro be used on an area of the body with artificial joints or plate pins?

Do I achieve same effect when my patient has his/her clothes on?

Are there any precautions when using on clothes?

What part should be used with care?

No, due to the nature of the magnetic field deep heat will be generated, which may cause deep-seated burns.

One of the characteristics of a magnetic field is that it is permeable with a similar therapeutic effect. Therefore, it can be used on clothes.

If there is a metallic decoration on the clothes, the magnetic field may cause burns on the surface of the skin. (e.g., bra strap rings, underwear metal ornaments, metal-containing fibers).

If the transducer with the lever fixed is moved, the rubber ball inside will wear out and the transducer may come off. Therefore, release the lever when it is not in use



Precautions and contraindications

Precautions

As a strong magnetic field is generated around the magnetic field generating section, equipment operation technicians, assistants, and patients must not hold any items which can be affected by the magnetic field.

Items such as wristwatches, mobile phones may be damaged by magnetic fields, so please be careful and keep them separately.

During the operation of the equipment, the patient shall not take drinks, water, etc. which can influence the equipment.

Be careful to ensure that magnetic stimulation does not penetrate the heart region.

Contraindications

Absolute contraindications for use of the emFieldPro are placing an active applicator over metal or electronic implants like cardiac pacemakers, cochlear implants, intrathecal pumps, hearing aids etc.

Be ensured that magnetic stimulation doesn't penetrate the heart region.

The emFieldPro should be used with caution in persons with Grave's disease, active bleeding disorders or seizure disorders.

Patients in the following categories cannot be treated, prior to permission of the doctor in charge:

- Fever
- Application over menstruating uterus
- Pregnancy
- Application over areas of the skin with sensitivity disorder
- Elderly and childrenPatients with suspected status of epilepsy on the basis of electroencephalograph
- Patients with evidence of external wound at brain and neck
- Patients with cranial implants
- Implanted defibrillators
- Implanted neurostimulators
- Malignant tumor
- Hemorrhagic conditions
- Epilepsy
- Recent surgical procedure
- Pulmonary insufficiency

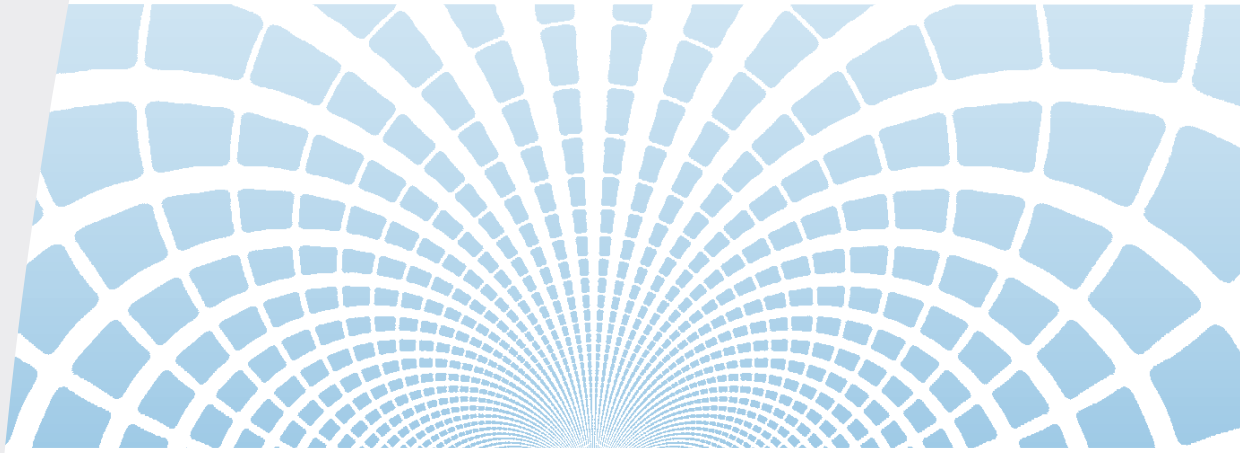
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