

Independent Health Care using Mobile Electro Therapy

Physical Therapy

Physical therapy is the use of scientifically developed physical methods of activating body functions, which are known to heal and alleviate debilitating injury and sickness, and to maintain a healthy and fit lifestyle.

Today, Physical Therapists promote health and fitness by using:

1 Manual therapy such as massage and adjustments to soft-tissue, bones and joints.

2 Exercise therapy and fitness routines.

3 Stimulation therapy to:

- Activate sensory input into the Central Nervous System (CNS). The use of light, sound, smell and touch, results in the activation of Action Potentials in motor nerve fibres.
- Increase bioelectrical activity in body cells.

Action potentials are electro-chemical in nature, and today, we are able to electrically stimulate action potential firing of sensory and motor nerves, with the use of minuscule pulsed electrical charges applied across the skin.

The Innovation of Mobile Electro Therapy

The innovation of Mobile Electro Therapy (MET) is what really provides the Independence for people to obtain:

An Independence from Pain and Degenerative Disease

The main innovation of today's MET machines is that they provide effective therapy for many of the chronic debilitating problems of severe pain and degenerative disease, which are difficult ailments to treat. Our present health care system is frequently failing to cope with these problems. Now, we can use MET to raise the level of endorphin's in the blood stream, to gain a stronger analgesic effect than that achieved with the use of analgesic and anti-inflammatory drugs.

Being a personally applied treatment, MET enables people to look after their health at any time of the day or night, to provide the individual user with Independence and Self-Reliance and control over their own Health and Wellbeing.

A Feeling of Wellbeing to improve the Quality of Life

Many chronic injuries and ailments can be rehabilitated using an intensive course of frequently applied MET. The endorphin release achieved at the same time has a sedating effect, which induces relaxation and a feeling of wellbeing.

Today's MET Machines

Today's MET Machines enable applications of MET, from small pocket size machines that have the power of large clinical devices. These pocket size devices achieve highly efficient electrical stimulation therapy, because MET may be used for extended periods. The treatment efficacy of MET is much more effective than that achieved with short period electrical therapy applied within a clinic.

Electrical Stimulation of the Body

The workings of the human body are so vast and complex, that we often resort to generalities in an effort to describe the genus of its operation. But without being too vague, we can safely say that electro-chemical activity is the body's *modus operandi*, or method of operation. Our internal and external environments mediate changes in the chemicals present in our bloodstream, which in turn mediates changes in the cellular electrical potentials of various organs and tissues. Pain perception, body movements, bone modeling, muscle growth and tissue repair all operate on the electrical level. In fact, electrical potentials are the basis of activating body functions.

It should not be a surprise then, to witness the excitement surrounding the arrival of technology that actually clones these natural electrical potentials. This gives both health care professionals and individuals the ability to alter and augment nerve, muscle, soft-tissue and bone function, in a way previously impossible.

To obtain sustained functional activity, it requires today's micro-electronic design to optimise today's health and wellbeing applications.

Today's Machines and Information

Health care professionals are privileged to be in a position to help people when they most need it. They are called upon for assistance in improving their patient's quality of life. This imposes on them the duty to be receptive to every tool that can help them achieve these ends.

The latest tool available to them is the advanced design electrical stimulator, which is at the heart of Mobile Electro Therapy (MET). They can use their knowledge of anatomy, physiology and psychology to optimize the efficacy of electrical stimulation, which directly effects the body's electrical action potential impulses, without recourse to intermediary therapy methods to which the body rapidly adapts. Electrical stimulation forms the most direct form of therapy available, which in many instances surpasses other therapies such as sound, light, heat, massage, mobilization and non-opiate medication. This occurs without dangerous side-effects.

Unlike the days when electrical therapy equipment looked like something out of a Frankenstein movie, today's stimulators are battery powered and are optimized in design to achieve specific effects. Their innovation lies in the fact that their design is led by clinical needs. As such, they represent the ideal machine for the clinical

practitioner and the individual. A further boost for the use of MET is low cost, portability and ease of use. It is this that has brought the use of electrical stimulation to all people, for them to personally improve their health and wellbeing.

Today, we have machines that are able to use the other side of the electro-chemical function of our body - *The Electrical Component*.

These machines and information advances in the use of the electrical component of biological function, involves a responsibility on the health care provider to instruct their long-time suffering patients, who have chronic pain and degenerative ailments, to be shown how to personally treat their ailment with MET.

Selective Electrical activation of Neural Action Potentials

Electrical stimulation fires neural signals (Action Potentials), which causes chemical neurotransmitters to enable expanding, massive chain reaction firing in adjacent nerves and the Central Nervous System (CNS). These signals build a mental image of what is happening inside and outside our body, for the brain to co-ordinate an immediate thought provoked and/or an automatic motor response, or store the information for later recall.

Fast acting 'A' Type sensory nerve fibres:

1 Send urgent sensory messages to the CNS, to let the mind know that the body may be in danger. It then urgently monitors the input and if necessary reacts to protect the body from any danger. These fast acting messages originate from sensory receptors that respond to stimuli, which are located:

- External to the body in the form of smell, sound, hearing and touch
- Inside the body with sensory input, from receptors that maintain our balance
- At sharp pain responding receptors.

2 The body's reaction to a dangerous environment is a 'Flight or Fight' function, which activates fast acting 'A' Type motor nerve fibre messages, which cause skeletal muscles to work, to eliminate danger to the body.

3 Fast acting messages travel at a velocity of 100 meters per second and they may be effectively activated by externally generated electrical stimuli, at pulse rates between 35 and 200 pulses per second (pps).

4 Electrical Stimulation is usually applied at a high rate of 100 pps for:

- A Gating of pain. Sustained applications may be needed, to prolong pain relief
- An Enkephalin release, which has a short 2 hour duration of pain management

- The activation of skeletal muscle. Exercise will continue whilst the stimuli is maintained. Sustained gentle exercise maintains circulatory flow, with an increased supply of oxygen and nutrients.

Slow acting 'C' Type sensory nerve fibres:

1 Send essential sensory message input into the CNS:

- To inform the sub-conscious mind of the state at which essential autonomic body functions are operating. From monitoring of this input, the mind reacts and sends motor messages that maintain the working of these essential functions.

2 These slow acting messages control:

- The regulation of complex functions like body temperature, vital chest function, circulation control, and digestive functions, and the functioning of body organs
- Management of severe pain and chronic debilitating ailments
- The fighting of diseases and invading organisms
- The rapid healing of injury, which is enhanced by the activation of visceral muscle, which will continue exercising, whilst the stimuli is maintained. Sustained gentle exercise is used to maintain the supply of oxygen and nutrients to healing sites.

3 Slow acting messages travel at a velocity of 0.5 to 2 meters per second and they may be effectively activated by externally generated low frequency electrical stimuli, at pulse rates below 20 pps.

4 Electrical Stimulation is usually applied at 2 to 10 pps, which is used to induce an endorphin release, which is the body's main pain defence mechanism. It has an 8 to 36 hour duration of pain relief.

Physiological factors that enable Electrical Nerve Stimulation

1 To equally stimulate two body regions, two application electrodes are placed upon the skin, with alternating positive and negative polarity pulsed potentials. Electrical stimulation occurs at the rate at which the charges are applied.

2 Negative pulse charges lower the voltage potential of resting nerve tissue.

3 A negative voltage must be applied to resting nerve tissue to lower its voltage by at least -15 mV. To achieve this the voltage applied on the skin must be at least 12 volts.

4 This increases the negative voltage of resting nerve tissue, which is at -70 mV to rise to at least -85 mV.

5 At this level, the nerve self-fires at a negative potential of approximately -140 mV.

6 This firing self-propagates action potential impulses, which travel without diminishing effect to and from the CNS in both sensory and motor nerve fibres. The firing continues whilst the stimulation is applied at an adequate voltage.

Selective Increase in Bio-electrical Cell Activity

By increasing bio-electrical activity over extended periods, at a pulse rate similar to the frequency at which the body normally moves (3L Stimulation), we are able to hasten healing times. These accelerated healing times are achieved by passing electrical potentials across muscle, connective soft-tissue and bone cells, which have a diminished bio-electrical activity (usually due to being rested, as a consequence of an injury or debilitating ailment).

Today's Health and Wellbeing Applications

Pain management;

- Acute, chronic and post surgical.

Rapid tissue healing;

- Increase micro-circulation at the site of an injury
- Increase circulatory flow around an injury
- Enhance cellular exchange of nutrients and waste products.

Muscle exercising;

- Strengthen and increase stamina in skeletal muscle
- Mobilize stiffened joints
- Body building
- Figure forming
- Strengthen paralysed skeletal muscle.

Increase circulatory flow;

- Prevent blood clot formation in the lower limb
- Activate smooth muscle of the viscera and blood vessels.

Rehabilitate;

- Temporary disablement following injury
- Chronic trauma induced disablement
- Strengthen atrophy of muscle
- Relieve lingering post surgical pain and arthritis
- Stress and urge incontinence and enhance pelvic health.

Stress relief;

- Induce relaxation from stress.

Wellbeing;

- Feel-good, Transcranial Stimulation
- Rapid recovery after physical exertion
- Induce sleep
- Enhance withdrawal from illicit drugs, prescribed drugs and alcohol.

Provide an effective alternative - to the taking of pain-relieving and anti-inflammatory drugs.

Extended out-of-hours applications - to enable people to use therapy at any time of the day or night, which is impractical to achieve within a clinic.

Note! No one application has just one effect. With many of the primary aims of MET, there is more than one additional beneficial effect.

Locations where MET can be Used

Physical therapy clinics.

Medical clinics.

Physical medicine clinics.

Occupational hand therapy clinics.

Sports medicine clinics.

Industrial medicine clinics.

Pain management clinics.

Hospitals.

The hospital in the home.

Sports clubs for strength training and recovery from fatigue.

At home, work, sleeping and at leisure.

Drug detoxification centres.

Retirement homes and hostels.

Electrical Stimulation Applications

Gone are the days when small electro-therapy machines were known only as Transcutaneous Electrical Nerve Stimulators (TENS). Those were the times when TENS machines were used only for the management of chronic pain. Many people still hold the perception that all TENS are the same - this is no longer the case. New sophisticated, portable, multi-function machines - together with innovative application systems - enable the employment of a greatly expanded range of health, strengthening and wellbeing applications.

By introducing electrical stimulation across the skin, the method of application is known as transcutaneous (across-the-skin), which is the most common method of applying electrical stimulation therapy. Another means is puncturing the skin with

needles - known as acupuncture. There are also examples of surgical implant devices such as the heart pace-maker and the bionic ear.

All methods of electrical stimulation use various modes of electricity (in the form of minuscule pulse charges) which closely match natural electrical signals, to either activate or suppress functions within nerves, muscles, soft-tissue and bone cells.

The Primary Modes of Electrical Stimulation

Transcutaneous

TENS - is used as an electronic aspirin to relieve most types of pain, by introducing the electrical stimuli, which causes the body to produce it's own natural pain control hormones (endorphins). This is achieved by activating action potentials in sensory nerve fibres. A practical and sustainable method of initiating and maintaining neural action potentials is achieved by using MET, that is directed into peripheral and CNS nerve tissue. Stimulation to directly activate the CNS or spinal segments may be applied either trans-cranial to activate the CNS at "Brain Wave Frequencies", or to spinal segments and peripheral nerve fibres at biological reactive or high rate hyper-stimulation frequencies.

TEMS - is Transcutaneous Electrical Muscle Stimulation - known as EMS, which is used to provide the stimuli to induce exercise in both skeletal and visceral muscle.

Acupuncture

An acupuncture device has a simple single function output. It is a sensory input device, which is an invasive method, performed by piercing the skin with needles.

Acupuncture is highly unsuitable for personal use and requires a skilled practitioner for safe and efficient therapy.

Implanted devices

- Heart pace-maker
- Bone-growth stimulator
- Bionic ear
- Deep-brain stimulator.

When to apply Electrical Stimulation

Stimulation may be applied from the first-aid period of an injury to prevent the deterioration of the injury and to act as an electronic aspirin. During and after the first-aid period, stimulation must be combined with compression whilst any swelling is present, or is likely to occur. It may then be used until a full recovery is achieved. It may also be used as a pain management procedure to relieve chronic pain.

Three commonly used Modalities

1 3L applications are performed using a LOW pulse rate, LOW pulse intensity and for a LONG duration. 3L may be applied "around-the-clock", or as a series of repeat daily doses, to maintain the healing functions, by keeping active the automatic functions of the permeability of body cells and the maintenance of vascular activity. This sustained level of cellular activity assists in the exchange of oxygen, nutrients and waste products.

2 3M applications are performed using a MEDIUM pulse rate, MEDIUM pulse intensity and for a MEDIUM duration. 3M may be applied in the clinical environment, for applications of up to 30 minutes. It is used for general healing and pain management. It is also used as a preferred method to tone up the body, build muscle stamina and increase the capacity of vital chest muscles.

3 3S applications are performed using a STRONG (high) pulse rate, STRONG pulse intensity and for a SHORT duration. 3S may be applied in the clinical environment, when time factors rule out the ability to perform 3L and 3M applications. It is used for development of skeletal muscle.

Treatment Dosage

3L doses - used for long duration. A mobile application, which may be applied anywhere at any time of the day or night.

3M doses - used for moderate duration.

3S doses - used for short durations.

Repeat daily doses - are frequently applied 3 times daily.

Pre-emptive doses - are applied prior to the onset of pain. This prevents the return of painful sensations and aids in the unlearning of pain.

On-Demand doses - are for random use, which are applied as required. This is like taking an aspirin when needed.

Progressive doses - are graduated increases in the level of application time, pulse rate, pulse intensity and repetition of applications. Therapy usually starts from a 3L application and progresses to a 3S application as recovery occurs, and strength and stamina return to normal.

Brain Wave Frequency doses - are applied trans-cranial, or to peripheral regions, which provide maximum sensory input.

Pain Management

Pain Management is achieved by using:

1 A HIGH pulse rate to activate nerve impulse transmission in 'A' type sensory nerve fibres, to activate the awareness state of the mind. This causes a gating effect, which has a quick-acting pain management effect that only lasts for a short period of approximately 2 hours.

2 A LOW pulse rate to activate nerve impulse transmission in 'C' type sensory nerve fibres. This activates a slow release of endorphins into the blood stream, which takes at least 30 minutes to rise to an effective level. The onset of pain management is slow acting, but the effect lasts for as long as 8 to 36 hours - with a 2 hour application having a stronger, more sustaining effect. The more regions simultaneously stimulated, the quicker and stronger the pain relief.

3 A combination of pulse rates is achieved by changing the pulse frequency from a HIGH to a LOW pulse rate (modulation). A modulated pulse rate will achieve a combined gating effect and endorphin release.

The unlearning of the 'Feeling of Pain' is a consequence of repeatedly relieving pain and of maintaining a pain free state, whereby, frequently used pain conducting

pathways are kept broken and the pain has to learn new pathways. Repetitive doses, pre-emptive doses, "around-the-clock" and/or 3L applications assist to unlearn pain.

For Pain Management the applicators are applied to:

1 The region of pain, so as to induce a gating effect, which will over-ride the pain. A mild release of endorphins is achieved.

2 Regions of maximum sensory feeling. These regions are located in the face, palms of the hands and soles of the feet. It is usual to place electrodes on the earlobes, wrists or ankles. Maximum sensory input induces an elevated level of endorphins into the blood stream. Endorphins, in addition to being a natural pain-inhibiting hormone, also induce relaxation and sleep.

The more sensory regions simultaneously stimulated, the more active CNS action potentials are fired and the stronger the pain management effect.

Electrical Healing

Hastened Healing is achieved by:

1 3L Stimulation, which may be personally applied 'around-the-clock', or as a series of repeat daily doses, by passing the stimulation through the injury site, at a low frequency of 2 to 10 pps. This maintains elevated levels of bio-electrical activity, which assists the cells to hasten the healing process. This keeps active the autonomic activities of the permeability of body cells and the maintenance of vascular activity. This sustained heightened level of cellular activity assists in the ongoing exchange of oxygen, nutrients and waste products, to further speed the healing and recovery time.

2 3M Stimulation may be performed in the clinical environment, using a MEDIUM pulse rate, MEDIUM pulse intensity, applied for MEDIUM time duration. This maintains the duration of the application for periods of up to 30 minutes, but it is not as effective for healing as obtained using 3L stimulation.

3 3S Stimulation may be used in institutions and private practice, when time factors rule out the ability to perform 3L and 3M applications. It is also a preferred method for gentle exercise for rehabilitation from muscle atrophy.

4 Progressive 3L to 3S Stimulation is used with incremental increases in the duration of application time, pulse rate, pulse intensity and repetition of application occurs from early 3L applications, as recovery occurs.

Apply stimulation under compression bandaging if bruising or swelling of the tissues is present, or is likely to occur.

Exercise of muscle is also an integral part of healing, due to its:

- Strength and stamina development
- Increased circulatory supply of nutrients
- Loosening of stiffened joints.

Notes:

Should rapid healing be an essential factor, then the hire or loan of equipment should be provided for intensive supervised mobile 3L applications.

No treatment stands alone. Therefore, in many cases, Mobile Electro Therapy needs to be used together with other forms of physical, medical, surgical, pharmaceutical, counselling and/or psychological therapy.

For Rehabilitation

Stimulation for pain management, healing, strengthening and mobilization is progressively increased in intensity using 3L through to 3S applications, as recovery occurs.

MET techniques, which are developed by Jim Lamers at the TENS Pain Management Centre, requires the use of Advanced BIOSTIM™ MET equipment.

Visit: www.jimsmet.com.au

Electrical Exercise

TEMS - Transcutaneous Electrical Muscle Stimulation (TEMS) is the use of electricity (in the form of trains of minuscule pulse charges), which activates exercise in both skeletal and visceral muscle. TEMS is commonly known as Electrical Muscle Stimulation (EMS).

These applications need to have adequate rest periods between the periods of exercise to prevent tetanus. This is achieved by surging the pulse trains, which are switched between ON (contraction) and OFF (relaxation) periods. Timing control over contraction and relaxation periods is used to set the work load, and to maintain a continuous supply of oxygen and sugar to keep the muscles from fatiguing. A contraction period of 6 to 12 seconds, is used with a relaxation period of 2 to 24 seconds.

1 A HIGH pulse rate of 100 pulses per second (pps) is used to activate 'A' type motor nerve fibres, to initiate and maintain impulse transmission, which directly activates and maintains skeletal muscle exercise. 3S applications are used with EMS to;

- Build body strength and to develop body shape
- Strength development following atrophy of muscle
- Increase general and micro-circulatory flow
- Mobilize stiffened joints.

Strengthening and stamina building requires frequent repeat doses of application, with the time and repetition of contractions incrementally increased as the muscles strengthen.

2 A MEDIUM pulse rate of 10 to 20 pps is used to;

- Increase body stamina
- Increase heart-lung endurance and to tone up the body.

This rate requires the use of slightly longer periods and lower levels of intensity of sustained exercise, than the time and intensity given with a 3S application.

3 A LOW pulse rate of 2 to 10 pps is used to activate 'C' type motor nerve fibres, to initiate and maintain impulse transmission at pulse rates as low as 0.5 pps. This requires prolonged period 3L applications to be used to:

- Strengthen visceral muscle
- Increase the micro-circulatory flow
- Assist in the supply of oxygen and nutrients and the removal of lactic acid and carbon dioxide to damaged cells, that are immobilized due to injury.

4 A HIGH-LOW (modulated) pulse rate of stimulation activates an effective combined exercise of both skeletal and visceral muscle.

For EMS the Electrodes are Positioned:

1 To pass the stimulation through the motor points of the muscle to be exercised. These points are located approximately one third of the way down the body of the muscle.

Place one electrode below the upper insertion of the muscle and the other over the middle of the muscle.

2 At peripheral nerves, which contain the motor nerve fibres that terminate in the muscle or groups of muscles to be exercised.

3 To pass the stimuli along the length of the body of the muscle/s that are to be exercised.

Today's Efficiently Designed Electrical Stimulators

Electrical Stimulation devices are rapidly changing in design and efficacy, due to recent advances in knowledge of the human body and technological advances in plastic moulding, microelectronics and therapy applicator design. This has enabled a vastly increased range of modalities of application.

The Rational of Modern Design

Many older types of machines still in use today use high levels of current (up to 100 milli amps). These machines will eventually be superseded and replaced by modern innovative minuscule pulse charge devices. Today's machines are built to stimulate at the impulse frequencies of natural neural action potential transmissions and the rate at which the body moves.

The Design of BIOSTIM™ Devices

Advanced BIOSTIM™ devices requires that they are optimally designed to provide the output modes of stimulation, which are required to effectively apply MET. These design features include:

Three pulse rate modes:

- Low pulse rates at a frequency of between 2 to 10 pps.
- High pulse rates at a frequency of between 35 to 100 pps.
- Low to High pulse modulated rates, which may be selected at a frequency, with the low rate set at a ratio of 1:5, to modulate from a low base of 2 to 10 pps up to 20 to 100 pps.

Two pulse intensity modes:

- A fixed (non-surgng) pulse intensity level, which is used with a low intensity pulse level, below the level where muscle stimulation occurs.
- A surging pulse level is used with a high pulse level to prevent tetanus and cramping of the muscles. This mode requires control over both Contraction and Relaxation periods of the high surging pulse intensity.

The various combinations of pulse and intensity modes, give six distinctly different output modes. These mode combinations have the ability to select pulse rates at any frequency between 2 and 100 pps on a BIOSTIM™ MET device*.

Low frequency Biological Movement rates:

These are the low frequencies that occur in activities such as running, doing gym work and energetic dancing, which naturally induce an endorphin release and create pressure gradients within muscles, soft tissues and bones. Electrical stimulation applied

at these low rates is used for the healing of muscles, connective soft-tissue and bone cells.

* Advanced BIOSTIM™ Multi-Function MET Systems are manufactured by [Bio Electronics Pty. Ltd.](#)

Symmetrical Stimulation:

Equally active stimulation from both electrodes in each output. This enables two regions to be equally activated. It enables equal bi-lateral stimulation to be applied for applications such as Wrist to Wrist and Ankle to Ankle. Equal stimulation is achieved using symmetrical alternating pulses.

BIOSTIM™ MET equipment is shown on the [Bio Electronics web site](#) on the Internet.
Visit: www.bioelectronics.com.au

Safety and Efficacy features

BIOSTIM™ devices are built with:

- Minuscule pulsed charges to enable 3L stimulation to be applied over a 24 hour period. During this time it only places 43.2 seconds of stimuli on the skin)**, Another indication of miniscule pulse charge levels is the power consumed by a heart pacemaker, which with a 3 volt, 3 ampere-hour battery, supplies power for 15 years.
- Active stimulation at all electrodes, with alternating, symmetrical polarity pulses.
- Non-ionizing pulses, with electro-static pulses.
- Steady and changing rate of pulse frequency.
- Fixed level and surging level of pulse intensity.
- Selection of the timing of surge ON and surge OFF periods.
- Selection of pulse rate and pulse intensity level - as above.
- Square wave pulses.

** $2 \text{ pps} \times 250 \text{ Us} / 1,000,000 \text{ Us} = 1 / 2,000$ duty cycle

$24 \text{ hours} \times 60 \text{ minutes} \times 60 \text{ seconds} = 86,400 \text{ seconds per day}$

$86,400 / 2,000 = 43.2 \text{ seconds per day of pulse charge is applied.}$

With an alternating pulse polarity = 21.6 seconds per electrode, during an "around-the-clock" 24 hour application.

Therapy Applicators

1 Rubber or cloth electrodes singularly positioned, or placed in single or multiple paired arrays.

2 Self-adhesive electrodes applied for convenience in ambulatory applications.

3 Cloth electrodes are sewn into electrode arrays and clothing apparel for ease of application. These are currently under development.

Compact Electrical Stimulation Devices

Transcutaneous electrical stimulators are now small, compact, safe and easy systems to use, with selection of multi-function outputs.

The small size of today's stimulators enables Mobile Electro Pain Management, healing and exercise to do for Health and Wellbeing, what the Cellular Phone has done for Telephone Communications.

Not all TENS Research is the Same

Research papers published about the efficacy of TENS used for Pain Management, shows that there is a wide variation in the results that are achieved. This is possibly due to there being no basic rules applied in how the research was conducted.

The variations occur because of:

1 The quality and type of the TENS machine in relation to:

- a The shape of the pulse (square wave, sine wave, spikes).
- b Patient compliance due to comfort and efficacy.
- c Portability for mobile use.
- d Pulse rate (selection from low to high).
- e Steady pulse rate or a modulated low to high pulse rate.
- f The intensity of the pulse charge applied.
- g Pulse polarity - either DC, true symmetrical alternating, or asymmetrical alternating pulses.
- h No EMI (electro magnetic interference) - clean circuitry with no internal or external EMI (will not interfere with other machinery, electronics, etc.).

2 The Treatment parameters;

a The location of the regions of stimulation;

- The region of pain
- Regions of maximum sensory perception
- The injury or ailment site
- The region to activate muscular exercise

b Length of each treatment;

- Less than 20 minutes
- From 40 to 120 minutes
- More than 2 hours duration (including 'around-the-clock')

c The repeat time of each treatment;

- On Demand
- 1 to 3 times weekly
- Daily
- 3 times daily
- Around-the-clock
- Pre-emptive to the onset of pain

Conclusion

The conclusion I have drawn from the research papers I have read, plus the extensive clinical experience I have gained, leads me to believe that much of the research has not been optimally carried out. Hence, the wide variation of results achieved. No

rational indication of the efficacy of TENS application is possible, unless the combination of the specifications of the quality and type of TENS and/or EMS device used and the treatment parameters applied are also published with the result of the research.

Meeting the Challenge of treating Pain 'Without Drugs'

Today individuals are able to correct the failure within our health care system to manage chronic ailments, as they are able to personally use high efficiency BIOSTIM™ equipment, to manage and alleviate their own health and wellbeing problems.

They are able to:

- Manage chronic pain and arthritic ailments.
- Rehabilitate Pelvic Floor ailments.
- Instigate drug free pain management routines without undesired side-effects.
- Perform intensive healing techniques.
- Use endorphins to assist in the detoxification from drugs.
- Exercise atrophied muscle to improve strength and stamina.
- Instigate wellbeing and body toning techniques.

Apply Feel-good concurrent applications

Whilst applying other therapeutic modalities, it is advantageous to also apply wellbeing stimulation by using hyper-stimulation applied to earlobes, wrists and ankles.

Personal Independence

By personally meeting this challenge, people are able to achieve an independence and self-satisfaction through being in control of their own health and wellbeing and have the ability to improve the quality of their lifestyle.

*W. J. (Jim) Lamers Diploma A. P. A. and V. M. P. A.
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