

What is Global Postural Re-education?

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The Global Postural Re-education (R.P.G.) is born in the 1980 from the scientific studies of French professor Philippe Souchart, today teacher of international fame, which in the trend of a lot of years of deepening and biomechanics researches, has processed an original method of postural re-education, by now taught in 12 countries of the world.

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

The in-depth studies that have gradually brought to the elaboration of Global Postural Re-education are born from **3 concepts of base**:

- **Individuality:** every individual is essentially distinct from the other and must be studied in his oneness. Any pathology, osteo-muscular or not, demonstrates itself with an infinity of differences in all of us. It is necessary then to **study the man** and not only to act with standardized protocols on the pathology.
- **Causality:** too often we see a therapeutic approach addressed toward the symptom, for example a lumbar pain treated entirely with anti-inflammatory therapy or therapies that act directly or indirectly only on the pain. In this way if there will be a benefit, will be more often just temporary, in fact it won't be resolved the cause that has brought the pathology the first time. To this are added all the mechanical compensations and the analgesic attitudes that our body puts into action in an entirely automatic manner, that will make even more difficult the following symptomatic treatment. The R.P.G. with a careful study of the patient, biomechanical and not only, succeeds systematically to go up to the CAUSE of the pain, eliminating also all the compensations established even during years of suffering. Only individualizing and attacking the cause is able to really eliminate the symptom to the root, giving the capability to the body of the patient to hold the corrections and not to have relapse problems.
- **Globality:** This is the real “weapon” of this method that allows to treat the patient in his totality, not allowing and contemporarily eliminating all the compensations that are necessarily put in action due to the principal problem. The body often “lies us”, putting into action strategies to escape the pain, for example a banal ankle distortion is able go up and give a cervical problem, difficult to put in relationship if we doesn't study the patient in his globality. This is a simple example on how our body compensate, finding different structural adjustments (in the case of the distortion, probably there will be a smaller load on the aching inferior limb that will tilt the pelvis, this inclination will be able to cause a bad positioning of the spine that will lead to a typical elevation of the shoulder of the opposite side of the lesion and a possible asymmetric interest of the cervical musculature).

Is for this reasons that we use **POSTURES**, positions that allow micro-adjustments in complete globality then without compensations, with an isometric muscular activity always in more eccentric positions of the muscles that have produced the original problem.

Through this **biomechanical study** on the patient the R.P.G.-specialist physiotherapist individualizes then the muscular “connecting rods” that are responsible for the structural unbalance. In fact, all our static and dynamic activity is possible thanks to very complex muscular coordinations, that can be altered however by a lot of factors.

Not all the muscles are voted in the same function and there is on the contrary a real hierarchy through which our nervous system schedules its activity to guarantee at first the vital functions and then the “less important” functions.

A study on the muscular functionality has been made, recognizing to some muscles a nearly permanent activity, from the moment when we born to the moment when we die. Other muscles instead are contracted much less often, sometimes rarely; some never for functions as the maintenance of the standing position (erect station). So it's obvious that during our evolution, the diverged muscular tissue have organized to develop to the best, and above all in economy for this diverged functions. Simplifying much the concept we may say that if there is the necessity to hold a contraction to long in a constant manner (like the standing position), it is not economic in energetic terms to spend for example big quantity of ATP and oxygen. The solution is evident; doing a dissection of a muscle of the back of the calf as the soleus (it would be the same to consider a back muscle of the spine) that is in constant contraction to hold us in standing position, is simple to understand how it is enormously more fibrous than an abdominal muscle like the rectus abdominis, that to the contrary, shows much more elastic fibers and that is not under constant contraction for the standing position. A lot of studies have confirmed this observation underlining 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).

So at least 2 typologies of muscular tissue exist: the STATIC (TONIC musculature) and that DYNAMIC (PHASIC musculature) , with obviously much nuances among the two due to the TONIC /PHASIC BIPOLARITY (Grossi, 2000). Here a chart that reassumes in a synthetic manner the more important characteristics of the two types of muscular tissues.

Static muscles (tonic muscles)	Dynamic muscles (phasic muscles)
<ol style="list-style-type: none"> 1. They have support functions (postural). 2. Short, oblique fibers. 3. They contain more red muscular fibers (greater myoglobin quantity). More slow fibers. 4. Much connective tissue (fibrous). 5. The neuromuscular spindle possesses much “chain” fibers (static stretching reflex). 6. They become tired lately compared to dynamic muscles. 7. They contract more slowly. 8. They react to the wrong load with 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 m. 12. They express the maximum power with slow speed contraction. 13. If inactive are stiffened much quickly but hardly they become weak. 14. They shorten for the continuous tension to which they are submitted. 	<ol style="list-style-type: none"> 1. They have movement function (dynamic). 2. Muscular fibers are longer and parallel; usually spindle-shaped. 3. They contain more rapid , white muscular fibers (less myoglobin quantity). 4. Minor connective tissue (more elastic). 5. The neuromuscular spindle possesses more “nuclear bag” fibers (dynamic direct reflex). 6. They become tired precociously. 7. They contract more rapidly. 8. They react to the wrong load with weakening and functional worsening. 9. Generally located more superficially and sideways. 10. Generally they belong to the group of the flexor. 11. They are more weak. 12. They express the maximum power with elevated speed contraction (dynamic). 13. If inactive become more rapidly weak compared to the tonic muscles. 14. They elongate and relax with the inactivity.
(Modified from Stockmeyer 1970, Spring et al. 1986)	

The static musculature (tonic):

- It has an antigravity role (and a suspensory role of the shoulders).
- It is in tonic activity nearly permanently, it has, in fact, greater lactic acid concentrations, and shows to the observation a greater interpenetration among the actin and myosin fibers.
- For this, for the confirmation of the observation and for the studies that have been made, we are able to affirm that this kind of musculature has the tendency **to SHORTEN** and it produces micro and macro structural alterations, postural and biomechanics.

To the contrary the dynamic musculature (phasic):

- It doesn't have an anti-gravity role, in fact, it doesn't have a constant tonic activity.
- It is fundamental to shift body position and moving in the space.
- They are muscles that, if not practised, have the tendency **to the HYPOTONICITY** (see abdominal muscles).

We must then imagine a different and more modern approach in comparison with “classical” physiotherapy, a new approach that considers the different typology of the tissues on which we work. We must not empirically strengthen or lengthen: we have to necessarily RE-BALANCE.

Fortunately today have been nearly surpassed all the old attitudes, (because useless and even harmful sometimes) like “strengthening of the abdominal musculature to take care of all kinds of back pain” or similar concepts. The therapeutic reality has evolved even if there isn't still a diffused conscience of this. It is also correct, besides, that all that it's new, above all in the medicine field, must give initials doubts, deleted yet from the evidence of the results.

The static musculature, in continuous contraction, will have the tendency to the shortening and to become always more fibrous and rigid: we must then lengthen, and in the specific, the only rational way to do it, as we'll see, is in **posture of active stretching**. Paradoxically this kind of musculature is **NOT FUNCTIONAL** because it is too rigid.

The dynamic musculature tends to the hypotonicity, concept tied to weakness that all know: to go back to the preceding example, it's clear that the abdominal muscles ,if not practised, tend to lose their tone very fast; to the contrary the back muscles of the neck, even without specific exercises will be always rigid, tonic and stiff!

The dynamic musculature has to work in concentric contraction then.

HOW:

We have already said that in R.P.G. are used specific **POSTURES** selected according to the patient's individuality. During these postures the work is totally **ACTIVE** in charge of the patient.

The global postural re-education therefore it may be definite a “proprioceptive active inhibition method” that uses the myotatic inverse reflex to inhibit the tone in excess of the muscles of the static. In fact, by a passive method is not possible, in the short period, to win the tensions of the static muscles: this is one of

the reasons of the failure of many classical Physiotherapy approaches.

To engage the myotatic inverse reflex, besides we have to necessarily use weak and controlled manual tractions and maintain elongations in time (De Deyne, 2001), to the contrary if a muscles is forced with rapid and hard elongations we would get the opposite effect, the activation of the myotatic direct reflex (r. from stretching): this is an error largely made in classical physiotherapy, forcing with a rapid, quantitative stretching it produces a “defence” (as protection) of the muscle that will bring an augmentation, in time, of its rigidity.

To get a permanent muscle elongation, not only momentary, and with modification also of the connective tissue, we require light tractions kept the right amount of time and the use of isometric contractions in the positions of stretching. This is the trigger mechanism trough we can use the myotatic inverse reflex. (Bishop, 1982; Moore and Kukulka, 1991).

The simplified physics equation that reassumes this concept is the following:

$$\frac{\text{Stretching strengt}}{\text{elasticity coefficient}} \times \text{time} = \text{Earned elongation after the traction}$$

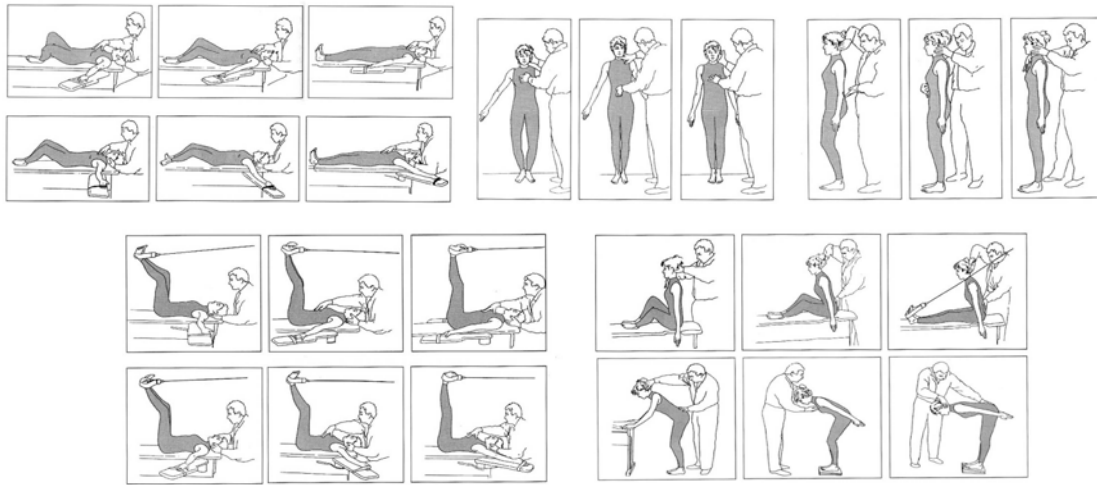
Note: as it is seen, the earned elongation is directly proportional to the traction time, that means that prolonged stretchings are more effective than strong and fast tractions or, worse, of elastic suspensions. Those, other than being harmful, activate the myotatic direct reflex (of dynamic kind), exciting the primary terminations of the neuromuscular spindles with the output of a signal that evokes the contraction of the same muscular group that is tried to lengthen! Even the stretching force however appear directly proportional to the earned elongation. This may be justified with this next 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 simply a force of 1 kg and hold it for 100 seconds! As it is easy understandable from the example, we may get in both cases the same theoretical elongation, but in a case with a paradoxical traction of 100 kg! The prolonged time and the weak traction wins on the “hurry and force” even for obvious reasons of muscular traumatism (100kg) that would bring, for defence, to a further shortening (Grossi, 2000).

THE 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

The postures that come out from these combinations are eight, all of them with their own indications and specificity (under gravity load, out of gravity load ecc.).



The ideal postures to work with the specific patient are chosen only after **a careful postural, biomechanics and anamnestic evaluation** made by the R.P.G.-specialized Physiotherapist. Besides the postures have to necessarily be adapted to the specific problem of the patient, to respect the individual oneness. The postures are just 8, we are more than 6 billions!

WHICH PATHOLOGIES IS ABLE TO FACE:

R.P.G. acts on all the problems that have source or that are connected to an altered biomechanics; among this we find:

- Structural problems of deviations of the spinal column as the scoliosis, hyperlordosis, hypercifosis, valgus or varum knee, the flat or cavus foot.
- Problems that come from articular hyperpression or crushings as discal hernias.
- Cervical, dorsal, lumbar articular lesions (bad positioning of one or more vertebrae in comparison with the others).
- It has an excellent effect on all the respiratory problems due to an altered mechanics.
- Post traumatic and post-surgical problems.
- Problems in sport, considered as an action on the pathology, and an increase of sport performance.
- Neurological spastic pathology.

The R.P.G. besides is a slow and progressive technique and for this reason may be applied to children as to elderly persons, where there could be an active work of the patient.

The lesson of global postural re-education is always individual for the reason of the oneness of the individual that must be always respected and studied to have a really decisive effect on the pathology.

In conclusion, having only quoted some of base principles of global postural re-education, trying to use a simple terminology and a comprehensible formulation to make this article readable to all, we want to underline the decisive importance in rehabilitation of the execution of a careful biomechanics analysis,

whichever is the alteration and the pathology for which the patient has to be re-educated. Being concerned exclusively to “protocols” **standardized on the pathology and not on the patient**, means not to respect the subjectivity and the oneness of the individual that we have in front of us and the expressive uniqueness of the pathology.

Treatment Results:

N° 1 case: 10 years old child with high level hyperlordosis and initial listesis of the second sacral metamer (S2) documented with x-rays.

In initial back vision it is noticed well that the “thoracic-lumbar junction” is extremely too “pinched”, the exaggerated anterior inclination of the pelvis (antiversion), the adducted shoulder blades (scapulas) and a greater altitude of the right shoulder.

After eight lessons with R.p.g. the morphology at rest position is improved in the two plans. In side view it is noticed a smaller antiversion of the pelvis and a more harmonic dorsal apex. The patient is even grown in height due to this new body attitude and posture. In back vision is observed a clear reduction of the “pinching” back-lumbar with a curve that is now more gradual and harmonic. Besides the shoulder blades are well now justify and in corrected mechanical relationship with the thorax. Considering the age of the patient in growth, it will still be necessary to work above all for the pelvis and the inferior limbs.



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