

User Manual

P4 Sport



Neuromuscular Stimulator



Official Supplier of Neuromuscular Stimulation Equipment to the European Tour Physiotherapy Unit

P4-SP-V50-EN-V11

I. Introduction

The **P4 Sport** is manufactured/distributed by VALMED SA, Sion, Switzerland.

The **P4 Sport** is manufactured in accordance with the requirements of European Safety Standards **EN 60601-1, EN 60601-2-10** and meets all requirements of the American Safety Standards for Transcutaneous Stimulators as set forth in **ANSI/AAMI NS4 – 1985**. The P4 Sport is a Class II Medical Device and conforms to the requirements of European Directive CEE 93/42 and holds certificate number CE0535.



Read this **User Manual**, especially Safety and Indications and Contraindications **before** using the **P4 Sport**.



Manufacturer is not liable for any damage caused by the improper use of the **P4 Sport** neuromuscular stimulator.



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III. Safety and Precautionary Guidelines

A. SPECIAL WARNINGS

The **P4 Sport** is intended for use by **ADULTS** and **ONLY** on healthy muscles. NEVER use the P4 Sport on muscles that are:

- Atrophied
- Painful
- Suffer spasms, or
- On a limb with painful or otherwise afflicted joints

The **P4 Sport** is not intended for the treatment of any medical condition or disease nor is it intended for physiotherapy or muscle rehabilitation. It is contraindicated for use on any muscle that is injured or diseased. Do NOT attempt to use the P4 Sport for:

- Muscle reeducation
- To prevent muscle atrophy or spasms
- Improving range of motion
- Blood flow deficiencies/venous thrombosis

B. CONTRAINDICATIONS

Do **NOT** use the **P4 Sport** if you have any of the following medical conditions:

- An implanted cardiac pacemaker, defibrillator or other implanted electronic or metallic devices
- Undiagnosed pain syndromes

C. WARNINGS

- Long-term effects of chronic electrical stimulation are unknown.

- Apply electrodes **ONLY** to normal, intact, clean skin. Do not apply electrodes over open wounds or over swollen, infected or inflamed areas or skin eruptions, e.g., phlebitis, thrombophlebitis, varicose veins, etc.

• DO NOT APPLY STIMULATION:

- Over frontal area of the neck (near site of carotid sinus nerves).
- Over the neck or mouth. Severe spasms of the laryngeal and pharyngeal muscles may occur with contractions strong enough to close the airway and/or cause difficulty in breathing. Stimulation over the neck could also have a adverse effects on the heart rhythm or blood pressure.
- Transcerebrally.
- Over swollen, infected or inflamed areas of skin eruptions (e.g., phlebitis, thrombophlebitis, varicose veins, etc.).
- Across the chest because the introduction of electrical current into the chest may cause rhythm disturbances to the heart, which could be fatal. Consult with your physician before using this device because it maybe possible to cause lethal rhythm disturbances to the heart in susceptible individuals.
- Over, or in proximity to, cancerous lesions.
- If you are epileptic
- After experiencing acute trauma or fracture
- Following recent surgery
- If you have a hernia (abdominal or lingual)
- To the frontal, laryngeal and temporal regions of the neck.

- Never use the **P4 Sport** while driving, operating machinery or during activities in which involuntary muscle contractions may endanger the user or others.
- The effects of stimulation of the brain are unknown. Therefore, do not apply stimulation across the head and do not place electrodes opposite sides of the head.
- Do not use the **P4 Sport** in the bath or shower.
- Persons with suspected heart problems or epilepsy should obtain appropriate medical advice.
- Never use the **P4 Sport** while sleeping.
- NEVER immerse the **P4 Sport** unit in any liquid.

D. PRECAUTIONS

- The safety of neuromuscular stimulation during pregnancy has not been established.
- Use caution when/if:
 - User has skin areas that lack normal sensation.
 - Following surgical procedures if muscle contractions might impede the healing process.
 - Over a menstruating or pregnant uterus.
 - There is a tendency to bleed internally following acute trauma or fracture.
- Place electrodes in accordance with illustrations in this User Manual.
- Users should ensure that extremities are isometrically fixed (braced) during treatment sessions to prevent movement that results from stimulation.
- This unit should not be used while driving, operating machinery or during any activity in which involuntary muscle contractions may place the user at undue risk of injury.
- Some users may experience skin irritation or hypersensitivity due to the

electrical stimulation or the conductive medium.

- **Keep the P4 Sport neuromuscular stimulator out of the reach of children.**
- Application of moderate heat (thermal wrap) to muscles as well as moistening skin prior to treatment improves treatment efficacy; use of cold packs on treated muscles after treatment is likewise recommended.
- This unit should only be used with the leads, electrodes and accessories provided by the manufacturer.

E. DO NOT USE THE P4-SPORT IF YOU

- Have an implanted cardiac pacemaker, defibrillator or other implanted electronic or metallic devices
- Have been diagnosed with cancer
- Are pregnant
- Have suffered acute trauma or surgical procedure in the past six (6) months
- Have cardiac problems or cardiac disease
- Have epilepsy
- Have painful and/or atrophied muscles
- Have abdominal or inguinal hernia
- Have limited range of motion in skeletal joints
- Have blood circulatory problems

F. ELECTRODE GUIDELINES

The PalsFlex electrodes that are supplied as a standard accessory with your **P4 Sport** mold easily to your body contours and are reusable. The specific instructions for electrode use are indicated on the factory sealed storage pouch. The recommended sizes are oval 3" by 5" electrodes for large areas (e.g., leg muscles) and round 3" electrodes for smaller areas such as forearm muscles.

- Use only skin pads (electrodes) supplied by manufacturer. Other electrodes may not stimulate correctly and may render

the treatment ineffective.

- Apply electrodes only to clean, intact, normal skin.
- Do not apply electrodes over open wounds, inflamed, swollen or infected skin area or over any skin eruptions such as varicose veins, phlebitis, etc.
- Do not share electrodes with other users. Multiple users may result in adverse skin reactions.
- Replace self-adhesive electrodes when they do not adhere (stick) firmly to the skin

G. POTENTIAL ADVERSE REACTIONS

Skin irritation and burns beneath the electrodes has been reported from use of some neuromuscular stimulators.

IV. Indications for Use

The ***P4-Sport*** is intended for stimulation of healthy muscles in order to enhance and facilitate improved muscle performance. The ***P4-Sport*** is therefore properly considered as a technique or means for muscle training.

The ***P4-Sport*** is **NOT** intended for use in any therapy or for treatment of any medical conditions or diseases. The ***P4-Sport*** training programs are not designed or optimized for injured or otherwise impaired muscles and use of the ***P4-Sport*** on such muscles is contraindicated.

P4-Sport provides four muscle stimulation training programs. Each program is for specific application/indication and stimulation of skeletal muscles, as follows:

1. ***Endurance*** training Program
2. ***Resistance*** training Program
3. ***Strength*** training Program
4. ***Explosive Strength*** training Program

The ***P4-Sport*** also includes a "***Potentiation***" stimulation training program for Warm-up prior to performing any sports activity. Use this program just before starting competition or an activity to obtain maximum muscle strength and optimal level of performance.

The "***Active Recovery***" cool-down program is used after completing one of the 4 stimulation training programs.

The "***Active Recovery***" program stimulates the muscles to produce low frequency twitches that act like a massage and result in increased blood flow. As a result, lactic acid levels are reduced and the stimulated muscles recuperate better from fatigue. Using "***Active Recovery***" is also recommended after hard training sessions or sports competition.

A. GUIDANCE FOR EFFECTIVE TRAINING WITH THE P4 SPORT

Muscles gain strength when exposed to resistance (loads) that exceed approximately seventy (70) percent of maximal voluntary contraction (MVC) force. The ***P4 Sport*** achieves this level of MVC forces and, in fact, produces forces that range from 70-100 percent of your MVC; optimal training results, occur when muscles are stimulated ***isometrically***, that is, the arm(s) or leg(s) that is being stimulated is firmly secured to prevent movement of that limb (which may result from muscle contractions).

Neuromuscular stimulation and physical exercise results in the most positive sport gains.

B. SCHEDULING

Neuromuscular stimulation works by inducing specific contractions at varied, user selected, intensity levels.

When starting neuromuscular training, it is not unusual to experience some aching.

These aches are similar to aches that one experiences after “eccentric” work such as long downhill walks or intense jumping. Scheduling of specific muscle groups is recommended; avoid intensive stimulation of the same muscle groups on consecutive days. Intensive stimulation tires the muscles and adequate recovery time is essential to attain improved muscle performance (this phenomenon is known as overcompensation). Taking the following steps will help minimize aching:

- Increase intensity levels (workload) gradually
- Use Program 4 between intensive sessions
- Saunas and hot baths accelerate recovery after heavy exercise due to increased blood supply to muscles.

C. TRAINING COMPLEMENTS

Optimal muscle strength improvement is obtained when you combine different methods of muscle exercise. Neuromuscular stimulation, in conjunction with regular, moderately intense exercise, is especially effective in attaining maximum strength gains and is recommended for the serious athlete or physical sport focused individual.

Recreational athletes should combine neuromuscular stimulation with other dynamic exercises; these exercises can include endurance sports, team sports, sport training, etc.

THE BOTTOM LINE?

The ***P4 Sport*** is a truly valuable adjunct for training various muscle groups.

V. How to Use the P4 Sport

A. Overview

The ***P4 Sport*** cannot be used without a battery; see instructions (below) for proper handling of the battery. Ensure that the battery (a 9 Volt battery) is not weak or discharged.

The ***P4 Sport*** must be connected to the skin pads (electrodes) and the electrodes must be positioned on the skin as shown in Section X of this manual entitled “Electrode Placement” (page 14). The specific placement of electrodes on your skin depends upon which muscle group or groups you intend to stimulate.

To use the ***P4 Sport*** effectively and safely, the following steps **must** be considered:

1. Choosing the appropriate muscle work program
2. Planning the stimulation session
3. Proper placing of electrodes, and
4. Setting the current intensity

Choosing the Appropriate Muscle Work Program

The program chosen determines the type of work imposed on the muscle that is being stimulated. Based upon your specific objective or need, you can select the program that is appropriate.

Planning the Stimulation Session

The recommended number and frequency of training sessions are indicated in Section VII for each program.

Proper Placing of Electrodes

Proper electrode placement is important. Make sure the electrodes are positioned as indicated in Section X of this user manual.

Setting of the Current Intensity

The intensity of the electrical current determines the number of working fibers in the stimulated muscle.

At low current intensity, there are fewer working fibers, at higher current intensity, a larger number of working fibers.

As a rule, the higher the current intensity, the more effective the stimulation. Set the current intensity at a level (between 1 and 8) that you can maintain without discomfort; this current intensity level will typically increase as you progress in your training using the **P4 Sport**.

Now, some specific instructions to ensure safe and proper operation of your **P4 Sport**:

B. INSERTING OR REPLACING BATTERIES

The warning (orange) light will illuminate when the battery weakens and requires replacement. If the battery is not replaced, your **P4 Sport** will cease to operate within one (1) hour and no indicator lights will function.

Remove (slide) the cover of the unit. Remove old battery, if one is in the unit. Insert a fresh 9-volt lithium, alkaline or rechargeable NiMH battery. Ensure proper battery polarity; your **P4 Sport** will not operate if polarity is reversed.

C. WARNINGS CONCERNING BATTERY HANDLING

Always read and follow the specific instructions provided by battery manufacturers. Note the following:

- Ensure that battery polarity is correct.
- Do not expose batteries to temperatures exceeding manufacturer's

specifications.

- Do not store and/or ship this unit with batteries inserted.
- Do not attempt to recharge alkaline or lithium batteries.
- Do not dispose of any battery in fire.
- Note that batteries may present burn or fire hazard if short-circuited.
- Improper battery handling may result in explosion, leakage or flames.

D. CONNECTIONS

Please refer, as needed, to the control schematic of the **P4 Sport** (page 7)

1. Ensure that the intensity control knobs (5) are in the OFF position.
2. Connect the skin pads (electrodes) to each output cable.
3. Position the skin pads (electrodes) on the motor points of the muscles to be treated (refer to page 14 in this manual for proper positions).
4. Connect the output cables to the output socket (6) of the **P4 Sport** unit. The two (2) cables can be connected to either output socket on the **P4 Sport** unit; the **P4 Sport** unit will function properly.

E. Isometric Position

Always stimulate muscles isometrically; make sure that the limb in which a muscle is being stimulated is firmly secured to prevent the movement of the limb (resulting from muscle contraction).

F. Switching the Unit On

Turn the intensity control knobs (5) until you hear a click.

G. Selecting a Program

1. Select a program by pushing the program select button (2) until the indicator for the program is lit. If you do not make a selection within 5 seconds, Program 1 will automatically start.
2. Slowly turn the intensity two control knobs (5) clockwise until you reach the desired intensity.
If desired, different current intensity levels are possible for each cable and set of electrodes.

H. Running a Program

1. Do not remove/relocate the electrodes during stimulation; turn unit OFF before removal or relocation of electrodes.

2. Each program consists of several stimulation sequences, for example, tetanic contractions followed by periods of rest. The full program should be completed for maximum benefit.

I. Ending a Program

1. Each program has a preprogrammed duration. Program completion is signaled by three separate events: 1) stimulation signals stop; 2) both green lights stop blinking, and; 3) a continuous "beeping" signal is heard. Once the stimulation stops, turn both intensity control knobs (5) counterclockwise to the OFF position. Failing to do this will cause battery discharge; should you forget to do this, an audible beep will be heard.
2. Remove the skin pads (electrodes) from the skin.
3. Disconnect the skin pads (electrodes) from the cables and store them in the

hermetically sealed bag.

J. Troubleshooting

If your **P4 Sport** unit is not working, please check the following:

1. Is the battery correctly inserted?
2. Are the cable connectors properly inserted into the **P4 Sport** unit?
3. Are the skin pads (electrodes) connected to the cables?
4. Are the skin pads (electrodes) adhering to the skin? If not, wet the pad surfaces sparingly with water.
5. If you have difficulty selecting the correct program, are you pushing the program select button **within 5 seconds** of turning the control knobs (5) on?

VI. Program Description

Your **P4 Sport** has four (4) programs of neuromuscular stimulation as well as warm-up (**Potentiation**) and post-training (**Active Recovery**) programs. Note that these programs do not take into account your personal parameters, such as age, level of physical Sport or your personal training objectives. All programs are completely safe.

Maximum results require firm muscle contractions; also ensure that you stimulate your muscles **isometrically**, that is, make sure that arms or legs that are being stimulated are firmly secured to prevent movement of limbs (which may result from muscle contractions).

Each program has a specific function as indicated in the pages that follow.

A. Program 1: Endurance

The impulse sequences in this program improve the body's resistance to fatigue (increased ENDURANCE). This program can be applied with outstanding results on all major muscle groups. After repeated stimulation muscles will become more resistant to fatigue. To fully develop this resistance requires multiple sessions of stimulation. Noticeable change in muscle resistance to fatigue typically occurs after approximately 20 applications. To achieve full and long lasting effect may require up to 50 applications. A corollary benefit of improved muscle strength can be noticed much earlier. This program is especially valuable for athletes in endurance sports, such as cycling, triathlon and marathons.

Duration

The optimal duration is pre-programmed for 90 minutes, but it is possible to train for greater or lesser periods.

Application

On healthy muscles at (or close to) the highest intensity level you can tolerate

Frequency of Use (Recommended)

Use two to three times weekly on major muscle groups

Position of Skin Pads (Electrodes)

See section: Electrodes Placement.

Additional Comments

This program will generate strong tetanic muscle contractions. You can enhance training results by supplementing the stimulated contractions with your own voluntary isometric contractions. The stimulated extremities should be braced to prevent their movement during stimulation.

B. Program 2: Resistance (Muscle Power and Force)

Description

The impulse sequences in this program improve muscle power (force) by increasing the time a muscle is able to maintain a high power working level. It is designed for sports activities that require intense physical effort that approaches the threshold of exhaustion (such as intermediate track races, swimming and cycling. You may notice improvement after as few as 5 stimulation sessions; full and lasting improvement may require up to twenty (20) sessions.

Individual results are a direct function of the current intensity level you select. High current intensity levels may cause some muscle soreness; this, however, is a normal result at the start of stimulation training.

Duration

This program lasts for 15 minutes.

Applications

Power/Force training: at (or close to) the highest intensity level you can tolerate

Abdominal reinforcement: (or close to) the highest intensity level you can tolerate

Frequency of Use

Three times weekly on target muscle groups.

After achieving desired results, use once weekly on targeted muscle groups to maintain power/force gains.

Position of Skin Pads (Electrodes)

See section: Electrodes Placement.

Additional Comments

Best results for quadriceps are obtained while in a sitting position, with knees bent at an angle of approximately 70 degrees from horizontal with feet braced isometrically against a wall. You will improve results by augmenting the stimulation with your own voluntary isometric quadriceps exercises. Stimulated

extremities should be braced to prevent movement during stimulation.

C. Program 3: Strength

Description

This program uses ultra-sophisticated stimulus frequency modulation to generate brief, rapid muscle contractions. By improving your muscle strength you will:

- Maintain power/force gained during training, and
- Maintain and refine muscles
- Improve muscle response and elasticity, and
- Maintain power/force gained during training

Duration

This program lasts for 12 minutes.

Application

Power/Force training: at (or close to) the highest intensity level you can tolerate

Frequency of Use

Use this program daily (recommended) or, as a minimum, not less than twice weekly

Position of Skin Pads (Electrodes)

See section: Electrodes Placement.

Additional Comments

This program includes potentiation and is recommended as a muscle warm-up exercise.

D. Program 4: Explosive Strength

Description

Use this program to improve capability to rapidly effect maximum (explosive) strength. After strenuous exercise, use this program to reduce muscle ache, accelerate recovery and obtain a feeling of relaxation. These benefits result from specific impulse sequences that may be applied to any fatigued muscle, such as quad and calf muscles.

Duration

The program lasts for 20 minutes; it is the minimum duration recommended.

Application

Explosive strength: at or close to the highest intensity you can tolerate.

Post-training recovery: medium intensity

Increased circulation: medium intensity

Massage: low to medium intensity (relaxation)

Frequency of Use

This program may be used as often as desired with no adverse effects.

Position of Skin Pads (Electrodes)

See section: Electrodes Placement.

Additional Comments

Use this program after you complete training with programs 1, 2 or 3. The "Active Recovery" phase acts as a massage, induces an increase in blood flow and speeds the lowering of lactic acid, leading to faster recovery and relaxation.

VII. Useful Information

A. Handling/Cleaning the P4 Sport Unit

Use soft brush or soft cloth to clean unit case; do not use liquid cleansers. Use same procedure with electrical leads. Your **P4-Sport** is designed to be maintenance free.

B. Storage Conditions

The **P4 Sport** may be stored for prolonged periods with no degradation. ENSURE that the battery is removed when the unit is stored.

C. Battery Disposal

Always dispose of batteries in accordance with battery manufacturer instructions.

D. Warranty

Free replacement*, for two (2) years, except for accessories and shipping charges.

*Free replacement will be made if defect is in manufacture of unit; free replacement does not apply when damages are related to improper use or abuse of unit.

VIII. P4 Sport Technical and Safety Data

A. Unit Technical Characteristics

Stimulation Channels

Two, independent, isolated channels. Separate knobs control intensity levels for each channel.

Controls/Indicators

- Two intensity control knobs; audible clicks at the OFF position
- Program selection button
- Two green output intensity lights, four program indicator lights
- Low-battery warning light

Output

Current waveform (during training): Asymmetrical biphasic with fast rise and zero net current.

Voltage waveform (open circuit): Low voltage, rectangular, compensated monophasic impulse. Peak open circuit voltage during each impulse: 45 Vp \pm 10%.

Maximum Output at 500 Ω Load

RMS voltage: \pm 5 V (volts) \pm 10%.

Peak open circuit voltage during treatment: 90mA (milliamperes) \pm 10%.

Power Supply

One 9 Volt lithium, alkaline or NiMh rechargeable battery. Battery power drain is \pm 1W. Battery power drain during use varies from 0.3W to 0.4W, depending upon stimulation

intensity setting. The output and program timing parameters are stable (\pm 2%) throughout the life of the battery.

Standard Accessories

Four skin pads (nonpolar, self-adhesive, reusable electrodes)

One alkaline 9 Volt battery

2 cables

Carrying case

User Manual.

Size

Unit size is approximately 10x7x3 cm. Weight is 200 grams or approximately 7 oz.

Cleaning/Maintenance

Use soft brush or soft cloth to clean unit case; do not use liquid cleansers. Use same procedure with electrical leads. Your **P4-Sport** is designed to be maintenance free.

B. Safety

P4-Sport meets the requirements of ANSI/AAMI NS4-1985 American standard and the IEC-601-2-10 European Safety Standard.

Specific Safety Features and Measures to Prevent Misuse

P4-Sport is inherently designed such that improper or accidental application of this unit **cannot** produce cardiac rhythm disturbances in users for which it is recommended. **This does not include individuals with implanted cardiac pacemakers!**

This inherent safety is due to the minimal electric charge of all stimulating impulses in the **P4-Sport**. In all programs of stimulation, the typical impulse is below 10 microcoulombs and the maximum possible impulse is less than 20 microcoulombs, zero net current. Moreover, this maximum charge of 20 microcoulombs is significantly below the cardiac rhythm

disturbance safety margin of 25 microcoulombs per pulse, the standard as established by the Association for Advancement of Medical Instrumentation (AAMI) in AAMI/ANSI standard NS4-1985 and acknowledged by the U.S. Food and Drug Administration (FDA).

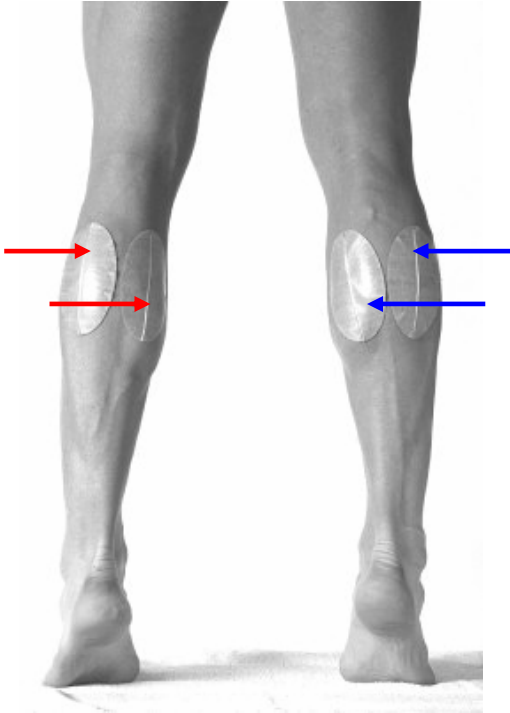
Specific safety features in your **P4-Sport** include:

1. Impossible for users to modify the embedded programs; users can only modify the intensity of stimulation
2. All programs begin with minimal electrical intensity; the user must increase the intensity to the desired training level.
3. Maximum possible electrical impulse is 20 microcoulombs.
4. The connector plugs used on **P4-Sport** cables have covering plastic hoods that effectively prevent the possibility of accidental connection to a power source, such as an AC power outlet.

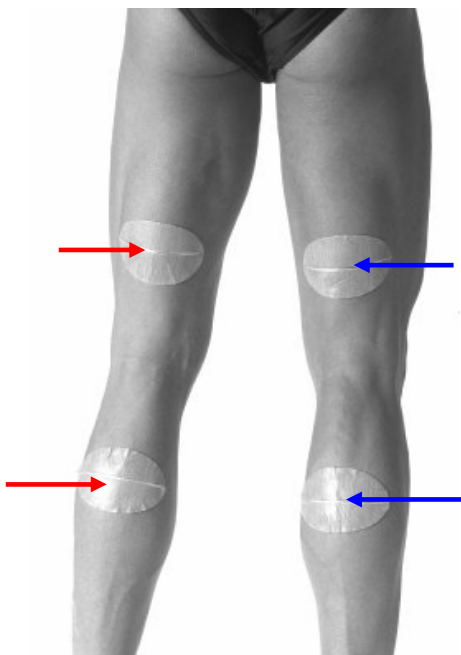
5. Automatic control of stimulation current density precludes excessive current density at the electrode-skin interface and ensures skin safety.

IX. Electrode Placement

1. CALVES



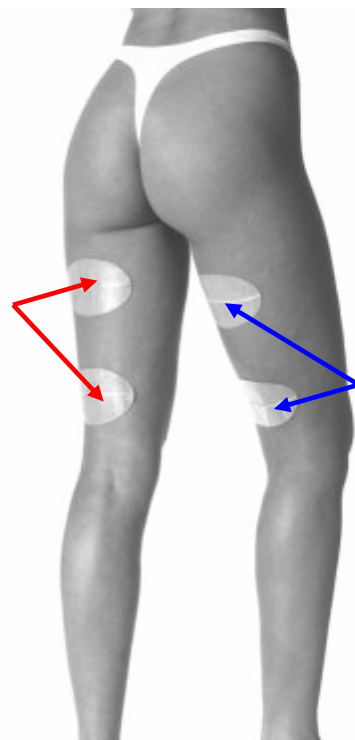
2. FEMORAL BICEPS AND CALVES



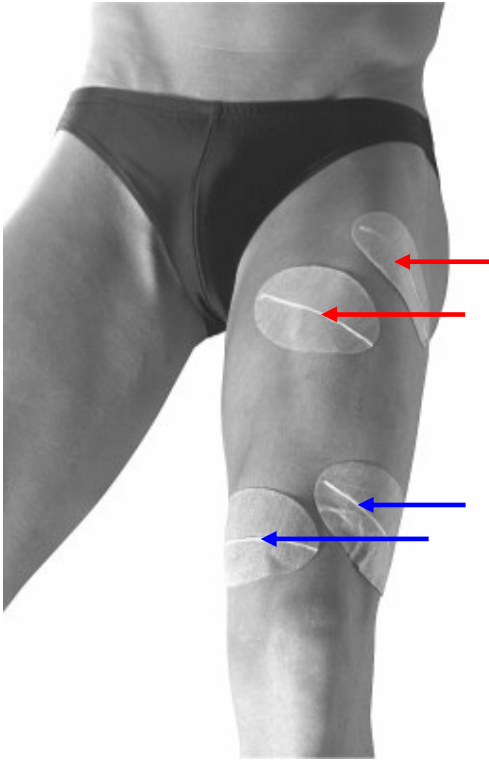
3. TIBIA



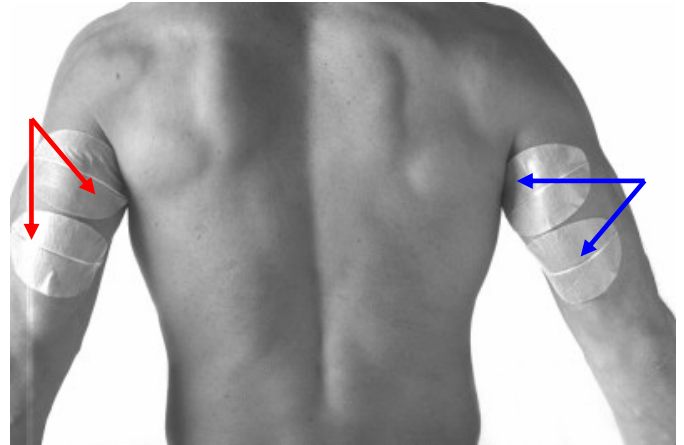
4. FEMORAL BICEPS



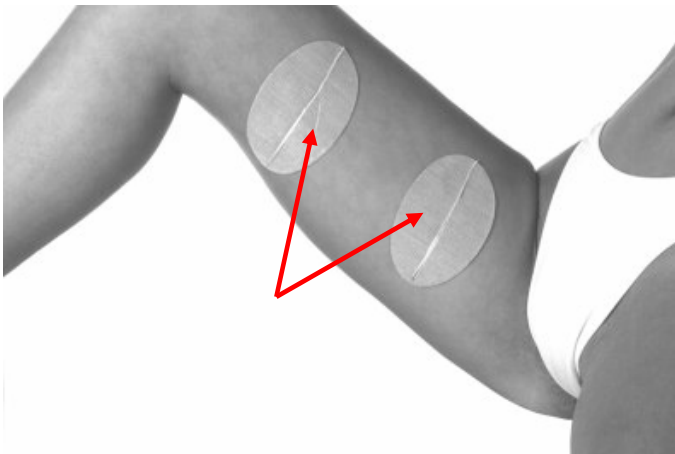
5. ON ONE LEG



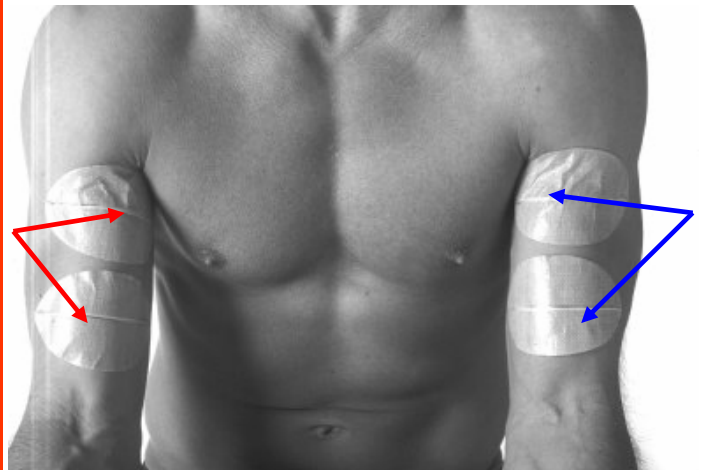
7. TRICEPS



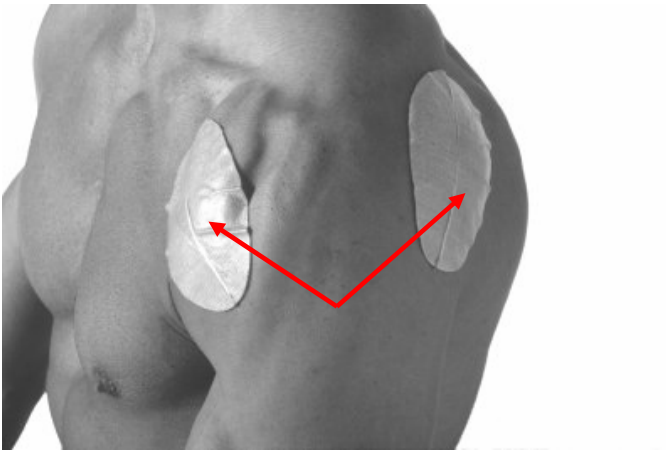
6. THIGHS



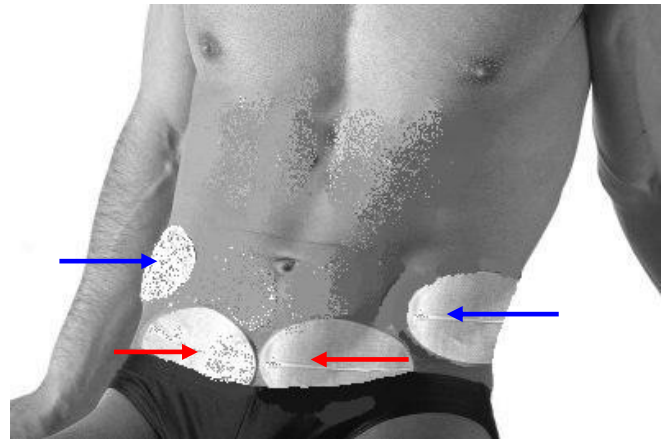
8. BICEPS



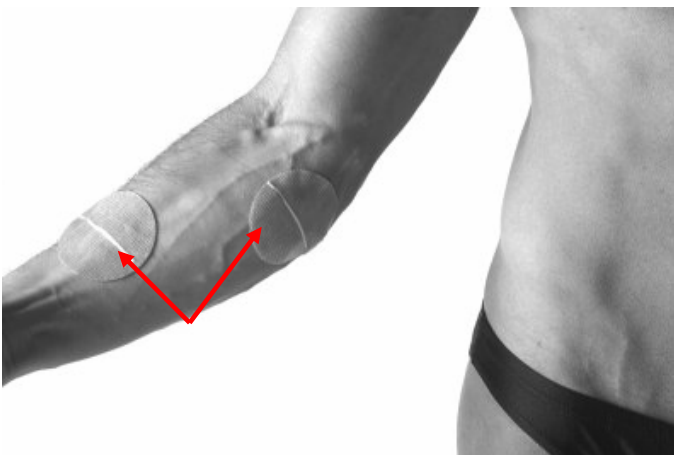
9. DELTOID



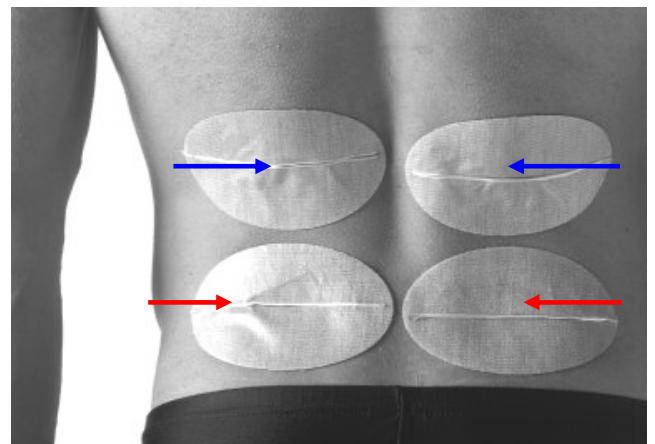
12. LOWER ABDOMINAL



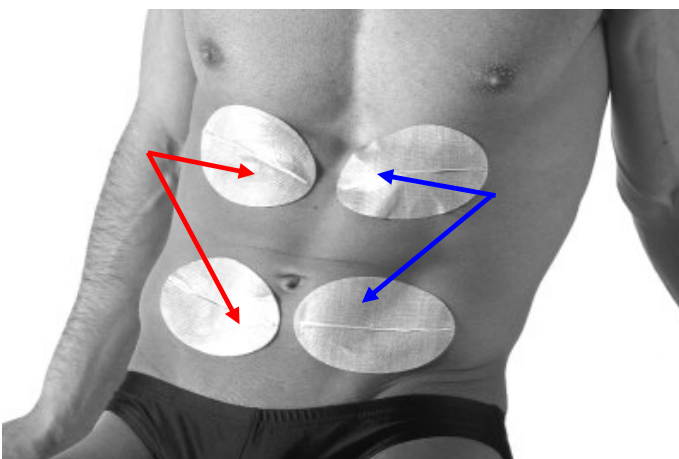
10. FOREARM



13. LUMBAR VERTEBRAE



11. ABDOMINALS



14. UPPER TRAPEZIUS

