126 - CONSTRAINED INDUCED MOVEMENT THERAPY EFFECTIVENES ON THE REHABILITION OF THE POST-EVA UPPER PARETIC LIMB: BRAZILIAN LITERATURE REVIEW

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INTRODUCTION

Encephalic Vascular Accident (EVA) is defined as an immediate interruption in the brain's blood circulation, caused by obstruction of an artery indicating an ischemic EVA, or by the rupture of a vessel characterizing hemorrhagic EVA. Apparent clinical signs will be previously determined by the localization and extension of the lesion, and also by the presence of lateral irrigation (ROWLAND, 2002).Factors that must be considered to minimize the chances of an encephalic vascular accident (EVA) are high blood pressure, atherosclerosis, dyslipidemia, heart conditions, ethylism, tabagism, sedentarism and mellitus diabetes (SILVA, NASCIMENTO E BRITO, 2013 apud FALCÃO et al, 2004).

When patient survives, he or she can evolve with physical sequelas such as muscular strength and motor control impairment, cognitive and communication sequelas, and also impairment in his or her sensorial and perception abilities (MOTTA, NATÁLIO e WALTRIK, 2008). Hemiplegia is one of the impairments with greater prevalence of motor damages that more often follows cerebral vascular accident (CVA), injuring normal function of the upper extremity involved, with a noticeable decrease in reaching and prehension movements of the impaired upper limb, reduction in the movement amplitude, low variability and interarticular coordination loss. (FREITAS et al, 2010).

Motor functions and lost reflexes are modified in a cortical level. These modifications are an attempt of brain cells in creating connections for a motor relearning, known as neuroplasticity. The neuronal reorganization is more effective with the stimulation of gestures and frequent movements, influenced by the environment (FREITAS et al, 2010 apud OBERG, 2002). In this context, an intervention, the Constrained Induced Movement Therapy (CIMT) was developed, and it aims to train the hemiparetic limb with coordination exercises, movement amplitude, strength and functional activities that emulate daily life activities (DLA). A glove is used to restrict the upper extremity movement during sessions. (FREITAS et al, 2010 apud PELICIONI, 2007).

The foundation of the Constrained Induced Movement Therapy (CIMT) is based on the learned disuse phenomenon defined as the restrict use of the affected upper limb in relation to the motor capacity of the individual, and the use-dependent reorganization where studies have confirmed the extension of areas of cortical representation of body segments subjected to intensive training (VAZ et al, 2008).

Many studies have been published about Constrained Induced Movement Therapy (CIMT) in individuals affected by encephalic vascular accident (EVA), which is increasing worldwide, due to unhealthy daily habits. This study is justified by the necessity of a comparison between the results of the studies about the use of CIMT as a rehabilitation method, and aims to verify which protocol followed during the practice of the technique, in contrast with the term and modality of application, showed greater effectiveness on the treatment of individuals affected by EVA.

Considering Constrained Induced Movement Therapy (CIMT) as an alternative technique for the rehabilitation of hemiparesis, this study aims, by means of a review on literature, to investigate the effectiveness of the therapy in the treatment of the paretic upper limb in patients who suffered encephalic vascular accident (EVA), examining methods of application and benefits of the technique.

METHOD

The current study is a bibliographic review on Brazilian scientific articles. This research was made on articles indexed in the following databases: Scielo, Bireme, Capes periodic publications and Latindex, using as reference publications released between 2009 and 2014. The key words used were “Encephalic vascular accident”, “upper extremity”, “constraint-induce movement therapy” and synonyms (“restricted movement therapy”, “induced movement therapy”, “forced use therapy”). The research was made between April and June of 2014, and the data were descriptively analyzed by means of tables and graphics.

The articles from Bireme database were selected by title and in Scielo and Capes periodic publication the articles were selected by subject. However, the research in Latindex database was made by the periodic publication and not by its articles as done in other databases. Thus, the research term was “medical sciences” and then the name “neurosciences”.

Criterion of inclusion such as articles in Portuguese, reporting the physiotherapeutic use of Constrained Induced Movement Therapy (CIMT) in hemiparetics who had suffered encephalic vascular accident (EVA), or articles that compared the use of CIMT to other treatments were considered. Bibliographic review articles, articles that reported the use of CIMT in other pathologies, associating CIMT with other treatment and rehabilitation methods, that were not considered scientific articles or that were not fully available were excluded.

RESULTS

1257 articles were initially found: 67 from Scielo, 232 from Bireme, 464 from Capes periodic publications and 494 from Latindex (Neuroscience Magazine). 1232 articles were excluded for not approaching the theme. Thus, there were 25 articles left, and out of these, five were excluded by year of publication, which was out of the predefined criteria of inclusion. Out of the 20 articles that remained, three were bibliographic reviews, and one was not integrally available, being excluded for that reason. Posteriorly, an analysis of the resumes was realized and it was found that out of the 16 articles remaining only six qualified, four case studies and two case series. The articles were critically analyzed, considering specific information related to the theme, resulting in this review. Chart 1 shows the analysis on the main aspects of these articles.

Chart 1- List of selected articles

AUTHOR (YEAR)	OBJECTIVE	METHOD	RESULT
Pereira, Menezes, Anjos. (2010)	Characterize the protocol of intervention through case report of a patient with chronic sequela after EVA.	Protocol applied in 2 weeks, with 3 daily hours of application. The patient was evaluated by Motor Activity Log (MAL) and by Wolf Motor Function Test (WMFT).	Good results verify that CIMT may have more influence on DLA's of patients with hemiplegia when applied all three kinds of intervention.
Freitas, Sutani, Pires, Prada. (2010)	To evaluate improvement in the functionality of the hemiplegic upper limb along with a modified protocol of Restricted Movement Therapy	Case study of a 60-year-old male patient, diagnosed with iEVA (right sided). The modified protocol had the duration of two months, twice a week and three-hour sessions.	There was gain of independence and motor ability for the decrease of the time measured, and increase in the selectivity and amplitude of movement in the upper limb.
Rodrigues, Marinho, Silva, Silva, Sales, Mariano. (2013)	To verify the effect of CIMT on the functional reeducation of the paretic upper limb after EVA with 11 years of lesion	Case study in a patient with right spastic hemiparesis and motor aphasia resultant from CVA. The interventionused CIMT associatedtoShapingprotocol.	There was statistic difference in mobility, sensitivity and motor function (p=0,05). There was quantitative and qualitative statistic difference (p=0,00) in MAL scale. Improvement in muscular strengthandMAafterintervention
Meneghetti, Silva, Guedes. (2010)	To evaluate the effectiveness of CMIT in chronic patient with hemiparesis after CVA.	Case study of a 45-year-old male patient CD for CVA, with hemiparesis on the right side. CMIT applied for three hours a day, during three weeks	There was improvement in the motor function in the affected limb, characterized by an increase in Fugl-Meyer scale, after the term under CMIT
Magalhães, Letiere, Silva, Kosour, Reis. (2013)	To evaluate the effect of CIMT on the recovery of motor function, quality and ability of the movements in the upper limb in chronic hemiparetic patients after CVA	The study was realized with 5 patients presenting CD for CVA, with chronic hemiparesis of the UL. The CIMT was applied for two weeks, 5 sessions per week with duration of 3 hours, in 10 sessions.	In the ULMAT, it was observed an improvement in the level of functional ability and in the quality of movement in all patients analyzed (p=0,00). The results also evidence an increase in the marks in FM scale (p=0,00).
Siqueira, Barbosa. (2013)	To verify the use of CIMT and mental training in the functionality of the upper limb after CVA.	Experimental, exploratory and comparative study with 20 hemiparetic post-CVA patients, randomized in three groups: G1- mental training, G2-CIMT, CG- kinesiotherapy. The treatment was conducted for 4 months, twice a week, 30-minute session for each group.	Improvement in the mobility and motor function of the UL's in all groups, however the group subjected to mental training obtained higher score; in goniometry kinesiotherapy group obtained the best results for wrists/fingers. In the FIM mental training group obtained the best results.

Legend: EVA (Encephalic Vascular Accident); CMIT (Constrained Induced Movement Therapy); DLA (Daily Life Activities); iEVA (ischemic Encephalic Vascular Accident); MAL (Motor Activity Log); MA (Movement Amplitude); CD (Clinical Diagnosis); CVA (Cerebral Vascular Accident); ULMAT (Upper Limb Motor Ability Test); FIM (Functional Independent Measure); FM (Fugl-Meyer scale).

DISCUSSION

Constrained Induced Movement Therapy (CMIT) is a promising intervention to rehabilitate the motor function of the paretic upper extremity. According to Pereira, Menezes and Anjos (2010), traditional therapy consists in the restriction of the non-affected upper extremity with a glove, repetitive training with oriented activities and realization of daily life activities at home. By means of a comparative evaluation between the end of the intervention and after three months from the end of CMIT, the author observes that there is an increase in the scale of the quality of movement of the upper limb of 2.42 in the pre-training to 3.48 after three months, along with an improvement in the average time that the patient took to accomplish the activities.

In his case study, Freitas et al (2010) applied a modified protocol of the Constrained Induced Movement Therapy (CIMT), restricting the non-paretic limb, only during the sessions of training with functional activities using Shaping method, without realizing any intervention at home. In spite of this, it was observed through photography and timing for the realization of the activities, a considerable improvement in the motor function of the affected extremity. There was an increase in the agility of the upper limb in performing activities, improvement in the pincer movement, progress in the fine motor coordination and decrease of the compensatory movement in the gross motor activities

In the same way, Rodrigues et al (2013), in his case study, also realized 10 Shaping protocol activities. The conduction attributed a series of functional activities stimulating from pincer movements to gross grasp movements. Some of the exercises were "bean and spoon", "disks in beans", "turning dominoes"; "pronation and supination"; series of twenty repetitions were realized, with the time the patient took to perform the activities being measured. He applied a schedule of two weeks of conduction, with two hours of activity per day, out of these two days were conducted at home, and other three at the clinic. In his results, it was possible to verify an improvement in the sensitivity, mobility, motor function, amplitude of movement, muscular strength and in the quality and quantity of activities in the daily life.

Similar results to Rodrigues et al (2013) could be found in the case study of Meneghetti, Silva e Guedes (2010), who restricted the affected upper limb movement at home, along with a monitored training performed at the clinic. Among the orientations given to the patient, the most important was the movements' repetitions, which perfects brain's functionality, recruiting new synapses to stimulate the learning mechanism. The only noticeable difference between these studies was that this last promoted an appeasement in the upper limb pain.

In turn Magalhães et al, applied a modified protocol observing improvement in the ability and motor function in all the individuals who participated in the study. The author still says that the CMIT promotes cortical reorganization resulted from intensive training of the upper extremity affected by encephalic vascular accident, with "overcome of the learned nonuse phenomenon", by means of a restriction of the intact limb and consequently a greater recruitment of the affected limb. This research and other protocols available in the literature, as Freitas et al (2010), demonstrate that the term needed for the therapy is not a determinant criteria but the repetition of the activities is.

One of the studies showed us a singular comparison in relation to others already mentioned, which is very relevant regarding to its results. The sample consisted of 20 patients that were separated in three groups with diversified types of intervention. Group I received mental training, while group II received CIMT and group III was control group (kinesiotherapy) .In the analysis of the different marks in the evaluations, the author concluded that group I (mental training) obtained the best marks regarding to the functionality of daily life activities (DLA), evidencing, as well, that in all groups there was improvement in the mobility and motor function of the upper limbs. The effectiveness of the Constrained Induced Movement Therapy seems to be reinforced by the use of mental practice (SIQUEIRA e BARBORA, 2013).

CONCLUSION

The analyzed studies, in general, demonstrated high effectiveness of Constrained Induced Movement Therapy (CIMT) on the improvement of the motor function, ability, and overcome of the learned nonuse phenomenon, increasing the quality and quantity of movement in the affected upper limb. This makes evident that motor training promotes brain development, for it induces neuroplasticity.

It was also possible to verify that whether traditional protocol or modified protocol for the Constrained Induced Movement Therapy (CIMT) had positive effects on the recovery of the functionality of the paretic upper limb, and that the plausible result is linked, mainly, to the repetition in the activities realized.

It is important to emphasize the necessity of future studies that compare the application of the Constrained Induced Movement Therapy (CIMT) through traditional and modified protocols, in patients in the same stage of the encephalic vascular accident (EVA), aiming to verify specifically which one is more effective whether in short or long term.

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CONSTRAINED INDUCED MOVEMENT THERAPY EFFECTIVENES ON THE REHABILITION OF THE POST-EVA UPPER PARETIC LIMB: BRAZILIAN LITERATURE REVIEW

ABSTRACT

Introduction: Encephalic Vascular Accident (EVA) is among the diseases that most frequently affect people today, having hemiparesis as one of its most evident sequelas, with agreater impairment of the upper limb that usually has a slower recovery than the lower limb. Constrained induced movement therapy (CIMT) has been considered as an upper paretic limb motor function rehabilitation technique that is effective in the functional improvement of this limb. Objective: to investigatethe effectiveness of constrained induced movement therapy in the treatment of paretic upper limb in patients affected by encephalic vascular accident. Method: This bibliographic review was realized by means of research on articles indexed on Scielo, Bireme databases, Capes periodic publications and Latindex. The key words used were, “encephalic vascular accident”, “upper extremity”, “constrained induced movement therapy” and their synonyms. Publications released between 2009 and 2014 were considered. Results and discussion: 1257 articles were initially found, however only six served the criteria of inclusion. The studies in general showed improvement in motor function, ability and overcome of learned nonuse phenomenon, improving the quality and the quantity of movement in the impaired upper limb. Conclusion: It has been evident that despite the results of the CIMT applied in the traditional and modified modes have been proven positive; there is necessity for further studies in this area

KEYWORDS: encephalic vascular accident, upper extremity, constrained induced movement therapy, restricted movement therapy, induced movement therapy and forced use therapy.

EFFICACITÉ DE LA THÉRAPIE CONFINEMENT INDUITE DANS RÉHABILITATION DES MEMBRE SUPÉRIEUR PARÉTIQUE APRÈS UN AVC: REVUE DE LA LITTÉRATURE BRÉSILIENNE.

RÉSUMÉ

Introduction:L'accidentvasculairecérébral (AVC) est l'unedesmaladiesquiaffectelaplupartdesgensaujourd'hui, et l'unedesconséquenceslesplusévidentes est une hémiparésie, avec une plus grande implicationdumembresupérieur, qui a généralement une reprise plus lente que lemembreinférieure. Thérapieconfinementinduite (TCI) a étéconsidéréecomme une techniquepourlaréhabilitationdelafonctionmotricedumembresupérieurparétique, efficacedanslapromotion de l'amélioration fonctionnelle à cemembre.Objectif:Enquêterl'efficacité deconfinementinduitedansletraitementdu membresupérieurparétique chez lespatientstouchés par unaccidentvasculaire cerebral. Méthode:Cetterevue de lalittérature a étéréaliséegrâce à larecherche d'articlesindexésdansScielo, Bireme, Périodique Capes et Latindex. Lesmots-clésrecherchésétaient «accidentvasculairecérébral», «extrémitésupérieure», «confinementinduit par letraitement» et sessynonymes. Publications 2009-2014 ontétéutilisés. Résultatsetdiscussion: 1257 articlesontététrouvésaudépart, mais seu lementsix répondaientauxcritères d'inclusion. Lesétudesanalyséesengénéral, a montré une amélioriationdanslafonctionmotrice, capacité et lasurmonterla non-utilisationappris, augmentantlaqualité et laquantité de mouvementdumembresupérieuratteint. Conclusion: Il est évident que, même si lesrésultats de TCI appliquéesdanslemodetraditionnelle et modifié est positif, ilyaun manque d'étudesbrésiliennesdanscedomaine.

MOTS-CLÉS: accident vasculairecérébral, member supérieur, thérapie de confinement induit, thérapie de restriction, thérapie par le mouvementinduit et thérapied'utilisation force.

EFICACIA DE LA TERAPIA CONTENCIÓN INDUCIDA EN REHABILITACIÓN DE POST-PARÉTICA GOLPE MIEMBRO SUPERIOR: REVISIÓN DE LA LITERATURA BRASILEÑA.

RESUMEN

Introduccion:El acidente vascular encefálico es uma de lainfermidad que mas victimashaceactualmente, siendo que uma de lassecuelas mas evidentes es laparalisis leve que alcanza um lado delcuepo, conmayorfrequenciadel membro superior, que en general tiene una recuperación mas lenta de lo que el membro inferior. La terapia de lacontenciónінducida, (TCI) hay sido considerada una técnica de lareabilitación de lafunción motora del membro superior parético, eficaz enlapromoción de lamejora funcional de esto membro.Objetivo: Investigar eficacia de la terapia contesiónінducidaenel tratamento de los membros superior pareticoen pacientes víctimas por elaccidente vascular encefálico.Método:Esta revisión bibliográfica fue realizada mediante busca de los artículos incluindo índice enla base de informaciónScielo, Bireme, Períodicos Capes y Latindex. Las palavras clave investigadas fueron acidente vascular encefálico, extremidad superior, terapia de lacontenciónінducida y suyassemejanzas. Fueran utilizado publicación de losañosdel 2009 hasta 2014.Resultado y Discursion:Fueranprovenidos inicialmente 1257 artículo, sin embargo solamente6atenderan a loscriterio de lainclusión estabelecida. Los estúdios analisados en general, provanmejorarlafuncíon motora habilidade y superacióndel no uso apreendido, elevar lacualidad y cuantidad de lo movimento del membro superior alcanzados. Conclusión:Quedou aparente que aunquelos resultados del TCI aplicado enel modo tradicional y modificado sea positivo, ha hecho una carencia de losestudiosbrasileños em esta área.

PALABRA CLAVE: acidente vascular encefálico, extremidad superior, terapia de lacontenciónінducida, terapia de larestriccion, terapia de los movimento inducido y terapia del uso forzado.

EFICÁCIA DA TERAPIA DE CONTENSÃO INDUZIDA NA REABILITAÇÃO DO MEMBRO SUPERIOR PARÉTICO PÓS-AVE: REVISÃO DA LITERATURA BRASILEIRA.

RESUMO

Introdução: O acidente vascular encefálico (AVE) é uma das doenças que mais acomete pessoas atualmente, sendo que uma das sequelas mais evidentes é a hemiparesia, com maior acometimento do membro superior, que em geral tem uma recuperação mais lenta do que o membro inferior. A terapia de contensão induzida (TCI) tem sido considerada uma técnica de reabilitação da função motora do membro superior parético, eficaz na promoção da melhora funcional deste membro.Objetivo:Investigar a eficácia da terapia de contensão induzida no tratamento do membro superior parético em pacientes acometidos pelo acidente vascular encefálico. Método: Esta revisão bibliográfica foi realizada através da busca de artigos indexados na base de dados Scielo, Bireme, Periódicos Capes e Latindex. As palavras-chave pesquisadas foram “acidente vascular encefálico”, “extremidade superior”, “terapia de contensão induzida” e seus sinônimos. Foram utilizadas publicações dos anos de 2009 a 2014. Resultados e discussão: Foram encontrados inicialmente1257 artigos, porém apenas 6 atenderam aos critérios de inclusão estipulados.Os estudos analisados em geral, demonstraram melhora na função motora, habilidade e superação do não uso aprendido, aumentando a qualidade e quantidade do movimento do membro superior acometido.Conclusão: Ficou evidente que embora os resultados da TCI aplicados no modo tradicional e modificado seja positivo, há uma carência de estudos brasileiros nessa área.

PALAVRAS-CHAVE: acidente vascular encefálico, extremidade superior, terapia de contensão induzida, terapia de restrição, terapia do movimento induzido e terapia do uso forçado.