Effects of Global Postural Reeducation in students with scoliosis

Global Posture reeducation effects in students with scoliosis

Pollyana Coelho Vieira Toledo [I] ; Danielli Braga de Mello [II] ; Maria Araujo Erivania [I] ; Daoud rejane [III] ; Estélio Henrique Martin Dantas[IV]

[I] Master; Collaborator Professor of Biosciences Laboratory of Human Kinetics at the Federal University of Rio de Janeiro State (UNIRIO) - Rio de Janeiro (RJ), Brazil [II] Professor Assistant I of the Army School of Physical Education (EsEFEx) - Rio de Janeiro (RJ), Brazil [III] Professor collaborator of Biosciences Laboratory of Human UNIRIO Motricity - Rio de Janeiro (RJ), Brazil [IV]Teacher graduate Program Doctor of Nursing and Life Sciences Human UNIRIO - Rio de Janeiro (RJ), Brazil

SUMMARY

The aim of this study was to analyze the effect of the Global Postural Reeducation (GPR) method in children diagnosed with nonstructural thoracic scoliosis (ETNE). School with indication ETNE the postural examination and negative Adams test were referred to radiographic examination for diagnostic confirmation. We selected 20 participants (11 boys and 9 girls, 10 ± 3 years), randomly divided into two homogeneous groups: what made the RPG (GRPG) for 12 weeks lasting 25 to 30 minutes each session, according to the that withstood remain in position; and the control group (CG) without intervention. After three months, the two groups repeated the postural evaluation and radiographic examination. To evaluate the statistics, we used analysis of variance (ANOVA) univariate, repeated measures followed by *post hoc Tukey* to identify possible intra and inter - group differences.The value of α was 0.05. The GRPG showed a significant reduction in the Cobb angle in the intragroup comparison (Δ % = -35.100; p = 0.009), but not GC (Δ % = 9,520, p = 0.789). It can be concluded that students submitted to the RPG method showed improvement of nonstructural thoracic scoliosis frame.

Keywords: posture; scoliosis; minors.

ABSTRACT

The aim of this study was to analyze the effect of Global Postural reeducation (GPR) method in scholars diagnosed with thoracic nonstructural scoliosis (ETNE). Scholars with indicative of ETNE to postural exam and test negative Adams Were directed to radiographic exam to diagnostic. Twenty participants Were selected (11 boys and 9 girls, 10 ± 3 years old) and randomly divided in two homogeneous groups: group treated by RPG (GRPG) and control group (CG). The GRPG was Submitted RPG treatment During 12 weeks in sessions from 25 to 30 minutes in agreement with each student at tolerance posture. The CG did not suffer intervention. After three months, BOTH groups repeated the postural and radiographic exam. For statistics, it was used ANOVA with repeated measures univariated, Followed by Tukey post hoc test to identify the possible

intra and intergroups differences. The α value used was 0:05. The GRPG present significant reduction at Cobb angle between pre and posttest (Δ % = - 35.100; p = 0.009), but the CG didn't show (Δ % = 9,520, p = 0.789). It was Concluded que scholars Submitted to RPG method presented improvement in thoracic nonstructural scoliosis.

Keywords: posture; scoliosis; minors.

INTRODUCTION

Scoliosis is a deformity that affects the three-dimensional shape of the spine and can occur at any stage of life, but especially from the age of ten [1] , with associated progression to the growth spurt. The prevalence of scoliosis in school ranges from 1 to 3% of the population. Thus, early detection of this disease increases up to three times the number of treated patients, decreasing the percentage of requiring surgery [2] .

It is clinically important to differentiate structural scoliosis nonstructural scoliosis. The nonstructural can be caused by bad postural habits and member of discrepancy, among others; have structural features and rotation of the vertebrae column becomes rigid due to abnormality in this structure, forming the jib.

The hump is therefore the rotation of the vertebrae to the side of the convexity of the curve and its clinical manifestation with the deformity of the ribs in the thoracic spine or spinous processes in the lumbar spine. In school, the nonstructural scoliosis is common, requiring treatment [3-6] .

Physical therapy has several methods of treatment: use vest, *iso-stretching* , osteopathy [7] , method *klapp* [8] , pilates [9] and the Global Postural Reeducation (GPR) [4.10] . The latter improves the body corrects the morphology, suppresses stiffness and releases the joints, treating disharmony taking into account the individual needs of every[11] , which is essential for the correction of nonstructural scoliosis, because it is the phase growth and because it is in this period that re-establishes the normal physiology of the column [12] .

Rosario et al. [13] clarifies that the RPG promotes global stretching of the muscle chains and advocates use of specific postures for stretching muscles. Muscle chains are formed by gravitational muscles that work synergistically within the same chain [10] .

The RPG assumes a shortened muscle creates offsets in close or distant muscles [10] . This improves the biomechanical alterations found on the basis of physiological actions, acting not only on the musculoskeletal system itself, but also in the nervous [14] , responsible for information storage, modifying thus body awareness.

Marques [12] shows a case of structural thoracic scoliosis treated with RPG with decreased curve. In another study, Fregonesi et al. [15] submitted a teenager diagnosed with structural scoliosis treatment RPG and it did not reduce the angle of scoliosis.

This study aims to evaluate the effects of the Global Postural Reeducation method in Cobb angle of students from 5th year diagnosed with nonstructural thoracic scoliosis.

MATERIAL AND METHODS

This research adopted the experimental study model and with the participation of 20 students (11 boys and nine girls) of the 5th year of elementary school at the State School Rotary Club, randomly divided into two groups: RPG (GRPG; n = 10) and control (GC, n = 10). The inclusion criterion was having functional scoliosis [9.17] ; school that showed no structural indicative of scoliosis chest "C" to postural examination, and negative Adams test, were referred to the ray examination X. It was the reason for exclusion the presence of structural scoliosis. Those responsible for the children in the study signed a consent form.

This study is in accordance with the ethical standards for conducting research in humans, r196 / 96 of the National Health Council of 10/10/1996 (BRAZIL, 1996) and the resolution of Helsinki (WMA, 2008) and had your project duly approved by the Ethics Committee of the University Castelo Branco under number 0109/2008.

Radiographic examination was used to measure the angle of scoliosis by the Cobb method, which is based on radiographs and is a reference for measuring the front angle of scoliosis. The measurement is made by drawing a line perpendicular to the top edge of the vertebra that leans more toward the concavity, and another on the bottom edge of the vertebra with greater angle toward the concavity. The intersection of the two determines the deviation angle in the column [16] . Since the index Risser essential in the management of children with scoliosis [17] , corresponds to the presence of calcification in the iliac apophysis which measures progressive ossification associated with the closure of the bone growth [18] , with 1 to 5 rating [17] .

The anteroposterior radiograph (AP) was held in the evening by a radiology technician with X-ray equipment brand Pulsar VMI Plus ® , 800 mA (milliamp) 125 kv (Kiloelétron volt) and digital command console. The incidence of chest X-ray is calculated at 300 mA, 5 mAs 75 kV, the thickness (chest) of 25 cm. For the exam, the school remained in the standing position. Radiography involved pelvis, lumbar spine, thoracic spine and part of the cervical spine with the AP.

A physiotherapist by postural evaluation and examining x-ray determined the degree of nonstructural scoliosis.After the initial evaluation, the GRPG was undergoing treatment for three months (12 weeks), twice a week, while respecting the limits of each school time during the postures [19] , ranging from 25 to 30 minutes, keeping 2 minutes between each one of them. The evolution of attitudes was under the control of breathing, the ability to maintain alignment and necessary corrections, depending basically the conditions presented by each school [20] .

Postures were used "frog on the floor" (Figure 1) and "frog in the air" (Figure 2), which allow a better approach for the same to be in the supine position and have no charge. They are both isometric work of static muscles, always pompagem joint in the cervical spine and lumbosacral spine, being progressive, increasingly global [21] , that is, not only treated the school column, but the body as one all.

Figura 1. Postura rã no chão

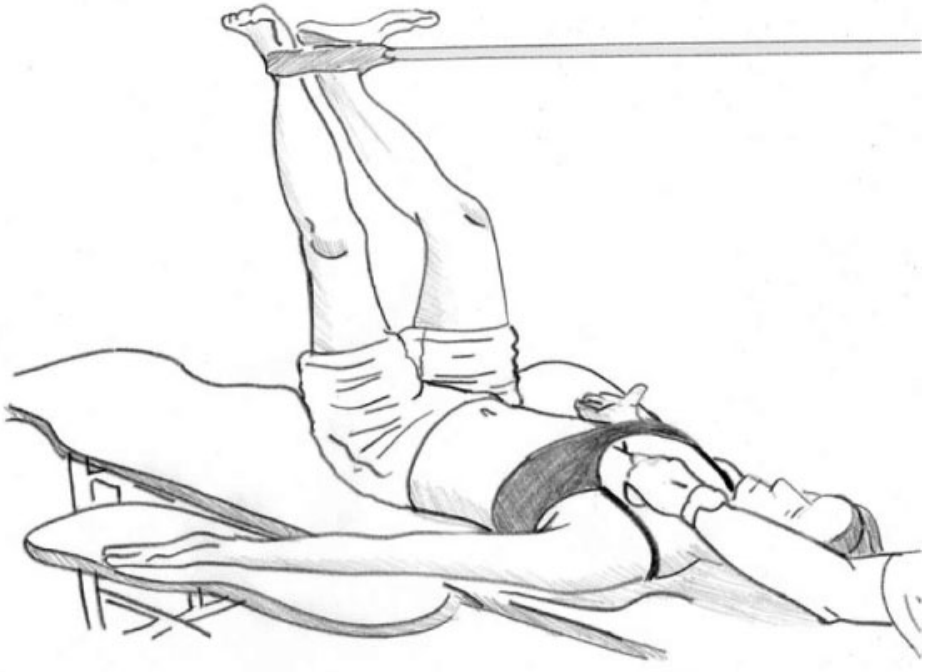


Figura 2. Postura rã no ar

For posture "frog on the floor", consisting of the trunk and lower limbs in extension, the students were positioned supine with arms along the body, radiulnares supine, legs in abduction with lateral rotation with hip flexion and knees to the soles of the feet [22] . The progression of posture opening angle is the extension and adduction of the lower limbs and opening the upper limbs [21] .

Since a "frog in the air" is the trunk and lower limbs are at an angle of 90 °. The school remained positioned supine, but with shoulders abducted about 45 °, with the joint radiulnar supine, lower limb in abduction and suspended by the calcaneus (by a rope attached to the wall) with talocrurais in dorsiflexion and parallel to ceiling[22] . The progression of angle closure in position is flexion and adduction of the lower limbs.

The postures RPG depend on the concentration and participation of the patient in following the physiotherapist's instructions and make the necessary corrections during the course of the position, which provides the active muscle stretching and isometric contractions increasingly eccentric of shortened muscles [23] .

In the course of the positions were held by pompagens physiotherapist, aiming to align the dorsal and cervical spinal curvatures [24] .

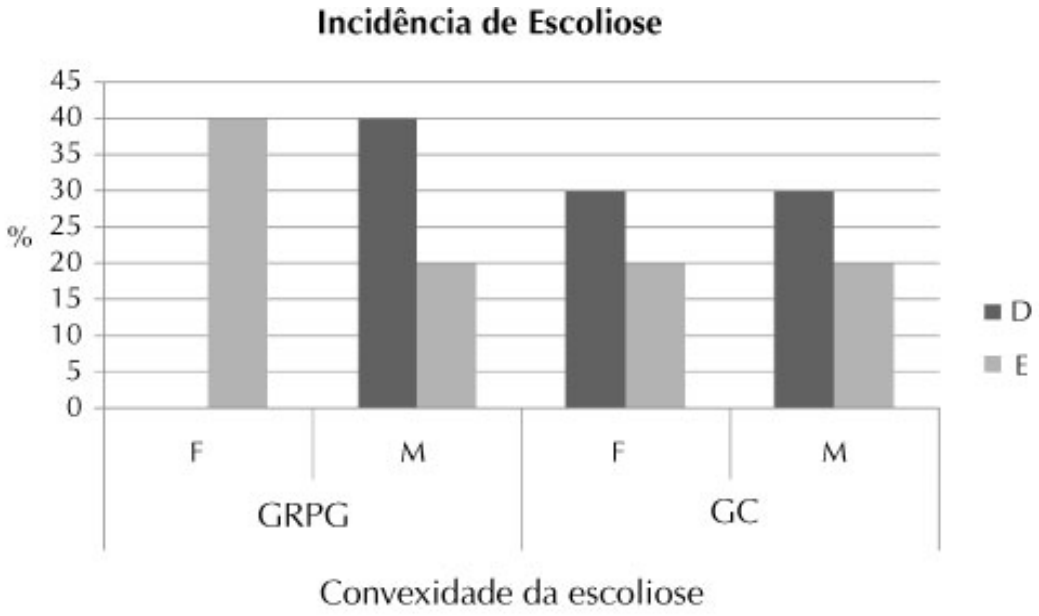
The GRPG was instructed on how to load the bag, and each session reeducation was possible to observe the improvement of body awareness and posture also. The CG was not treated and, like the accomplished with GRPG was also instructed as to the best way to carry the backpack during the three months between the first and the last ray X.

After the quarter, GRPG and CG were again the postural evaluation and X-ray examination to analyze the results.The whole application procedure for diagnostic and summative assessments and exercises, was conducted by the same physical therapist who has qualification certificate RPG method in Brazil.

For the analysis of the results, at first were descriptive statistical techniques used by mean, standard deviation, standard error, minimum and maximum values. The normality and homogeneity of variance of the sample data were verified with the use of the Shapiro-Wilk and Levene test, respectively. It used analysis of variance (ANOVA) with repeated measures univariate followed by *Post Hoc* of *Tukey* to identify possible intra and inter - group differences for the variable angle of Cobb. The value of α was 0.05.

The GRPG school (4 girls and 6 boys) and GC (5 girls and 5 boys) have the same age (10 years) and were part of the same class of 5th grade elementary school and is subject to the same overhead material and school routine .

The incidence of convexity nonstructural scoliosis in both groups can be seen in Figure 3 .



GRPG: grupo RPG; GC: grupo Controle; D: direita; E: esquerda; F: sexo feminino; M: sexo masculino.

Figura 3. Incidência da convexidade da escoliose não estrutural

The Table 1 , below, shows the degree of curvature of scoliosis by means of the Cobb angle in GRPG and GC.

Tabela 1. Análise intra e intergrupos, entre os grupos GRPG e GC do ângulo de Cobb (graus)

		Média	Desvio padrão	Valor mínimo	Valor Máximo	Δ%	Valor p intragrupo
GRPG	Pré	15,10	2,51	12,00	20,00	-35,10	0,009[a]
	Pós	9,80[b]	2,90	6,00	14,00		
GC	Pré	14,70	3,77	10,00	20,00	9,52	0,789[a]
	Pós	16,10[b]	3,75	10,00	22,00		

GRPG: grupo RPG; GC: grupo Controle; Δ%: diferença percentual; p<0,05.
a: Diferença significativa intragrupos; b: diferença significativa intergrupos no pós-teste (p=0,001)

We observed with normal population distribution before the intervention. When comparing the average values of the Cobb angle shown before and after the intervention period, it was observed that the GRPG showed a significant reduction (p = 0.050) in the degree of curvature of scoliosis after performing the RPG, while the GC recorded an increase not significant (p = 0.789) in the degree of curvature, which indicates deterioration in scoliosis above.

The sample analyzed (GRPG and GC) shows the Risser index 1 (corresponds to the presence of ossification occupying up to 25% side of the full extent of the epiphysis and the Risser index 2 (presents ossification occupying 26 to 50% side of the full extent of epiphysis) [25] . the frequency distribution of the convexity of scoliosis and Risser index between the groups can be seen in Table 2 .

Tabela 2. Distribuição de frequência da convexidade da escoliose e índice de Risser entre os grupos

		GRPG		GC	
		M	F	M	F
Escoliose	D	5	1	3	3
	E	1	3	2	2
Risser1	D	5	1	3	3
	E	0	3	2	1
Risser2	D	0	0	0	0
	E	1	0	0	1
Total		6	4	5	5

GRPG: grupo RPG; GC: grupo Controle; D: direita; E: esquerda; F: sexo feminino; M: sexo masculino

DISCUSSION

Little is known about the progression of the scoliosis curve, but several factors affect this process. While flexible or unstructured, it becomes easier its correction and / or stabilization, ie the end of growth, the likelihood of correction is less than [8] .

The aim of this study was to evaluate the effects of the Global Postural Re-education method in Cobb angle of children diagnosed with non-structural scoliosis. The method of the GPR was chosen because it lengthens large number of muscles at once, there is no enabling compensation. But the muscle stretching lengthens a muscle or specific muscle group, however, may become less efficient due to secondary compensation that may occur in its chain [10] .

This research was conducted with students from ten years of age due to the onset of the growth spurt. The physical therapy with the RPG was chosen because, in addition to considering the individual holistically, aims the knowledge of the body and thus the improvement of righting reactions. Martell [6] in his study, describes that idiopathic scoliosis has an impact on school 10-16 years, which are considered a population at risk due to age, still punctuating the importance of self - image and that proper posture in childhood is important for prevent future problems.

Short et al. [26] evaluated two teenage ten years. They were not treated during the study period. The first presented lumbar curve with angle of 17 ° cobb and thoracic curve of 14 ° cobb. After a year, the curve has evolved: the lower back became 24 ° cobb and chest 23 ° cobb. The second teenager had thoracolumbar scoliosis of 18 ° cobb, which evolved after a year to 40 ° cobb.

The results of this study demonstrate that the GRPG showed a significant decrease in the angle of scoliosis, while the GC recorded an increase. One reason for the decline of the curve is that the RPG works from the center to the edge of the body, ie the column to the members using the active muscle stretching involving together the static antigravitários muscles, the internal rotators and inspiratory [27] , restoring muscle balance.

In this sense, following other methods that evaluated the results of treatment of scoliosis, as in Molina and Camargo study [4] who treated 9 children 9-15 years , with eccentric isotonic stretching posture and obtained as aresult decrease the angle of scoliosis, assessed by Cobb method. Already Monte-Raso et al. [28] used the *iso-stretching* to improve postural changes such as scoliosis, with 12 volunteers. The author reports that the method was not effective in the treatment of asymmetries.

The result of the radiological analysis in relation to the Cobb angle can be compared to the study by Oliveira Souza and [7] , who applied the method of *iso-stretching* and osteopathic manipulation in the study with scoliosis, reaching the result of 66.7% of reduction of the Cobb angle and 16.7% of patients with stabilized curvature. In this study, the GRPG obtained decrease in scoliosis angle in every school.

Scoliosis and its treatment have a great impact on quality of life of school, causing cultural differences in their perception [29] .

In the study by Marques [12] and Fregonesi [15], treatment of scoliosis structural GPR achieved different results. The first author was able to decrease at 10 ° angle. But the other, even subjecting the school to a year of weekly treatment, achieved no improvement in curvature, but managed to stabilize the curve. In this study, recorded GRPG average decrease of 35.10% in the angle of scoliosis, and CG, 9.52% increase. Rosario , et al. [10] states that the RPG is effective in treating postural shows deviation, however, is still scarce literature [12] .

In the control group the increase found in scoliosis may be related to poor posture during the spurt of growth phase [8] .

Thus, nonstructural scoliosis treated with RPG decreases the curve in the spine and / or improve the postural changes, enabling the school capacity to perceive the body itself [22] . In this case, the muscles working together both as to their static and dynamic their central nervous system acts three-dimensionally. Therefore, any postural changes cause retraction of its chains, leading to bone misalignment. Souchard [22] states that every move we do need to stock all the bone structure, muscle and ligament to maintain balance and realize one's own body is fundamental [14] .

Thus, therapeutic exercises have been shown to be an effective tool for the improvement of scoliosis and / or stabilization [7] . The RPG rescues the musculoskeletal balance through stretching, muscle contraction, body consciousness and postural correction. Thus, the basic principles of the RPG in scoliosis were to improve the retraction of the static muscles; correct, through the traction, stress curves; drawing, globally, the muscles of static and release the respiratory block [30].

Some studies about the RPG demonstrated the effectiveness and limitations of this method in several pathologies, including the Scoliosis. However, prevention,

or primary care is necessary, and from this thought non-structural scoliosis becomes a priority.

CONCLUSION

It can be concluded that students submitted to the Global Postural Re-education method showed improvement of thoracic scoliosis frame not estrutural.Diante this, the present study recommends RPG for treatment, however, it is necessary to evaluate the school every six months to observe the development of your spine throughout the spurt phase of growth. It should be emphasized, though, that will be necessary research with a longer period of time to evaluate the treatment protocol, since scientific studies on the subject are scarce.