

## Brain, Lagree Method, Manual Therapy; Physical Exercise, Microformer, Massage in Psycho-Body, Emotional-Affective and Socio-Relational Recovery – Case Report for A Randomized Controlled Trial

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### ABSTRACT

Exercise as a moment of socializing, fun and well-being. Titanic Enterprise? Just want to do. For me, I have brought together the greatest, the best, my closest friends, for one great passion: movement, physical exercise, as a source of well-being, especially in this critical moment for those who have suffered damage even from the point of view economically. But the topic is another. I was in Sicily, a friend of mine is training with others but ... he has a herniated disc ... prevents him from moving ... yet, thanks also to the encouragement, the sociability, the fun of the group itself, he does not he feels pain and is able to perform all exercises perfectly. Hence the idea: can conviviality, sociality in the world of sport have and be a natural opioid? Can we modulate our perception of pain thanks to a “disembodied attitude and an inactive approach? We are embodied beings”, in which minds, bodies, environment and culture are connected to each other on different levels. “The answer is yes and the purpose of the post is to leave you breathless to admire the infinite beauty of my friends who train and have fun, live the sport, the Movement and long live true friendship. Obviously I emphasize my world, my fitness lagree method, Lagreefitness which also improves self-esteem, good mood through the generation of wellness molecules and hormones. Heart health, brain health, muscle and joint health. Neuroscience and lagree method; induction of the pituitary hypothalamic axis of growth hormone, its possible implications in longevity

The massage or touch is to give well-being through touch, body. A well-being not only physical, but also neural, social, rewriting neuronal circuits and improving synaptic plasticity. With this image I want to highlight the art of massage, manual techniques, rehabilitation and also movement and psychology. In a moment of uncertainty I want to give certainties; what we will return to instill well-being again. This is the topic of our research, indeed two. We scientifically demonstrate how both

the massage and the Lagree method are fundamental for a better cognitive development, so please send me the material in private. If you want you can; you are a thinking being and while you think big. Imagine, create, thrill and expand. Reinvent yourself by creating the best version of yourself. Now imagine and create the desired reality. The amygdala, an almond-shaped group of nuclei located in the limbic system, deep within the medial temporal lobes of the brain, is the boss when it comes to processing and storing memories of various emotions. In fact, the amygdala experiences emotions even before the conscious brain does. Repetitive triggering of the stress response makes the amygdala more reactive to apparent threats, which stimulates the stress response, thereby further triggering the amygdala, on and on and on in a vicious cycle. The amygdala serves to help form "implicit memories," traces of past experiences that lie beneath conscious recognition. As the amygdala becomes more sensitized, it increasingly tinges those implicit memoirs with heightened residues of fear, causing the brain to experience ongoing anxiety that no longer has anything to do with the circumstances at hand. At the same time, the hippocampus, which is critical for developing "explicit memories"—clear, conscious, records of what really happened—gets worn down by the body's stress response. Cortisol and other glucocorticoids weaken synapses in the brain and inhibit formation of new ones. When the hippocampus is weakened, it's much harder to produce new neurons and thus make new memories. As a result, the painful, fearful experiences the sensitized amygdala records get programmed into implicit memory, while the weakened hippocampus fails to record new explicit memories.

When this happens, you wind up with no real memory of what set you off to begin with but with a very clear sense that something bad—something very bad—is happening. We have to transcend the body to change the body, overcome the ego to change the ego. We must become pure awareness and going beyond time, forget the known reality and go into the unknown and observe the infinite possibilities and tune into the possible realities, because if we think about them, in the quantum universe they already exist core, endurance, strength, neuroscience, the secrets for good longevity: heart health, brain health, muscle and joint health. Neuroscience and lagree method, besides fitness and wellness, neuro complex training. Happy to be part of this family and also to be its ambassador and researcher also used by astronauts returning to earth.

### KEYWORDS

Neuroscience, Deep skills, Recognition memory; Spatial memory, Physical activity, Psychomotor skills, Lagree Fitness, Mental health, Rehabilitatio, Cognitive exercise, Massage, Exercise physiology, Neurophysiology, Psychology, Psychophysiology.

### Introduction

Through my clinical and scientific research, I have also talked about the importance of massage, touch, therapy and manual medicine as an integral part of the person's sociability (social neuroscience) and of what happens in our brain (I invented the Psycho Royal trust massage to be coupled with the lagree method, ("psychosomamassage"). Through the hands on the person we have tactile and vibrational stimulation suitable to awaken the awareness of one's body. Through manual medicine, massage, any field of application, there is a physical and psychic completeness, an experience aimed at psycho-body, emotional-affective and socio-relational recovery through a nourished tactile dialogue that allows the person to deal with the its own conscious and unconscious unity, and which relies on the harmony between the pleasures of the body and the serenity of the soul. It is a geological and topographical exploration of the body, an authentic re-appropriation of it and therefore the reunification of what the mind can integrate through it or, if you prefer, a genealogical reconstruction of the meaning of the body understood as subjectivity in relationship with individual life. With the Massage, (be it my Royal Trust Massage or others) the thought, the emotional influence and the intertwining of psychological reasons in the experientiality of one's body, influence and accompany that process of materialization of the Self through which the person achieves awareness in terms of body image, identity. This self-image is based on the reworking of the sensory-bodily and perceptual-affective experiences related to the psychic ego and the body ego. Massage sets in motion a continuous process of accommodation of sensory experiences, which makes the body "feel" and "relive" and, at the same time, develops and keeps alive

the symbolic capacity, matrix of mental life. Through the science of holistic and non-holistic massage, a person can return to live his or her corporeality as a subjective existence and recover a dimension of domination and harmony in his individuality.

Physical activity, which is often recommended by doctors, refers to a regular "aerobic" motor activity that can vary for each subject based on their characteristics and / or pathologies. In practice this activity can vary from walks with a sustained pace to slow running or cycling with city bikes for short journeys repeated periodically in the week or swimming 2/3 times a week also regularly follow gym classes or workout programs in the gym are to be considered as a good physical activity.

Physical activity aims to improve cardio-circulatory and respiratory functions to tone muscles and improve joint movement skills.

Doing sports means dedicating oneself to a sporting discipline, constantly training to improve both physical performance and technique in athletic gestures and game patterns.

Professional sport, as the word itself says, refers to athletes who, due to their genetic characteristics, have a predisposition for a discipline obtaining good performances for these characteristics, perhaps with a little luck they manage to enter the limbo of the elect and sport they make a profession often with significant economic benefits. The career of professional athlete can be more or less long, but still short compared to normal working life.

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The amateur sport, is practiced by millions of people, of all ages who train constantly in a specific way for each discipline with the aim to compete in championships or competitions with athletes of the same age or category. Often they are people who continue with sports done by boys or some change completely discipline for others is a discovery in the late age of passion for sport.

- "In the sportsman at the base of a good performance, there is always good nutrition"
- "In man, at the basis of well-being there is always proper nutrition".

Our organism for life constantly needs energy. We consume energy to work, study, breathe, sleep, etc .. because each organ or apparatus is made up of billions of cells in which there are many biochemical processes, catalyzed by enzymes, that allow us to live. All this has a considerable expenditure of energy.

Every mechanical means of traveling needs energy that can be supplied, from petrol, diesel, electric power, etc. Our body also needs fuel supplied by foods that, once digested, thanks to the biochemical processes mentioned above, are transformed into "ATP" (adenosine-tri-phosphate) and available as an energy source.

As for a race car to be able to make the engine work better and to get high performance, you need a lot of fuel and excellent quality, in the athlete "at the base of a good athletic performance there is always an excellent supply".

To improve every physical performance, first of all follow with intelligence training programs and the technical diagrams that are given by the coaches, try to correct their mistakes and improve the execution of athletic gestures and keep the "engine" your body at its best of the conditions providing "petrol".

Food of excellent quality.

"Each engine is designed to work up to certain levels, if the engine is broken, it breaks"

Every athlete has some athletic characteristics genetically determined to overcome them means to have damages often irreparable.

"The doping substances overcome these limits, improving performance for a short period of time, with serious damage to the athlete's health".

ENERGY: defined as the ability to produce work.

Here are two forms of energy that most interest us: 1) E. Mechanics, 2) E. Chemistry.

1) Mechanical energy can be the expression of a tennis bat or a golf club or baseball that with their oscillating movements perform a mechanical job. The stroke, with its displacement in the frontal direction of the center of gravity can be an expression of mechanical work. The energy produced by these movements is defined in "Kinetic energy".

The mechanical work carried out by virtue of the position, how to lift a body in the opposite direction to its gravity is called "Potential energy"

2) Chemical energy is a source of potential energy.

In the body foods are degraded through chemical reactions with energy release, which is in turn used to synthesize other chemical compounds; once degraded, they release chemical energy that is used by skeletal muscles to perform mechanical work.

In other words, a part of the chemical energy present in foods is converted from skeletal muscles into Mechanical or Kinetic Energy. The unit of energy measurement is the CALORY. Sports can be classified based on the use of energy in: ANAEROBIC and AEROBICS.

ANAEROBICS can in turn be classified into:

- 1) LACTACIDES that produce lactic acid
- 2) ALACTACIDS which do not produce lactic acid

Before discussing the biological and metabolic mechanisms that differentiate the different use of energy, we classify sports according to their energy requirements.

**AEROBIC SPORTS:** "Require Energy over an extended period of time"

1. cycling
2. running (marathon, half marathon)
3. swimming over long distances (800, 1500) m.
4. cross-country skiing
5. rowing

**ANAEROBIC SPORTS:** "They require high energy in a short period of time"

These must be further classified based at the time of the services.

1. Alactacids are activities that have a duration of less than 2 minutes.

- fast travel with and without obstacles (100,200,400) m
- swimming (50, 100, 200) m
- tennis
- volleyball
- Baseball
- throwing (hammer, disc, javelin, weight,)
- jump (high, long, with rod)
- skiing (slalom) downhill

2. Lactacids are activities that last between 2-3 minutes

- travel (800,1500) m
- swimming (400, 800) m
- football
- Water polo
- basketball
- handball

In team sports it is often difficult to make a classification because for the duration of the often brief athletic gesture that does not exceed one minute should be classified alactacids but for the frequent repetition of the actions without a rest period we could classify them in lactic acid.

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## ENERGY SOURCES

"ATP" ready-to-use energy

ATP or adenosine triphosphate is a form of chemical energy that is ready for muscle contraction. This energy source is stored in a large amount of cells, especially those in muscle.

All forms of chemical energy, such as those taken through food must be transformed into ATP to be used.

The chemical structure of ATP is very complex but for our purpose it is sufficient to know that it is composed of a large molecular complex ADENOSINE, and three simpler complexes called phosphorus linked together by high energy bonds:

ADENOSINE == P == P == P

When the link with the last phosphorus breaks, a large amount of energy is released which allows the cells to do their work:

ADENOSINE == P == P // = P

### Power

- Mechanical work (contraction) is performed by muscle cells
- Conduction of nerve stimuli occurs through nerve cells
- Secretions depend on secretory cells.

Any work done by the cells requires an immediate energetic relationship that is provided by the breaking of the phosphoric bond with the release of energy.

The amount of energy per molecule of hydrolysed ATP is between 7/12 kcal.

**MOLE:** Quantity of chemical substance expressed in grams equal to its molecular weight which depends on the type and number of atoms that make up the compound.

Paired reactions

If for a muscular contraction the energy coming from the hydrolysis of the phosphoric bond of the ATP is used with the formation of ADP (adenosindiphosphate) and release of phosphorus (P) to synthesize new ATP it needs further energy and the use of the byproducts of hydrolysis i.e. the ADP and the P.

The energy needed for the resynthesis derives from three different reactions that occur in the organism: two of them depend on the foods we eat the third from Phosphocreatine, a substance similar to ATP and also stored in the muscles.

The various reactions are functionally linked in such a way that the energy released by one of them is always used by the other "COUPLE REACTION".

We are doing research on the benefits of massage. Through science with functional magnetic resonance imaging (fMRI) brain maps with encephalograms (EEG) and tests on individual energy fields with a gas release visualization machine (GDV). Through the touch on we rewrite the neuronal circuits through neurochemistry and neuroplasticity. Insula, posterior and anterior cingulate, inferior parietal cortex and medial prefrontal are involved in the neural correlates of consciousness, particularly in arousal and awareness. The massage activates the anterior cingulate cortex and the subgenual retrosplenial / posterior cortex. This increase in blood oxygen level-dependent signal (BOLD). Through the touch some mechanoreceptors are stimulated including: Merkel cells,

Ruffini finals, Pacinian corpuscles, Meissner corpuscles, Free nerve termination. There is already research where the effects of body massage in premature infants have been explored and massage has been found to accelerate the maturation of electroencephalographic activity and visual function, particularly visual acuity. Higher levels of IGF-1 in the blood were found in massaged infants. The massage accelerated the maturation of visual function even in rat pups and increased the level of IGF-1 in the cortex. The antagonizing action of IGF-1 by systemic injections of the IGF-1 antagonist JB1 blocked the effects of massage in pups. These results show that massage has an influence on brain development and in particular on visual development and suggest that its effects are mediated by specific endogenous factors such as IGF-1. The connection between touch and feelings of emotion seem to occur in the limbic brain. In short, massage, in addition to the various bodily benefits, also has positive effects on the mind, helping in the treatment of anxiety or depression disorders or even diseases of the nervous system. You may have always known this but now science declares it more and more.

Exercise encourages the brain to function at its optimal level of capacity, thus favoring the multiplication of neurons and the strengthening of neural connections, with the "side effect" of amplifying intellectual abilities. Motor coordination occupies a relevant part of what we mean "quality" of movement and is the basis of the integrated training method that we want to propose.

The classic traditionalist view holds that a movement is coordinated when the content of the central impulse that commands the efferent impulses towards the periphery performs movements identical to the copy of this central impulse, the cortical one. The new concept of coordination maintains that it is not enough for the brain to send an impulse to ensure that the body moves accordingly but it is necessary, in addition to the efferent system where the last motor neuron is too influential, a series of auxiliary systems that make this impulse controlled and constant. The result of this controllability is included in the environment surrounding the action. Research on expertise (competence) discusses this assumption and shows that performance can be greatly influenced by voluntary intensive training. Evidence on the plasticity of the human mind and body suggests that the acquisition of skills should rather be described as a process of specific adaptations to the typical activities of the domain rather than as a development of the pre-existing innate ability muscles "don't move" without brain. The amygdala, an almond-shaped group of nuclei located in the limbic system, deep within the medial temporal lobes of the brain, is the boss when it comes to processing and storing memories of various emotions. In fact, the amygdala experiences emotions even before the conscious brain does. Repetitive triggering of the stress response makes the amygdala more reactive to apparent threats, which stimulates the stress response, thereby further triggering the amygdala, on and on and on in a vicious cycle. The amygdala serves to help form "implicit memories," traces of past experiences that lie beneath conscious recognition. As the amygdala becomes more sensitized, it increasingly tinges those implicit memoirs with heightened residues of fear, causing the brain to experience ongoing anxiety that no longer has anything to do with the circumstances at hand.



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At the same time, the hippocampus, which is critical for developing “explicit memories” —clear, conscious, records of what really happened—gets worn down by the body’s stress response. Cortisol and other glucocorticoids weaken synapses in the brain and inhibit formation of new ones. When the hippocampus is weakened, it’s much harder to produce new neurons and thus make new memories. As a result, the painful, fearful experiences the sensitized amygdala records get programmed into implicit memory, while the weakened hippocampus fails to record new explicit memories. The Lagree Fitness Method using the Megaformer, because of its innovative design is optimally suited to rehabilitation type exercise. While known primarily for its use in the fitness industry, the Megaformer has several mechanical features, which make it suitable for use in rehabilitation. It is a very solid and stable platform. Even morbidly obese patients will be able to use the machine safely. The patient can be sitting, lying down supine, prone, or standing, which is helpful for disabled patients.

With over 300 defined exercises, and countless user described modifications there is a very large selection of ways to train each muscle group. Their springs provide many different resistances, so adjusting the resistance to even severely weak patients feasible, as in this case. In addition, counter intuitively, exercises done on the front of the machine, get easier as resistance is added. Rehabilitation of deconditioned muscles is a difficult and complex process. In many cases neurological and psychological dysfunction is ongoing. Lagree Fitness training with the Megaformer can be a valuable tool in this patient population. Disabled patients can improve muscular strength, endurance, coordination, and balance using a modified version of LF training.

For appropriate patients in a well monitored and controlled environment, LF training can be used to reverse the debilitating effects of many neurologic disorders. Medical clearance should always be sought before starting any rehabilitation program.

## Learning and Memory

Memory is a wonderful mechanism, a means of transporting us back in time. We can go back a moment, or a large part of life. Sometimes not perfect, sometimes not authentic, sometimes with nuanced details, memory is still the system that allows us to recall the information we have stored and learned from both the external and internal environment. It is the experience that changes us, the contact with the environment that modifies our behavior through a series of both structural and functional changes of our nervous system. The last challenge of neuroscience is precisely to better understand the complexity of these mechanisms and how complex phenomena such as learning and memory can occur.

Although the changes that occur within individual brain cells can be relatively simple, given that the brain is made up of many billions of neurons, the overall phenomenon is certainly very complex and makes the isolation and identification of the specific changes responsible of a certain really difficult memory. Similarly, although the elements of a specific learning task may be simple, its implications for the organism can be very complex (Carlson, 2002).

From a neurobiological point of view, learning and memory are adaptations to the environment of the brain circuits that allow us to respond appropriately to situations we have previously experienced. Therefore, learning (process through which the nervous system acquires new information and experiences) and memory (the ability to retain, preserve and recall such information) are the main mechanisms through which environmental events shape behavior. Experiences are not simply “accumulated” in the brain, but are able to cause plastic changes in our nervous system and to alter the circuits involved in our more sophisticated functions; in this way they change our way of acting, thinking, perceiving, planning. Memory and synaptic plasticity are thoroughly studied by neuroscientists who can now rely on the use of different methodologies and technologies ranging from behavioral studies to the investigation of gene expression. Thus, understanding the changes in synaptic efficacy represents the most well-known field of investigation to date, even if memory is not just a succession of synaptic events. In a more holistic view of the process, memory is determined by the integration of multiple signals and activities that affect the brain (attention, intention, interest, emotionality), but also that which involves the emotional state of the subject (hormonal structure, physical stress , etc.).

Recent data, obtained thanks to the development of morphometric techniques, underline how experience is also able to cause changes in the morphology of the neuron and in particular of the synapse.

Three significant examples of morpho-functional alterations reported here have been chosen.

A first example constituted by the demonstration that an environment rich in visual, auditory, tactile stimuli, etc., induces in the rat, modifications at the level of the visual cortex which can be quantified as an increase in: a) weight and thickness of the cortex; b) size of the cell bodies of neurons; c) length and number of dendrites; d) diameter of synapses and dendritic spines; e) number of synaptic contacts of cortical neurons. These modifications can be induced in both young and middle-aged or old animals, suggesting that neuronal plasticity, very pronounced in developmental age, is maintained throughout life (Turner and Greenough, 1985).

A second example is represented by the modifications of the CA1 area of the hippocampus, both in the number of neurons between synapses and dendrites and in the shape of the dendritic spines after induction of long-term synaptic enhancement (LTP) (Chang and Greenough, 1984).

The third example of morpho-functional alteration is provided by the increase and decrease of pre-synaptic markers in neurons (Bailey and Chen, 1983).

These various experimental observations clearly indicate how the memorization processes are also related to morphological modifications at the synaptic level as anticipated by the intuitions of Hebb (1949) who proposed that if two neurons are active at the same time, the efficiency of the synapse is strengthened.

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## Anatomical structures

Learning and memory are not functions confined to a single brain area or a limited number of cells, but in different brain areas as already demonstrated by studies on rats with brain lesions carried out by the American psychologist Karl Lashley, in the first half of the 20th century, and by his pupil, Donald Hebb (1949). The latter's hypotheses stimulated the development of computer models of neural networks; his assumptions have contributed to the study of memory, demonstrating that this information is not stored in the hippocampal structures and in the connected diencephalic structures and that the cerebral cortex may be the main long-term storage site of different aspects of memory.

Since different cortical areas preside over different cognitive functions, it is not surprising that information related to the specific cognitive function of the corresponding cortical area is stored in these regions.

## Frontal cortex

The frontal cortex is part of the neocortex, which covers most of the surface of the cerebral hemispheres and is so called because it developed in a recent evolutionary period. It is divided into the prefrontal cortex and the motor cortex, which in turn is divided into the premotor cortex, the supplementary motor area and the primary motor cortex. In addition to involvement in some aspects of memory, the frontal cortex also performs executive functions that affect the organization of behavior.

## Medial temporal lobe

The temporal lobe is important for recording past events and contains two important areas in the processes of declarative memory, the hippocampus and the amygdala, located in the medial part of the temporal lobe.

## Hippocampus

Although different areas of the brain play a role in the consolidation of different forms of learning and memory, the hippocampus has been recognized as having a vital role in particular in the formation of declarative memory, such as semantic and episodic memory. In 1957, Scoville and Milner observed that bilateral removal of the hippocampus, as a treatment for epilepsy in the patient H.M., caused anterograde amnesia. Since then, several studies have been conducted and the specific role of the hippocampus and temporal lobes in the formation of memory was explicitly identified.

## Amygdala

The amygdala plays a decisive role in physiological and behavioral reactions towards stimuli or situations with a biological significance, such as those related to pain or the presence of food; therefore emotionally relevant. Neurons in the central nucleus of the amygdala project to the brain regions that oversee the expression of the different components of emotional responses; in particular in emotional learning linked to aversive situations. So the amygdala is a brain structure essential for the acquisition and expression of conditioned fear. In this regard, several behavioral studies have

been carried out with Fear Conditioning. As already mentioned, the latter is a test which consists in applying a short electric shock immediately after an acoustic stimulus. The electric shock will elicit an unconditional emotional fear response with altered heart rate and blood pressure. After a short period of training, just hearing the sound, the rats show the same kind of physiological responses evoked by the electric shock; they also exhibit a behavior defined as freezing, i.e. a species-specific defensive response consisting in an arrest of the behavior.

## Anxiety and manual techniques

Anxiety is an inevitable part of life. There are several components of anxiety that can cause problems in everyday life. The worry related to the thought that our actions can always lead to negative consequences, fear, and the loss of mental alertness. Other anxiety disorders include specific phobias, obsessive compulsive disorder, post-traumatic stress disorder, panic.

Anxiety manifests itself as trait anxiety, which is recognized by physical and / or psychological symptoms, or as state anxiety, which has a temporary nature, usually associated with specific stimuli that act as activators. Anxiety is a complex phenomenon but from the clinical description it can be defined as a psychosocial condition with associated worry and fear, mixed with physical symptoms. Mental anxiety produces muscle tension that can be reduced using therapeutic massage, which sends signals to the brain by relaxing the muscles. It can thus increase the overall relaxation and available energy, making it easier to deal with different situations. The main objective of the therapeutic massage is the reduction of stress and relaxation, with psychological effects that include mental relaxation, the reduction of depressive states, anger and fear; making the recipient feel that someone is taking care of him / her. Therapeutic massage is one of the most popular and widespread complementary therapies in the world. The need for contact is one of the basic needs of the human being and massage, as a form of contact, produces a relaxation of the body and mind. An important aspect of therapeutic massage is non-verbal communication, inducing a form of respect, trust, empathy without the use of words, and only through physical contact. Anyone can enjoy therapeutic massage, both as a treatment method and as a daily habit. Nowadays, more and more people use massage to decrease pain and stress, and to achieve a general feeling of well-being. Several clinical studies show that massage therapy can have positive effects on anxiety, pain and muscle tension. A moderate pressure massage contributes to many positive effects: reduction of pain in various syndromes, including fibromyalgia and rheumatoid arthritis, improves attention levels, reduces symptoms of depression and strengthens the functions of the immune system. From a comparative study between massage with light and moderate pressure in the laboratory, it was found that massage with moderate pressure reduces depression, anxiety and heart rate, and alters EEG patterns, as occurs in a relaxation response. It also leads to an increase in vagal activity and a reduction in cortisol levels, associated with chronic stress. The functional magnetic resonance data show that this massage is represented in different regions of the brain, including the amygdala, the

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hypothalamus and the anterior cingulate cortex, all areas involved in the regulation of emotions and stress. The massage is used for maintaining health and for the prevention of ailments, to restore the body to a general energy balance, covering the physical and social aspects, and the psychological aspects of the patient.

### Scientific Protocols

We can simplify the functioning of our brain as dependent on two closely related and complementary parts, acting and deciding separately. The most external (cortex) is the rational one, in which we record all our "knowledge" in the most notional and encyclopedic sense of the term: we could consider this cortex as the conscious part of us, the one regulated by the will.

However, there is an internal part of our brain (subcortical or limbic) made up of different systems connected to each other (a skein of ganglia and neurons) that act on our hormonal (endocrine) system and regulate instinctive, affective and vegetative functions. We could consider the limbic system as our instinctive part.

The movements used as a treatment in the Amazonian Massage® and the manual skills aimed at forming waves that propagate inside the person's body, act on the human brain at the subcortical level. The human body's response to the solicitations of the Amazonian Massage® is therefore produced at the subcortical level and cannot be controlled. That is, there is evidence that the movements practiced in the modalities of our massage result in automatic responses of the brain.

### Conclusion: How does this happen?

Strength, flexibility and cardiovascular fitness are all equally important to a prenatal program. Targeting areas such as upper body and abdominals will help improve posture as the woman begins to experience significant weight gain. Cardiovascular exercise in the form of gentle, low-impact aerobics helps increase endurance and build stamina, which will assist her during labour. Pelvic floors exercises, also known as Kegels, help strengthen the muscles, which surround and support the pelvic organs. These muscles become lax due to hormonal changes in the body. Pelvic tilt movements help alleviate stress on the lower back and strengthen abdominals. Stretch and limbering exercises are important in preparing the muscles and connective tissue and protecting the joints from strain. Relaxation and breathing are important for the woman to release stress and tension from her body and focus on herself and the baby within.

### Class Format

Begin seated or standing for a 10-to 12-minute warm-up. Include rhythmic stretches for the upper and lower body using a slow, steady pace. Since pregnancy hormones make joints less stable, it is important to spend ample time warming up. Floor stretches are a good time to introduce the pelvic tilt. In an all-fours position, the pelvic tilt is an effective stretch for the low back. The pressure of the baby is off the back and out of the pelvis. Women will get some relief from backache and tired legs, cramps, pelvic pressure and circulation congestion. Also include side-bending stretches in an

all-fours position, known as "tail-wagging," where the hips go from side to side. Pelvic tilts may be done in standing position and could be included before or after aerobics.

### Pelvic-Floor Strengthening

Warm-up should also include Kegels. The pelvic floor is a sheet of muscles located at the base of the pelvic, which supports pelvic organs. As the uterus enlarges, there is added stress on the pelvic floor muscles. These under-utilised muscles should be conditioned and prepared for the trauma of childbirth. During a vaginal delivery, the baby passes through the pelvic floor, greatly stretching the entire supporting sheet of muscles. Conditioning the pelvic floor, or perineum, during pregnancy allows more stretch during delivery without tearing and in some cases decreases the need for episiotomy (incision of the vulva to allow sufficient clearance for birth).

Pelvic floor strengthening should resume as soon as possible the postpartum period. Keeping the pelvic floor conditioned will help prevent sagging, urinary incontinence and displacement of the pelvic organs. Kegel exercises may be done seated, standing, on all fours or elbows and knees depending on what is comfortable for the woman. If Kegels are not done during the warm-up, they may be done as a standing exercise or during relaxation.

### Aerobics

The 15- to 30-minute segment should consist of gentle, low- to moderate-intensity, low-impact aerobics. The pace should be slow enough to keep participants' heart rates under 140 bpm. Remember the extra weight will cause a woman to move slower and get tired more quickly. Exercises should have simple choreography without a lot of abrupt changes in direction.

The way different pregnant women will respond to the same exercise varies, therefore limit strenuous exercise to 15 minutes. Remember to bring the heart rate down gradually in the last five minutes and follow the aerobics section with gentle stationary stretching, either standing or on the floor. After the aerobics section, take a heart rate to be sure you not working above 140 bpm.

### Stretch

Unlike traditional aerobics, prenatal exercise stretching is often recommended throughout the class. After aerobics and prior to strengthening work, spend a few minutes stretching the muscles. If you plan work in a standing position, stretch in a standing position or at a bar. This makes smoother transition.

### Upper Body

Strengthening the upper back, chest and shoulders is particularly important for posture, balance and preparing you for lifting and carrying your newborn. The best positions to work the upper body are standing or seated. In standing position, utilise a ballet bar or wall to do push-ups. The use of restrictive bands in an effective way to condition the upper body either standing or seated.

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## Lower Body

Strengthening exercises should include quadriceps, gluteus, hamstrings, inner and outer thighs, plus strengthening of calves and ankles. Lower body muscle strength is important for general balance and tone. Ankle rotations help the veins return blood from the lower legs and minimise varicosities and swelling of the ankles. Calf strengthening can prevent leg cramps, which are common in pregnancy. Leg cramps can be brought on simply by pointing the foot. Therefore, when performing calf-strengthening exercises, flex and relax the foot rather than flex and point.

Lower body strengthening can be done standing with squats, plies, lunges and leg lifts to the front, side or behind the body. A ballet barre, table or chair back provides extra support. In a seated position, bands provide effective muscle resistance work while side-lying positions offer the support necessary for working against gravity.

## Abdominals

As the uterus continues to grow, the abdominal muscles are stretched and weakened. If they become too weak they will not be able to assist during labour. As the woman gains weight, her centre of gravity also moves forward, increasing stress on the lower back. The pelvis is forced to tip forward which affects posture. The results are often fatigue and backache. Exercising the abdominals throughout pregnancy helps alleviate some of the back stress and maintain the elastic qualities of the muscle to better support the pelvis, pelvic organs and the growing baby.

ACOG guidelines indicate after the fourth month, when the enlarged uterus puts pressure on major blood vessels in a supine position, traditional sit-ups should be avoided. If a woman chooses to continue sit-ups after her fourth month, she must not maintain that position for more than three minutes at a time, and she should stop if she experiences dizziness. Modify sit-ups by simply changing to a side-lying or C-curve position. In these positions there is no longer pressure on the blood vessels.

Pelvic tilting for the purpose of abdominal strengthening can be done seated or standing in addition to the all-fours position. As pregnancy advances, the pelvic tilt must be controlled against the increasing weight of the pelvic contents. Pelvic tilting on hands and knees or all fours position is the most effective way to work the muscles against gravity. Proper breathing enhances the benefit of this exercise. Inhalation should take place when the baby moves closer to the floor expanding the abdominals, and exhalation when the abdominals are lifted and contracted.

## Strength and Relaxation

Effective relaxation is essential for good health. "Genuine relaxation requires insight into our muscular system with which we make all purposeful actions in life and express our emotions," says Elizabeth Noble, author of *Essential Exercises for the Childbearing Year*. Relaxation is the time to release stress from the body during the state of restful alertness. This can be done with imagery, music,

and silence, breathing techniques and inward focusing. Deep breathing aids blood circulation and helps the mother to balance psychologically and physiologically. It is important to include these few minutes to release the body and mind from tensions. Stretching may be incorporated before, during or after the relaxation phase. Perform relaxation lying on the side, seated or on all fours. Lying on the left side of the body is a safe and comfortable position.

All the major muscle groups should be stretched at the end of class. Include reaches for the upper body, straddle stretches for the back, inner thighs and hamstrings, shoulder rolls and partial head circles, cat stretches for the back and torso rotations for oblique and outer thighs. Squatting provides effective positions for good body mechanics. In a pregnancy squat, the feet are flat and wide apart, hips drop below the knees and the centre of gravity is lowered. The pelvis is tilted backward and the spine is held straight. As the elbows rest on the knees for balance, calf muscles get a good stretch. Squatting is a wonderful position for labour since the pelvis is at its widest. The force of the abdominals and gravity also help the baby down the birth canal. Practising this position helps prepare the body before labour.

## Guidelines and Limitations

- Avoid deep flexion or extension of the joints. Stay within the joints' range of motion.
- Avoid activities with a lot of rapid, repetitive jumping or jarring movements and sudden directional changes.
- Limit vigorous exercise to 15 minutes.
- Keep heart rate below 140 bpm.
- Precede vigorous exercise with a low-intensity warm-up, which includes rhythmic stretching.
- Finish with a gradual decrease of intensity, which includes static stretching.
- Stop physical activity if any unusual symptoms appear and contact your doctor.
- Avoid exercises in the supine position (back lying) after the fourth month. If you don't feel any dizziness, you may exercise in supine position for up to three minutes.
- Drink plenty of fluids before, during and after exercise.
- Get a doctor's approval to exercise.

Signals from the sense organs (skin for touch, eyes for sight, ears for the vestibular system of balance, proprioceptive muscle-tendon systems) travel first to the thalamus and then immediately to the amygdala. There is a very thin bundle of nerve fibers that go from the thalamus to the amygdala, so the response to stimuli begins in the amygdala before the neocortex.

Where is the amygdala located? Below the cortex, it is part of the limbic system, above the brain stem. It is a core of gray matter. It is considered a center of integration of emotions. It is also involved in emotional memory systems. It begins to respond to stimuli before the neocortex.

When a particular movement is perceived as in the case of our



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Amazonian Massage® practiced with rocking and oscillations that have a given frequency, the amygdala immediately sends an automatic, subcortical, uncontrollable response of well-being.

### The effect

The amygdala is a subcortical mechanism that is activated by any basic mechanism. Emotions (anger, fear, happiness, surprise, relaxation) are not controlled, they are not mediated by the cerebral cortex, which is an evolved zone. As we grow up, as we "get older" we learn to control emotions, because the reactions mediated by the cortex that are acquired over the years, with the experiences tested, which have determined a cortical specialization, intervene.

The stimulated amygdala stimulates the release of endorphins and more or less amount of adrenaline (it depends on whether the stimulus is more or less exciting, and this changes from person to person but also from how the operator performs the maneuvers), obtaining:

relaxation of intestinal spasticity  
muscle relaxation  
activation of the cardiovascular system  
activation of the lymphatic system  
improved mood  
improved ability to cope with life  
deep relaxation

with the following benefits:

alteration of muscle tone due to stress  
insomnia  
reduction of anxiety neurosis  
spasticity of the intestinal musculature  
psychosomatic disorders  
aesthetic improvements due to lymphatic drainage  
improvement of the aesthetic vision of oneself

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