What is Global Postural Re-education?

Emiliano Grossi *

Global Postural Re-education Centre, FisioClinic - Rome, Italy

The Global Postural Re-education concept (G.P.R. or R.P.G.) originated in the 1980s out of the scientific studies of French Professor Philippe Souchard, today a teacher of international renown. Over many years of further research, he evolved the concept into an original method of postural re-education, now taught in 12 countries around the world.

The purpose of this article is not to enunciate in a detailed manner the scientific principles that are the basis of G.P.R., but rather to give an overall vision of the approach that differentiates this innovative technique from classical physiotherapy.

The in-depth studies that have contributed to the development of Global Postural Re-education were derived from **three basic concepts:**

- **Individuality:** every patient is a distinct being and so must be individually studied. Any pathology, osteo-muscular or otherwise, manifests in a way that reflects such individuality. It is therefore necessary to **study the individual** and not rely solely on standardized protocols for the pathology.
- **Causality:** too often we see a therapeutic approach addressing only the symptom, e.g. a lumbar pain treated solely with anti-inflammatory therapy, or therapies that act directly or indirectly only on the pain. This approach often results in any benefit being only temporary and is highly unlikely to address the primary cause of the pathology. Not specifically addressed are all the mechanical compensations and the antalgic attitudes that our body calls into action in an entirely automatic manner which will make subsequent symptomatic treatment even more difficult. G.P.R., with a careful study of the patient, including but not limited to biomechanical review, usually succeeds in systematically elucidating the CAUSE of the pain, eliminating the confounding effects of the compensatory mechanisms established during the period of suffering. Only the process of individualizing and focusing on the cause eliminates the root symptoms, returning to the body the ability to preserve the corrections and not to suffer relapse.
- **Globality:** This is the real "weapon" of the method. It is about treating the patient holistically and contemporarily eliminating all the compensations that result from the primary problem. The body often misleads us, putting into action strategies that mitigate the pain. As an example, symptoms of a fairly minor ankle injury may be "referred" upwards, resulting in a cervical problem. It may be difficult to understand this connection without studying the patient in his globality. This is a simple example of our body's ability to compensate by finding different structural adjustments. In the case of the ankle distortion, there is likely to be a smaller load on the aching inferior limb that will result in tilting of the pelvis. This tilting then causes an incorrect positioning of the spine that could lead to a compensatory elevation of the opposite shoulder and a possible cervical musculature asymmetric work.

It is for these reasons that we use therapeutic **POSTURES** - positions that allow micro-adjustments in complete globality without compensations - with an isometric muscular activity always in more elongated positions of the muscles that have produced the original problem.

Through a **biomechanical study** on the patient, the G.P.R. specialist physiotherapist pinpoints the mio-fascial "connecting rods" that are responsible for the structural imbalance. In fact, all static and dynamic activity is possible thanks to these very complex muscular coordinations, that can however be altered by many factors.

Not all the muscles are voted in performing the same functions. On the contrary, there exists a real hierarchy through which our nervous system schedules its activity to guarantee firstly the vital functions and only subsequent to that, the "less important" functions.

A study on the muscular functionality reveals that some muscles undertake nearly permanent activity, from the

moment when we are born to the moment we die. In contrast, other muscles contract much less often, sometimes rarely. Some are rarely used for functions such as the maintenance of the standing position (erect posture). It therefore makes sense then that during our evolution, specific muscular groups have developed with greatest efficiency for divergent functions. Greatly simplifying this concept, we may say that if it is necessary to hold a muscle contraction long-term in a constant manner (as in maintaining the standing position), it is not economic in energetic terms to utilize large quantities of ATP and oxygen. The solution is evident - evolution of specialized muscle types. Thus, analysis of a muscle in the calf (the soleus) or a spinal muscle (both in constant contraction to hold us in the standing position), reveals how enormously more "fibrous" they are than an abdominal muscle like the rectus abdominis, that is not under constant contraction for the standing position and which shows a greater preponderance of "elastic" fibers. Many studies have confirmed this observation, documenting the differences in the "tonic" fiber percentage in comparison with the "phasic" fibers in different skeletal muscles (studies of Pierrynowski and Morrison with Johnson and coll.; C. Bosco: "Muscular strength. Physiological aspects and practical applications"- 1997, also Schleip et al. 2006).

So at least two types of muscular tissue exist: the STATIC (TONIC musculature) and that DYNAMIC (PHASIC musculature), with obviously some overlap between the two, due to the "tonic/phasic bipolarity" (Grossi: "Il gesto atletico" - 2000). The following chart summarizes the more important characteristics of the two types of muscular tissues.

Static muscles (tonic muscles)	Dynamic muscles (phasic muscles)
1. They have mainly a support functions (postural). 2. Short, oblique fibers. 3. They contain more red muscular fibers (greater myoglobin quantity). Slower twitch fibers. 4. Much more connective tissue (fibrous). 5. The neuromuscular spindle possesses more "chain" fibers (static stretching reflex). 6. They tire later than dynamic muscles. 7. They contract more slowly. 8. They react to wrong load through shortening and with functional worsening. 9. Generally located more deeply medially. 10. Generally, they belong to the group of the extensors, with anti-gravity functions. 11. They are about 1/3 stronger than dynamic muscles 12. They express the maximum power with slow speed contraction. 13. If inactive, they stiffen much more quickly but hardly ever become weak. 14. They shorten for the continuous tension to which they are subjected.	1. They have movement function (dynamic). 2. Muscular fibers are longer and parallel; usually spindle-shaped. 3. They contain more rapid (fast twitch), white muscular fibers (less myoglobin quantity). 4. Less connective tissue (more elastic). 5. The neuromuscular spindle possesses more "nuclear bag" fibers (dynamic direct reflex). 6. They tire quickly. 7. They contract more rapidly. 8. They react to the wrong load with weakening and functional worsening. 9. Generally located more superficially and laterally. 10. Generally, they belong to the group of flexors. 11. They are 1/3 weaker than static muscles. 12. They express the maximum power with elevated speed contraction (dynamic). 13. If inactive, rapidly weaken compared to the tonic muscles. 14. They elongate and relax with inactivity.

Table n°1 (2000 Grossi, from studies of Stockmeyer 1970, Borg 1980, Spring et al. 1986, Janda 1960)

The static musculature (tonic):

- It has an antigravity role (and a suspensory role of the shoulders).
- It is in tonic activity almost permanently, has greater lactic acid concentrations, and a greater interpenetration between the actin and myosin fibers.
- This kind of musculature has the tendency **to SHORTEN** and it produces micro and macro structural alterations, postural and biomechanics.

The dynamic musculature (phasic):

- Does not have an anti-gravity role; in fact, it does not have a high constant tonic activity.
- It is fundamental to shift body position in space.
- If not activated, has a tendency **to HYPOTONICITY** (see abdominal muscles).

We must then develop a different and more modern approach in comparison with "classical" physiotherapy, a new approach that considers the different types of muscle tissues on which we work. We must not empirically strengthen or lengthen: instead we must RE-BALANCE.

Today some old approaches have been abandoned or replaced, (because often useless and even sometimes harmful) e.g. "strengthening of the abdominal musculature to take care of all kinds of back pain". The therapeutic approach has evolved, even if there is not yet a general awareness of this. It is also the case that new concepts, particularly within the medical field, often attract initial doubts, which are eventually dispelled by the evidence of the results.

The static musculature, in continuous contraction, will have the tendency to shorten and to become more fibrous and rigid: as such, we must promote lengthening. A rational way to do this is by adopting a **posture of active stretching**. Paradoxically this kind of musculature is **NOT FUNCTIONAL** because it is too rigid.

The dynamic musculature tends to hypotonicity, a concept tied to widely-recognized weakness: going back to the preceding example, it is clear that the abdominal muscles, if not exercised, tend to lose their tone very quickly as distinct from the back muscles of the neck, which even without specific exercises will usually tend to be rigid and tonic.

Because of this, the dynamic musculature has to work in concentric contraction.

HOW:

We have already said that G.P.R. uses specific therapeutic **POSTURES** selected according to the patient's individuality. During maintenance of these postures the work is ACTIVELY done by the patient.

The global postural re-education therefore may be defined as a "proprioceptive active inhibition method" that uses the myotatic inverse reflex to inhibit the excessive tone in the static muscles. Indeed, in the short-term, a passive method is not able to overcome the tensions of the static muscles.

To engage the myotatic inverse reflex, we must use gentle and controlled manual tractions and maintain elongations in time (De Deyne, 2001). If a muscle is exposed to rapid and forceful elongations, we will get the opposite effect, namely the activation of the myotatic direct stretch reflex. This is an error commonly made in classical physiotherapy. Forcing a rapid, quantitative stretching produces a "defence" protective reaction of the muscle that will result in an augmentation of its rigidity.

To get a more permanent muscle elongation, and with additional modification of the connective tissue, we require that light tractions be maintained for the right amount of time, as well as the use of isometric contractions in the positions of stretching. This is the trigger mechanism for using the myotatic inverse reflex. (Bishop, 1982; Moore and Kukulka, 1991).

The simplified equation that reflects this concept is the following:

$$\frac{\text{Elongation Force Applied}}{\text{Elasticity Coefficient}} \times \text{Time} = \text{Elongation Achieved}$$

Note: since the earned elongation is directly proportional to the traction time, it means that prolonged stretching is more effective

than forceful and rapid tractions or, worse, of elastic suspensions which activate the shortening myotatic direct reflex. The stretching force however, also appears directly proportional to the earned elongation. This may be illustrated with this example: to get an elongation of 100 units, we may apply (considering the elasticity coefficient always as 1) a force of stretching of 100 kilograms and hold it for a second, or much more simply, a force of 1 kg and hold it for 100 seconds! As it is easily understandable from the example, in both cases we would get the same theoretical elongation, but using a paradoxical traction of 100 kg would elicit, for defence, a further shortening (Grossi "Il gesto atletico" - 2000). The prolonged time and the weaker traction wins over the "hurry and force", even for such obvious reasons as likely production of muscular trauma(100kg).

The Therapeutic POSTURES:

There are four principal families of postures:

- Extension of the coxo-femoral angle
  in association with the adduction or the abduction of the superior limbs

- Flexion of the coxo-femoral angle
  in association with the adduction or the abduction of the superior limbs

Eight therapeutic postures arise from these combinations, all of them with their own indications and specificity (under gravity load, without gravity load ecc.).

The ideal postures to use with the specific patient are chosen only after **a careful postural, biomechanics and anamnestic evaluation** made by the G.P.R. specialized Physiotherapist. Moreover the postures should be adapted to the specific problem of the patient.

WHICH PATHOLOGIES ARE ABLE TO BE ADDRESSED?:

G.P.R. acts on all problems that originate from or that are connected to altered biomechanics. This includes:

- Structural problems of deviations of the spinal column such as scoliosis, hyperlordosis, hyper kyphosis, valgus or varum knee, the flat or cavus foot.
- Problems that come from articular or vertebral compression and spinal disc problems such as discal hernias.
- Cervical, dorsal, lumbar articular lesions (bad positioning of one or more vertebras in comparison with the others).
- Respiratory problems due to altered mechanics.

- Post traumatic and post-surgical problems.
- Problems in sport, considered as an action on the specific sport related alteration, and an increase of sport performance (see also Global Active Stretching approach).
- Neurological spastic pathology.

The G.P.R. is a slow and progressive technique and for this reason may be applied equally on children and on elderly persons, where there is active participation by the patient.

To have a truly decisive effect on the pathology, the implementation of Global Postural Re-education should always individualized.

In conclusion, despite having only covered some of basic principles of Global Postural Re-education, using relatively simple terminology and a comprehensible formulation to make this article understandable by all, we want to underline the paramount importance in rehabilitation of executing a careful biomechanics analysis, whatever the pathology for which the patient has to be re-educated. Utilizing exclusively "protocols" **standardized on the pathology and not on the patient**, implies a lack of respect for the subjectivity and the oneness of the individual that we have in front of us, as well as the expressive uniqueness of the pathology.

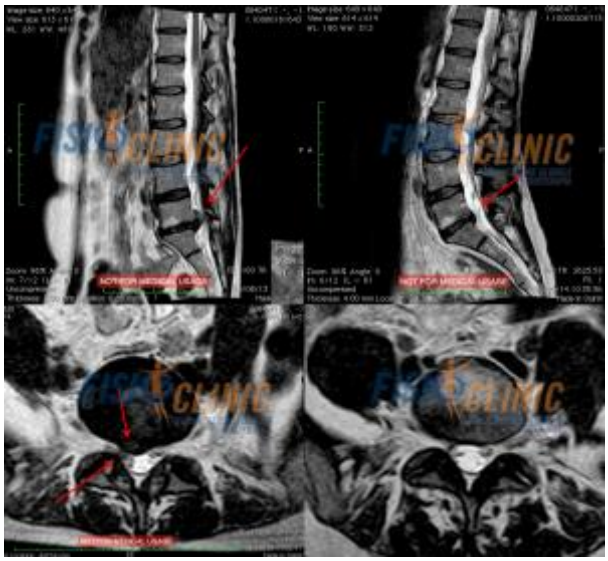
Treatment Results, two examples:

Case example N° 1 (Posture effect): 10 years old child with high level hyperlordosis and initial listesis of the second sacral metamere (S2) documented on x-rays.

From the initial posterior view, it is clearly noted that the "thoracic-lumbar junction" is extremely "pinched", with an exaggerated anterior inclination of the pelvis (antiversion), adducted shoulder blades (scapula) and a greater elevation of the right shoulder.

After eight sessions with G.P.R., the morphology at rest position is improved in the two dimensions. In the side view a smaller antiversion of the pelvis and a more harmonic dorsal apex are noted. The patient has even grown in height due to this new body attitude and posture. In the posterior view a clear reduction of the "pinching" back-lumbar is seen, with a curve that is now more gradual and harmonic. The shoulder blades are well now positioned and in correct mechanical relationship with the thorax. Given the age of the patient and likely further growth, it will still be necessary to work above all on the pelvis and the inferior limbs.

Case example n°2 (Articular Effect): Prolapsed and cranially migrated discal Hernia L5-S1. Patient starts therapy two months from the first MRI, during which time there had been increased symptoms (low back pain, radiating down the limb in the territory of the affected radicular level) and inability to walk without two crutches. From that moment the patient stops all the other treatments and starts to be treated exclusively with G.P.R. Souchard method, one session per week. He comes back for the second session, without crutches and a sharp reduction of radiating pain symptoms. An interesting sign is the evident sclerosis of the subchondral bone in the anterior portion of the vertebral bodies L5 and S1 that suggests that the long period of time during which the vertebral column has operated in an incorrect anterior load due to the lumbar rectification/ straightening or hypolordosis that is seen in the first MRI), resulting in a posterior intervertebral space opening and herniation of the nucleus. Therefore to avoid relapses, we worked on the recovery of the physiological curve. The second MRI, in addition to a reduction in the disc herniation, shows the L5-S1 disc is much less compressed and the **patient has regained a physiological lumbar lordosis**. In the upper lumbar vertebrae we notice in the first MRI numerous bulgings which are also reduced in the second MRI with expression of a reduced compression and crushing index on all the spine.



*** Emiliano Grossi**
PhT B.Sc, Global Postural Re-education Specialist (GPR). Member of the Italian Teaching staff of GPR/RPG Post-University degree. Encharged by the "Université de Thérapie Manuelle" (France).
Certified Spinal Manual Therapist (SMT) - (Australia).
Director of Physical Therapy Division of FisioClinic (Rome).

FISIOCLINIC Riabilitazione Globale - Fisioterapia
Via Giuseppe Ferrari, 12 - 00195 Rome - Italy
Via Reich, 22 Torre Boldone - 24020 Bergamo - Italy
Tel/Fax +39 0636307405 - www.fisioclinic.com - www.fisioterapiaroma.it - email: info@fisioclinic.com