HUMANTECAR® SYNERGY VISS: A NEW SOURCE OF ENERGY, THE SOURCE OF A NEW TYPE OF THERAPY.
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THE NEUROMUSCULAR SYSTEM

Keep it balanced to eliminate pain and improve strength, muscle tone and trophism and coordination

The neuromuscular system receives sensory information from the external environment. It has great capacity for adaptation because the signals are processed by the Central Nervous System (CNS), which is able to readjust on the basis of the information received.

HumanTecar® SYNERGY VISS is a new form of energy: it makes it possible to re-establish and maintain coordination between the sensory information and the neuromuscular system and therefore to efficaciously restore muscle strength and tone.

This technology is able to stimulate and rebalance the neuromuscular system for a greater control over the body and a better quality of life.

A full-blown re-programming of this circuit allows to improve the coordination of all body muscles. The special kind of stimulus used by SYNERGY VISS has also been demonstrated to favour bone tissue synthesis and enable the managing of acute and chronic pain.

The plasticity of the Central Nervous System grants to maintain the results achieved for more than six months after treatment.

The possibility of applying this technology even without moving the joints allows bedridden patients to avoid the muscle tone and strength wasting that usually results from prolonged immobilisation. Immediately starting the rehabilitation programme means significantly reduce recovery times.

The benefits for the body

- Recovery of correct muscle tone and strength.
- Pain relief.
- Improvement of balance, posture and coordination.
- Better efficiency in controlling the bloodstream and lymph drainage.
- Delay in the onset of muscle fatigue due to a greater capacity to bear workloads.
- Prevention of future accidents.
- Optimisation of muscle performance when training and competing.

The square-wave, focused mechano-acoustic vibration system is suitable for:

- subjects with hypertonia and hypotonia problems;
- subjects suffering from chronic or acute pain;
- elderly subjects with balance problems, neurodegenerative diseases (e.g. stroke, Parkinson’s) or sarcopenia;
- individuals affected by osteoporosis;
- subjects with urological dysfunctions;
- children with flat feet;
- amateur or high-class athletes;
- people who wish to improve their muscle tone for cosmetic reasons.

Subjects suffering from chronic or acute pain;

«Dig within. Within is the wellspring of Good; and it is always ready to bubble up, if you just dig.»

– Marcus Aurelius
The afferent signal
It is the signal which comes from sensory receptors and carries information to the CNS. It reaches the spinal cord, then the thalamus and, lastly, the encephalon. Here, the afferent signal is processed and a consequent response is generated, the efferent signal.

The efferent signal
This is the "message" that is sent from the encephalon to the muscle from which the stimulus originated.

The Pacinian (or lamellar) corpuscles are sensory receptors, more specifically, quick-adapting mechanoreceptors, which play a key role in neuromuscular system modulation. The signals they send to the CNS (Central Nervous System) cause a reflected response towards the muscle district the stimulus originated from. They are located in the deep dermis and in the subcutaneous tissue, especially in the muscle belly and close to the musculotendinous junctions. Their activation requires a localised stimulus, which allows a specific action on a certain muscle group.

How can the Pacinian corpuscles be activated?
The lamellar corpuscles can only be activated by means of a pressure stimulus with a certain intensity and frequency.

Pressure: the force applied to the Pacinian corpuscles influences the intensity of the afferent signal transmitted to the CNS.

Frequency: the corpuscles are only activated at frequencies above 60 Hz, with maximum sensitivity at 250-300 Hz, the values at which the stimulus is most efficient. They are, in fact, known as "high-threshold" receptors. According to the frequency used, it is possible to activate in a preferential manner: red, slow muscle fibres or white, fast muscle fibres. The former are involved in prolonged movements, such as the postural ones, whereas the latter are involved in actions requiring a rapid development of strength, such as during sports.

The greater the intensity of the afferent signal originated from the Pacinian corpuscles, the greater is that of the efferent signal. An intense efferent signal will activate more muscle fibres during movement, correspondingly obtaining better, faster results.
Scientific research has allowed HumanTecar® to discover the form of energy best-suited to activate the Pacinian corpuscles in an effective and selective manner: the square-wave, focused mechano-acoustic vibration.

THE SQUARE-WAVE, FOCUSED MECHANO-ACOUSTIC VIBRATION.

SQUARE-WAVE
In order to activate the lamellar corpuscles efficaciously, it is necessary to maintain adequate and prolonged pressure. With an appropriate interval between stimuli, it is possible to induce a continuous sending of signals to the CNS. The square wave allows this type of action.

The flow modulator is also able to almost completely eliminate the negative half-wave by keeping pressure always above the atmospheric value, making the treatment even more efficient.

FOCUSED
Clinical studies have shown that, compared to the Whole-Body Vibration, the treatment is more effective and longer-lasting when it is localised on the muscle or close to the involved musculotendinous junction.

Furthermore, SYNERGY VSS technology avoids the side effects typical of the Whole-Body Vibration, especially those affecting the spine.

MECHANO-ACOUSTIC
The mechano-acoustic wave is generated by a patented flow modulator that moves air cones at a varying frequency (30-300 Hz).

The longitudinal displacement causes an alternating air compression and dilation, the mechanism by which sound propagates.

By varying the wave frequency, it is possible to selectively activate different types of muscle fibres and therefore achieve different therapeutic effects.

These three specific characteristics make it possible to activate the Pacinian corpuscles in a more efficacious manner, for an immediate and long-lasting effect.
TECHNOLOGY: HUMANTECAR® SYNERGY VISS AND SYNERGY VISS handy

Two different versions of the device allowing customised use with the same efficacious and long-lasting results.

SYNERGY VISS
A technology designed to stand permanently inside the physiotherapy practice, in order to permit the most complete and rapid treatment possible. It allows the simultaneous treatment of up to 14 bilateral muscle groups, using 28 transduction points.

SYNERGY VISS handy
The more compact and lightweight portable version that makes it possible to perform the treatment even at the patient’s home. It allows the operator to treat up to 5 bilateral muscle districts simultaneously, using 10 transduction points.

The advantages of the technology
Endless localized and systemic treatment options
HumanTecar® SYNERGY VISS is a very versatile device. It acts on different areas at the same time, thanks to several transduction points. During the session, the patient perceives absolute comfort and his active participation is not required, unless to perform the movements needed to identify the area to be treated or in case of dynamic applications. Moreover, the device is not dependent on an active operator, except when the manual transducer is used, for example, to treat trigger points locally.

Swift results
The effects appear rapidly after just two or three consecutive sessions and sometimes even from the first and they remain stable for up to and even longer than six months. For athletes, after the initial intensive treatment period, one session a month is recommended in order to maintain the excellent results achieved and to guarantee the best-possible performance.

Programmes
Neuromuscular stimulation is a strategy that allows the treatment of different diseases. This is why we have created as many as 40 pre-set programmes (with different frequencies, amplitudes and duration of treatment) to be chosen according to the disorder to be treated (results supported by scientific research). The programmes can be adapted to suit the requirements and needs of the individual patient, for customised therapies.

The characteristics of this technology make it suitable for everyday use because it:
- is easy to use;
- is comfortable for the patient;
- does not require the constant presence of an operator;
- can be combined with other treatments;
- allows to obtain immediate results;
- is not invasive;
- does not require active patient participation and is therefore useful in the immediate postoperative period and in debilitated or elderly subjects.
**TRANSUDERS**

*Transmit 100% generated energy to tissue*

The vibration is transmitted to tissue by means of transducers which are applied to the skin. They are made of ABS polymer with a Santoprene sound damper that facilitates the adhesion to the skin and ensures an airtight seal.

They come in six sizes and two different shapes to allow an optimum fit to different areas of the body.

Some transducers are equipped with a membrane between the polymer part and the Santoprene damper, making it possible to treat areas in which it is difficult to obtain a perfect adhesion to the skin, such as very small areas with an irregular anatomical surface, i.e. the epicondyle, the epitrochlea, the lumbrical muscles or fingers. In these cases, the vibration can also be transmitted when the transducer/tissue contact is imperfect.

In addition to the autostatic transducers, HumanTecar® SYNERGY VISS and SYNERGY VISS handy come with two manual therapy transducers, which are ideal for the treatment of trigger points.

The transducers should be positioned correctly on the areas with the highest concentration of mechanoreceptors, i.e. the muscle belly and close to the musculotendinous junctions.

**FLOW MODULATOR**

*Our “engine”*

The special type of signal used, consisting of a square wave, is obtained by using a patented device known as flow modulator.

It allows the simultaneous opening of a number of chambers that release air cones, whose variable pressure generates the vibration typical of HumanTecar® SYNERGY VISS. This technology is therefore able to keep the pressure at higher values than the atmospheric one, for a greater treatment efficiency.

Representative graph of the variation of pressure in time according to the square-wave pattern, which is typical of the mechano-acoustic vibration obtained thanks to the flow modulator technology.

**INTERNATIONAL PATENTS**

- EU Patent no. 1824439
- US Patent no. 8105254 / 9713567
- RU Patent no. 2449824
- IN Patent no. 276258
- MX Patent no. MX/A/2007/006677

Made in Italy
AREAS OF APPLICATION

Scientific research has allowed HumanTecar® to identify the form of energy which is best-suited to effectively treat different diseases.

Acute and chronic pain
The mechano-acoustic vibration system allows to silence the signal from the nociceptors (pain receptors) thanks to the Gate Control mechanism. This means that, in the presence of the vibration stimulus, the medullary neuron that carries the pain information to the brain cortex transmits only the vibration one, thereby interrupting the pain signal. The elimination of pain favours the functional recovery of the affected muscle. [017, 025]

Post-surgical recovery
It often occurs that patients cannot be mobilised immediately after surgery and must wait for a while before being able to start rehabilitation. In the meantime, the muscles lose tone and strength, making recovery times significantly longer. Immediate action on the neuromuscular system considerably reduces rehabilitation times. [015, 021]

Sport
Treatment with SYNERGY VISS allows trained athletes to sustain greater workloads. In this way, they can maximise their training, optimise performance during competitions and prevent the onset of overload accidents. [003, 005, 021]

Neurorehabilitation
Many neurodegenerative conditions, first and foremost stroke and parkinsonisms, have repercussions on subjects’ movement ability, because the motor nerve fibres are damaged. Patients treated with SYNERGY VISS obtain a better control of their body and an improvement in hypertonia and hypotonia conditions, leading to a significant better quality of life. [009, 011, 012, 016, 023, 027]

Osteoporosis
The opportunity to apply a new form of energy to the neuromuscular system has positive repercussions on this condition, which causes a weakening in the bone tissue and an increase in the risk of fragility-induced fractures and consequent falls. The square-wave, focused mechano-acoustic vibration consents to stimulate the osteogenesis process, which restores the bones’ solidity. The treated area also receives greater nutrition from the blood flow, thanks to the recovery of muscle tone. [020]

Elderly
These subjects undergo a degeneration of the muscle fibres that leads to sarcopenia. Their movements consequently become more difficult and unstable, with an increased risk of falls. Recovering muscle strength and tone is the key to overcome these problems. [004, 008, 014]

Urology
Taking effective actions on the hypertonia and hypotonia of the pelvic muscles can resolve and prevent the onset of urological disorders such as urinary urgency and incontinence, pelvic floor pain, constipation, etc. [026]

Orthopaedics
Favouring the recovery of muscle tone and strength during rehabilitation enables to regain function in a short time and to treat a number of orthopaedic conditions such as flatfoot, jumper’s knee and muscle hypotrophy. [006, 007, 015]

Cosmetic medicine
The correct muscle tone is fundamental for a good figure. The treatment with SYNERGY VISS tones the muscles and reduces localised fat deposits with a non-invasive procedure. [002]
CLINICAL STUDIES

Here below a series of published articles about the square-wave, focused mechano-acoustic vibration technology regarding the areas of application of SYNERGY VISS.

Acute and chronic pain

[017] TREATMENT OF MYOFASCIAL PAIN SYNDROMES: LOCAL ACOUSTIC VIBRATION VS LIDOCAINE INJECTION

[025] PAIN ALLEVIATION BY VIBRATORY STIMULATION
T. Lundeberg et al, Pain, 1984; 20:25-44

Post-surgical recovery

[015] SELECTIVE DEVELOPMENT OF MUSCULAR FORCE IN THE REHABILITATIVE CONTEXT
R. Saggini et al, Europa Medicophysica, 2006; 42(suppl.1 to n.2):357-8

[021]* CONTRALATERAL EFFECT OF SHORT-DURATION UNILATERAL NEUROMUSCULAR ELECTRICAL STIMULATION AND FOCAL VIBRATION IN HEALTHY SUBJECTS
M. A. Minetto et al, European Journal of Physical and Rehabilitation Medicine, 2018; PMID:29532649

Sport

[003] HIGH FREQUENCY VIBRATION CONDITIONING STIMULATION CENTRALLY REDUCES MYOELECTRICAL MANIFESTATION OF FATIGUE IN HEALTHY SUBJECTS

[005] ACUTE AND CUMULATIVE EFFECTS OF FOCUSED HIGH-FREQUENCY VIBRATIONS ON THE ENDOCRINE SYSTEM AND MUSCLE STRENGTH

[021]* See Post-surgical recovery

Neurorehabilitation

[009] TASK-ORIENTED PHYSICAL EXERCISE USING POSTURAL REALIGNMENT WITH BODY WEIGHT SUPPORT IN CHRONIC STROKE

[011] COMBINED REHABILITATION PROGRAM FOR POSTURAL INSTABILITY IN PROGRESSIVE SUPRANUCLEAR PALSY
L. Di Pancrazio et al, NeuroRehabilitation, 2013; 32:855-60

[012] EFFICACY OF MECHANO ACOUSTIC VIBRATION ON STRENGTH, PAIN AND FUNCTION IN POSTSTROKE REHABILITATION: A PILOT STUDY
C. Costantino et al, Topics in Stroke Rehabilitation, 2014; 21(5):391-9

[016] GLOBAL BIOPROGRESSIVE REHABILITATION PROGRAM AND POSTURAL INSTABILITY IN PARKINSON’S DISEASE

[023] REHABILITATION PROGRAM BASED ON SENSORIMOTOR RECOVERY IMPROVES THE STATIC AND DYNAMIC BALANCE AND MODIFIES THE BASAL GANGLIA NEUROCHEMISTRY: A PILOT 1H-MRS STUDY ON PARKINSON’S DISEASE PATIENTS
S. Deli Pizzi et al, Medicine, 2017; 96(50)

[027] THE EFFECTS OF LOCAL MECHANO-ACOUSTIC VIBRATIONS ON UPPER LIMB SPASTICITY
R. Casale et al, 5th World Congress of SIMFER, Istanbul, 13-17 June 2009, Turkey

Osteoporosis

[020] EFFECT OF COMBINED TREATMENT WITH FOCUSED MECHANO-ACOUSTIC VIBRATION AND PHARMACOLOGICAL THERAPY ON BONE MINERAL DENSITY AND MUSCLE STRENGTH IN POST-MENOPAUSAL WOMEN
R. Saggini et al, Clinical cases in mineral and bone metabolism, 2017; 14(3):305-11

Elderly

[004] EFFECTS OF LOCAL VIBRATIONS ON SKELETAL MUSCLE TROPHISM IN ELDERLY PEOPLE: MECHANICAL, CELLULAR AND MOLECULAR EVENTS
T. Pietrangelo et al, International Journal of Molecular Medicine, 2009; 24:503-12

[008] MUSCLE STRENGTH AND BALANCE TRAINING IN SARCOPENIC ELDERLY: A PILOT STUDY WITH RANDOMIZED CONTROLLED TRIAL

[014] INSTABILITÀ POSTURALE, SARCOPENIA E CADUTE
R. Saggini et al, Europa Medicophysica, 2008; 44(suppl.1 to n.3)

Orthopaedics

[006] FLEXIBLE FLATFOOT TREATMENT IN CHILDREN WITH MECHANICAL SOUND VIBRATION THERAPY

[007] LONG-TERM EFFECTIVENESS OF COMBINED MECHANOTRANSDUCTION TREATMENT IN JUMPER’S KNEE

[015] SELECTIVE DEVELOPMENT OF MUSCULAR FORCE IN THE REHABILITATIVE CONTEXT
R. Saggini et al, Europa Medicophysica, 2006; 42(suppl.1 to n.2):357-8

Cosmetic medicine

[002] THE USE OF MECHANICAL ACOUSTIC VIBRATIONS TO IMPROVE ABDOMINAL CONTOUR
**Classification of the HumanTecar® devices:**

**SYNERGY VISS and SYNERGY VISS handy**

**TECHNICAL AND MANUFACTURING PARAMETERS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SYNERGY VISS</th>
<th>SYNERGY VISS handy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of protection against electrical hazards</td>
<td>Class I device</td>
<td>Class I device</td>
</tr>
<tr>
<td>Level of protection against electrical hazards - applied parts</td>
<td>Type BF device</td>
<td>Type BF device</td>
</tr>
<tr>
<td>Electromagnetic compatibility</td>
<td>Group 1, Class A</td>
<td>Group 1, Class A</td>
</tr>
<tr>
<td>Type of protection against penetration of water</td>
<td>Common device</td>
<td>Common device</td>
</tr>
<tr>
<td>Type of protection against penetration of dust</td>
<td>Common device</td>
<td>Common device</td>
</tr>
<tr>
<td>Sterilisation method</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Safety level in an atmosphere with flammable gases</td>
<td>Unsuitable device</td>
<td>Unsuitable device</td>
</tr>
<tr>
<td>Mode of use</td>
<td>Continuous use</td>
<td>Continuous use</td>
</tr>
<tr>
<td>Placement</td>
<td>Transportable device</td>
<td>Transportable device</td>
</tr>
</tbody>
</table>

**Intended use**

CND – Italian Medical Device Classification

Z12069099

Physiotherapy and rehabilitation device - others

**Technical data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SYNERGY VISS</th>
<th>SYNERGY VISS handy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains voltage</td>
<td>~ 230 V ± 10%</td>
<td>~ 230 V, 115 V or 90 V ± 10%</td>
</tr>
<tr>
<td>Mains frequency</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Absorbed power</td>
<td>0.950 kW (max)</td>
<td>0.400 kW (max)</td>
</tr>
<tr>
<td>Protection fuses</td>
<td>F1 – F2 = T10A</td>
<td>F1 – F2 = T10A</td>
</tr>
<tr>
<td>Cooling system</td>
<td>By air</td>
<td>By air</td>
</tr>
<tr>
<td>Size</td>
<td>L 400 x D 440 x H 1000 mm</td>
<td>L 370 x D 430 x H 190 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>52 Kg</td>
<td>9.7 Kg</td>
</tr>
<tr>
<td>Vibration frequency range</td>
<td>30–300 Hz</td>
<td>30–300 Hz</td>
</tr>
<tr>
<td>Simultaneous transduction points</td>
<td>28</td>
<td>10</td>
</tr>
<tr>
<td>Maximum noise pollution*</td>
<td>85 dB</td>
<td>85 dB</td>
</tr>
</tbody>
</table>

* Maximum noise pollution is the value that can be detected if the transducer detaches completely from the patient’s skin during treatment at the maximum frequency of use (300 Hz).

HumanTecar® is the new concept of doing physiotherapy. It is a trademark owned by Unibell, which has been present in the healthcare field for 40 years and is internationally renowned for having invented Tecartherapy in the ‘90s. The registered trademark “TECAR THERAPY GAIN WITHOUT PAIN®” dates from 1997, the year in which it devised and developed a ground-breaking, cutting-edge approach for the treatment of acute and chronic osteoarticular and muscular diseases. Its technological and methodological R&D has made HumanTecar® an important benchmark in the physiotherapy field, far beyond the conventional concept of orthopaedic treatments.

The synergistic action between advanced technologies, manual techniques and functional products that act on the neuromuscular, circulatory and proprioceptive systems, allows to regain the body balance, in order to reactivate its natural functions in a fast and effective way.

International high-level athletes, the leading clinics and physiotherapy and rehabilitation centres that adopt this method are the main proof of its absolute efficacy, which has now been successfully "transferred" to everyday life.

HumanTecar® is a concept that coexists perfectly and shares the same approach with another brand, owned by Unibell too, developed specifically for the cosmetic sector: Omeoenergetica®. Source of beauty and rejuvenation, this line of products and technologies stimulates the body’s hidden energy to guarantee immediate, long-lasting results and deep treatments.

Beauty comes from within.