75 - FACILITATION TECHNIQUE EFFICIENCY IN CORECTION OF SPINE SAGITTAL PLANE DEVIATIONS

OCHIANA GABRIELA, OCHIANA NICOLAE
Faculty of Movement, Sports and Health Sciences,
University "Vasile Alecsandri" of Bacău, Romania
Marasesti 157 str., 600192
tel/fax 0040234517715
gabi_ochiana@yahoo.com

doi:10.16887/87.a1.75

Abstract

Neuro-muscular facilitation is used in the recovery of people with neurological disorders, traumatic, rheumatic and also case of people with spinal deviations. In case of deviations in sagittal plane, these techniques are used to restore muscular balance and recovery spine.

The research, aimed to study the effectiveness of facilitation techniques in correction of sagittal spinal deviations, respectively kyphosis. Positive differences obtained by the subjects of the experimental group, which were only used techniques to facilitate the recovery kyphosis, plus the frequency of 2 sessions per week compared with 4 meetings in controls group, us to say that the role of techniques facilitating the recovery deviations spine in sagittal plane is a major one.

Selecting and using the most appropriate facilitation techniques for relaxation of contractures muscle groups and in the same time to tone those elongated from the dorsal spine level is dependent by the level of knowledge and application modality of the therapist and also patient communication mode.

Introduction to the research topic

In the diseases caused by incorrect posture, kyphosis attitudinal deviations are one of the major incidence among young people (De Mauroy, JC 2012; Grimmer, K. M. Williams, 2000; Anderson EM, L. Clarke, B. Spain, Fon 2002 GT, Pitt MJ, AC Thies, 1980)

The modalities that can be used in solving this affection are surgical and especially lately, by and with noninvasive recovery physical therapy techniques help.

Proprioceptive Neuromuscular Facilitation (PNF) is a concept (Adler, S., Bekers, D., Buch, M.,2003) of non-invasive treatment and the goal of the PNF techniques is to promote functional movement through facilitation, inhibition, strenghthering and relaxation of muscle groups. These techniques are used primarily to facilitate the appearance and growth of motor response in muscle hypotonia case or to inhibiting the muscle spasm, respectively decreasing the muscle contraction.

Neuro-muscular facilitation is used both in the recovery case of people with neurological, traumatic, rheumatic disorders and also in case of person with spinal deviations. In spinal deviations in sagittal plane case, these techniques are used to restore muscular balance and recovery spine too.

Research problems, objectives, settings, design and methods

The research was aimed to study the effectiveness efficiency of facilitate techniques in the correction of sagittal spinal deviations, respectively of kyphosis. The hypothesis developed in line with this objective was to establish the response to the question: if in the recovery program will apply proprioceptive neuromuscular facilitation techniques will restore muscle balance agonist-antagonists and they will correct the deviations spine in the sagittal plane in a shorter time compared with a classic physical therapist program?

The study was conducted during february 2016 - may 2016, at a private physical therapy cabinet and recovery section of the County Hospital of Bacau on a sample of 20 subjects diagnosed with spine deviations in the sagittal plane respectively kyphosis attitude, with aged between 12 to 16 years who were divided into two groups (10 subjects formed the experimental group and 10 control group). The formation of the two groups was random; however there were clear selection criteria of the subjects, which are: disease, age, availability and agreement to participate in this study.

The experimental group physical therapist intervention program was formed only of proprioceptive neuromuscular facilitation techniques while the control group followed a classic physical therapist program. Recovery sessions were conducted for 4 months at a rate of 4 per week in the control group and 2 per week for the experimental group.

Both at the beginning and end of the treatment period, subjects were evaluated through: visual examination in frontal and sagittal plane, palpation of muscle groups, numerical pain rating scale (SEN) 1-10 (http: www.scientia.ro), distance occiput - wall (normal 0), cervical (normal - 3 cm) and Ott's sign for measuring the amplitude of the dorsal column - normally grows from 30-33 cm.

The research methods and techniques

Subjects in the control group were integrated into a therapeutic program that contained the exercises from corrective medical gymnastics tailored for each subject, according to age and evolutionary stage, analgesic and corrective posture, massage with painkillers and anti-inflammatory ointments, active movements using various positions, active movements with objects, isotonic contractions, isometric contractions and stretching.

For the experimental group, the recovery program was formed only proprioceptive neuromuscular facilitation techniques and included: Miotensive method, rhythmic initiation, rhythmic rotations, relaxation-opposition and reversal agonist for relaxing muscle groups shortened from front torso and also for upper trapezius and slow reversal with opposition (using isometric spinal extensors only), isometric contraction in the shortened zone, alternating isometric and rhythmic stabilization for muscle toning of the rear trunk. These techniques were applied 4-6 times each, starting with relaxation techniques and continuing with muscle toning. Techniques have been made according to time breathing, using the contraction exhalation, and between techniques was involved both thoracic and abdominal breathing.

Results and discussion

The values obtained from assessments of the two groups, and the average initial and final values are found in table. 1 and 2. Table no.1. Experimental group evaluation

Nr. crt.	Subjects	Sex	Age	Diagnostic	Duration	Pain		DOP		SC		SO	
						I	F	I	F	I	F	I	F
1	PE1	m	12	Functional kyphosis	4 month	4	0	1,5	0	4	3	30	33
2	PE2	m	14	Functional kyphosis	4 month	3	0	1	0	3,5	3	30	33
3	PE3	m	15	Functional kyphosis	4 month	5	1	1,5	0,5	4	3,5	30	32
4	PE4	m	16	Functional kyphosis	4 month	4	0	1	0	3,5	3	30	33
5	PE5	m	12	Functional kyphosis	4 month	3	0	1	0	3,5	3	30	32,5
6	PE6	f	14	Functional kyphosis	4 month	4	1	1,5	0	4	3	30	32

7	PE7	f	13	Functional kyphosis	4 month	3	0	1	0	3,5	3	30	33
8	PE8	f	15	Functional kyphosis	4 month	3	0	1	0	3,5	3	30	33
9	PE9	f	16	Functional kyphosis	4 month	4	0	1,5	0,5	4	3,5	30	32.5
10	PE10	f	16	Functional kyphosis	4 month	4	1	1,5	0	3,5	3	30	33
				Average values		3,7	0,3	1,2	0,1	3,7	3,1	30	32,7

Table no.2. **Control group evaluation**

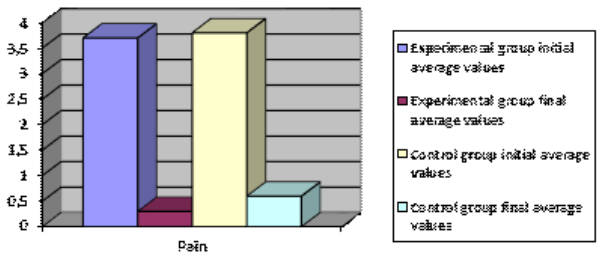
Nr. crt.	Subjects	Sex	Age	Diagnostic	Duration	Pain		DOP		SC		SO	
						I	F	I	F	I	F	I	F
1	PC1	m	14	Functional kyphosis	4 month	5	1	2	1	4,5	3,5	30	32
2	PC2	m	13	Functional kyphosis	4 month	4	0	1,5	0,5	4	3,5	30	32,5
3	PC3	m	15	Functional kyphosis	4 month	4	1	1,5	0,5	3,5	3	30	32
4	PC4	m	12	Functional kyphosis	4 month	3	0	1,5	0,5	3,5	3	30	32,5
5	PC5	m	16	Functional kyphosis	4 month	4	1	1	0	4	3,5	30	32
6	PC6	f	13	Functional kyphosis	4 month	3	0	1	0	3,5	3	30	33
7	PC7	f	15	Functional kyphosis	4 month	4	1	1,5	0,5	4	3,5	30	32
8	PC8	f	12	Functional kyphosis	4 month	3	1	1	0	3,5	3	30	33
9	PC9	f	16	Functional kyphosis	4 month	4	0	1	0,5	3,5	3	30	32.5
10	PC10	f	14	Functional kyphosis	4 month	4	1	1	0,5	4	3,5	30	32
				Average values		3,8	0,6	1,3	0,3	3,8	3,25	30	32,35

Abbreviations
PE 1...10 = patient experiment group 1...10
PC 1...10 = patient control group 1...10
m=male; f=female
I= inițial; F=final
DOP= wall occiput distance
SC= cervical arrow
SO= Ott's sign

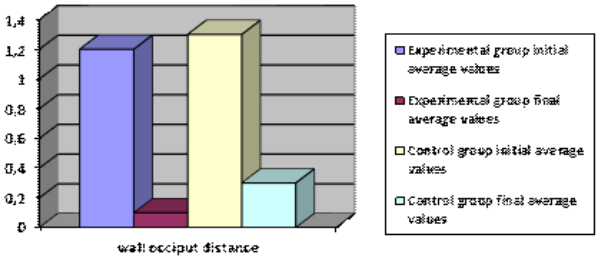
Comparing the results of the 4 tests, respectively: pain, distance occiput-wall, cervical arrow and Ott's sign can be observed differences in mean baseline and final, as well as differences between the values of the experimental and the control group (graph no.1-3). Mean baseline of pain in the experimental group was 3.7 and 3.8 in the control group, which represents a below average level of pain and the final values were 0.3 on experimental group and 0.6 in the control group, which corresponds to a minimum level of pain (near to value of 0) (graph no.1). Regarding the occiput-wall distance, the initial average value of the experimental group was 1.2, and the final 0.1, and in the control group, the initial average value 1.3, and the final 0.3 - which represent an equilibration of the dorsal spine muscle groups (graph no.2).

Related cervical arrow values the mean baseline recorded in the experimental group was 3.7 and a 3.1 at the end, with a difference of 0.1 until 3 who is considered normal value, while the control group initially had an average of 3.8 and 3.25 final with a difference of 0.45 until normality (graph no 3).

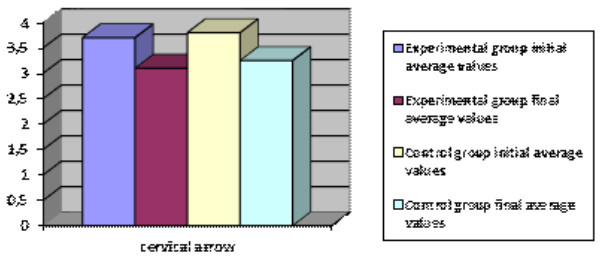
Also, the initial average value of the Ott's sign in the experimental group increased from 30 to 32.7 with a minimum difference until a value considered as normal 33, and in the control group increased from 30 to 32.35. (graph no.4), the growth difference was 0.35 for the experimental group.



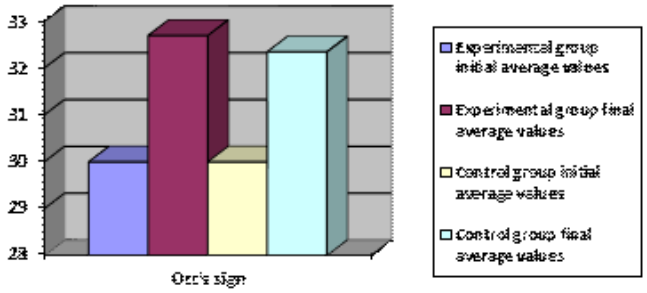
graph. no. 1. Initial and final average values of the experimental and control group - pain indicator



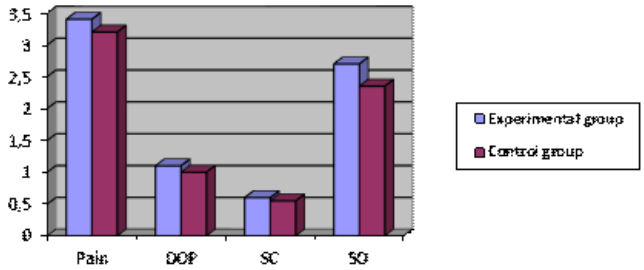
graph. no. 2. Initial and final average values of the experimental and control group - wall occiput distance



graph. no. 3. Initial and final average values of the experimental and control group – cervical arrow indicator

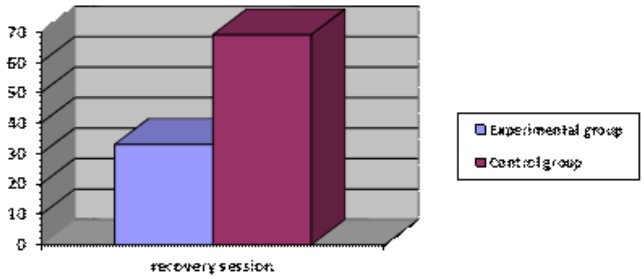


graph. no. 4. Initial and final average values of the experimental and control group – Ott's sign indicator



graph no. 5. Values of Initial and final average difference at both goups for all 4 indicators –pain, wall occiput distance, cervical arrow and Ott's sign indicators

In the graph no.5 are presented the difference, respectively the progress between average value initial and final at each tested indicator compared to the experimental and control group. In this way we can observe a greater progress at experimental group subjects who used facilitation techniques compared with the control group that followed the classic physical therapy program.



graph no. 6 Recovery session number made in 4 months by the two groups

The number of recovery sesions was lower in the experimental group than in the control group respectively 33 sessions compared to 69, which means a half time curtailment (graph no. 6).

Conclusion

Following the interpretation of the results for the two groups, we are able to conclude this:

·Pain intensity decreased to around 0 (0.3 experimental group and 0.6 control group), with a difference of 0.3 to experimental group favor, which means adoption of a normal position in the absence of pain caused by muscle contracture;

·Occiput-wall distance has a value of 0.1 in the experimental group and 0.3 at the control group with a difference of 0.2 for the experimental group reported to the normal value of 0, which means restoring the balance muscle at the head and neck level, which causes a normal attitude of upper torso;

·Cervical arrow finally had a value of 3.1 in the experimental group and 3.25 in the control group with a difference of 0.12 in favor of the experimental group. Normal values is 3, which means a recovery of the cervical spine - with forming a normal lordosis;

·Ott's sign finally had a value of 32.7 in the experimental group and 32.35 in the control group. Compared to value of 33 considered normal, that means a greater mobility of dorsal spine.

Both groups have obtain values close to normal with slight differences in favor of the experimental group mentioned above, which shows the effectiveness of both recovery programs used in spine kyphosis functional recovery.

Differences of good results obtain by experimental group subjects would not be an asset in supporting of using proprioceptive neuromuscular facilitation techniques in recovery of spinal deviations in the sagittal plane. However a careful analysis of the time needed to reach levels close to normal for both groups highlights the importance of these techniques and confirmed the hypothesis from which we started. Work time to reach similar results was 2 times lower in the experimental group (33 treatment sessions) than the control group (69 treatment sessions).

Thus, use of facilitation techniques in the following order: Miotensive method, rhythmic initiation, rhythmic rotations, relaxation-opposition and reversal agonist for relaxing muscle groups shortened from front torso and also for upper trapezius and slow reversal with opposition, isometric contraction in the shortened zone, alternating isometric and rhythmic stabilization for elongated muscle contribute to restore muscular balance, pain disappearance as well as and recovery of dorsal spine

respectively correction of functional kyphosis.

As a final conclusion, we can say that selecting and using the most appropriate facilitation techniques both for relaxation of contractures muscle groups and toning the elongated at dorsal spine level is dependent on the level of knowledge and their application by the physiotherapist and how she/he communicate with the patient.

Bibliography

ADLER, S. BECKERS, D., BUCK, M., PNF in practice, An illustrated guide, second edition, Springer, p.1-19, 2003

ANDERSON M.E.; CLARKE L.; SPAIN B., Disability in adolescence, Taylor & Francis e-library, 2002

DE MAUROY, J.C. Kyphosis Physiotherapy from Childhood to Old Age, in Physical therapy perspectives in the 21st century – challenges and possibilities, Josette Bettany-Saltikov, J., Paz-Lourido B., pg.41-66, InTech, Rijeka, Croatia, 2012

FON G.T.; PITT M.J.; THIES A.C. Thoracic kyphosis, range in normal subjects. American Journal of Roentgenology. 134, 979–983,1980.

GRIMMER, K.; WILLIAMS M. Gender-age environmental associates of adolescent low back pain, Applied Ergon, 31; 341-360, 2000

http:www.scientia.ro

FACILITATION TECHNIQUE EFFICIENCY IN CORECTION OF SPINE SAGITTAL PLANE DEVIATIONS

Key word: facilitation technique, correction, spine deviations, sagittal plane

Abstract

Neuro-muscular facilitation is used in the recovery of people with neurological disorders, traumatic, rheumatic and also case of people with spinal deviations. In case of deviations in sagittal plane, these techniques are used to restore muscular balance and recovery spine.

The research, aimed to study the effectiveness of facilitation techniques in correction of sagittal spinal deviations, respectively kyphosis. Positive differences obtained by the subjects of the experimental group, which were only used techniques to facilitate the recovery kyphosis, plus the frequency of 2 sessions per week compared with 4 meetings in controls group, us to say that the role of techniques facilitating the recovery deviations spine in sagittal plane is a major one.

Selecting and using the most appropriate facilitation techniques for relaxation of contractures muscle groups and in the same time to tone those elongated from the dorsal spine level is dependent by the level of knowledge and application modality of the therapist and also patient communication mode.

EFFICACITÉ DE LA TECHNIQUE DE FACILITATION DANS LES CORRÉCTIONS DES DÉVIATIONS DE LA COLONNE VERTEBRALE EN PLAN SAGITTAIRE

Mot-clé: technique de facilitation, la correction, les déviations de la colonne vertébrale, plan sagittal

Abstrait

La facilitation neuromusculaire est utilisé à la fois dans le rétablissement des personnes atteintes de troubles neurologiques, traumatiques, rhumatismales et aussi chez les personnes présentant des troubles de la colonne vertébrale. Dans le cas des déviations à dominante sagittale, ces techniques sont utilisées pour rétablir l'équilibre musculaire et la récupération de la colonne vertébrale.

Cette étude a pour objectif d'établir l'efficacité des techniques de facilitation dans la correction des déviations de la colonne vertébrale dans le plan sagittal, respectivement dans le traitement des cyphoses. Différences positives obtenues par les sujets du groupe expérimental, pour lesquels ont été utilisé seulement des techniques de facilitation pour le redressement de la cyphose, ainsi que une fréquence de 2 séances par semaine par rapport aux 4 sessions du groupe de contrôle, nous laissent entendre que le rôle des techniques de facilitation dans la récupération des déviations de la colonne vertébrale dans le plan sagittal est majeur.

Choisir et utiliser les plus adéquates techniques de facilitations pour la relaxation des contractures de muscles mais aussi pour tonifier les muscles allongés au niveau de la colonne vertébrale sont dépendantes du niveau des connaissances et la/les méthode(s) appliquée(s) par le thérapeute et le mode de communication avec le patient.

EFICIENCIA DE LAS TÉCNICAS DE FACILITACIÓN EN LA CORRECCIÓN DE LAS DESVIACIONES DE COLUMNA EN EL PLANO SAGITAL

Palabras clave: técnicas de facilitación, corrección, desviaciones vertebrales, plano sagital.

Abstract:

La facilitación neuro-muscular es utilizada en la recuperación de las personas con alteraciones neurológicas, traumáticas, reumáticas y además en casos de pacientes con desviaciones vertebrales. En el caso de las desviaciones en el plano sagital, éstas técnicas son utilizadas igualmente para restaurar el equilibrio muscular y la recuperación vertebral.

Esta investigación está enfocada al estudio de la efectividad de las técnicas de facilitación en la corrección de desviaciones vertebrales sagitales y en la cifosis. Se han obtenido cambios positivos en los sujetos del grupo experimental, los cuales sólo utilizaron técnicas para facilitar la recuperación de la cifosis con una frecuencia de dos sesiones comparada con las cuatro sesiones del grupo control. Estos datos sugieren que el papel de las técnicas empleadas en la recuperación de las desviaciones vertebrales en el plano sagital es un tema de gran importancia.

La selección y el uso de las técnicas de facilitación más apropiadas para la relajación de los grupos musculares contracturados, y de forma simultánea la elongación del tono muscular desde la zona de la columna dorsal, depende del nivel de conocimiento y la modalidad de tratamiento del terapeuta así como de la forma de comunicación del paciente.