BRAZILIAN JOURNAL
BJHBS
OF HEALTH AND
BIOMEDICAL SCIENCES

Review article

Physiotherapy in the acute hospital phase of strokes: A bibliographic review

Fátima S. Ferreira,[1] Natália B. M. de França,[1] Rubens A. Lima,[1] Juliana R. Ferreira,[1] Késsia N. A. Sales[2]*

Abstract

Introduction: Early rehabilitation of patients with strokes is an important component in interdisciplinarity within the hospital environment since, in addition to other interventions. they culminate in early mobilization by removing patients from their beds as soon as possible. Guidelines recommend the start of motor physiotherapy as early as possible, although the results of published studies are still inconclusive as to the relevant benefits of these interventions. Objective: To analyze the importance of the performance of physiotherapists in the acute phase of the stroke in the hospital environment through a narrative review of the literature. Methods: to construct this narrative review, a search of data in the literature was made through consultation of the electronic databases: Scielo, Bireme, Pub Med, Lilacs Google Scholar and specialized books in the field. We excluded any articles that addressed cerebrovascular accidents in the chronic phase and those that were published before the year 2000. Results: The articles analyzed consider that physiotherapy can be considered a great ally in rehabilitation, thus reducing the risks of clinical complications by acting early in the hospital phase of the post-stroke patient. Conclusion: Through early mobilization and the relevance of physiotherapeutic intervention in the prevention of clinical complications, motor gains in the performance of daily life activities (ADLs) and quality of life (QoL) of these patients can be seen.

Keywords: Rehabilitation; Physiotherapy; Stroke; Early intervention.

1. Departament of Fisiotherapy. Pitágoras Faculty. Belo Horizonte, MG, Brazil.

2. Departament of Odontology. Faculty of Basic and Health Sciences. Federal University of Jequitinhonha and Mucuri Valleys. Diamantina, MG, Brazil.

***Corresponding address:**
Rua da Glória, 157
Diamantina, MG, Brazil.
E-mail: sales.kessia@gmail.com

BJHBS, Rio de Janeiro, 2019;18(1):47-54

Recebido em 05/02/2019. Aprovado em 06/06/2019.

Resumo

Fisioterapia no acidente vascular encefálico na fase aguda intra-hospitalar: Uma revisão bibliográfica

Introdução: A reabilitação precoce em pacientes com Acidente Vascular Encefálico (AVE) é um componente importante na interdisciplinaridade no âmbito hospitalar uma vez que além de várias outras intervenções, culminam com a mobilização precoce, retirando o paciente do leito o mais breve possível. As diretrizes recomendam o início da fisioterapia motora o mais precoce possível, apesar de os resultados de estudos publicados ainda serem inconclusivos quanto aos benefícios relevantes destas intervenções. Objetivo: Analisar a importância da atuação do fisioterapeuta na fase aguda do AVE no ambiente hospitalar através de uma revisão narrativa da literatura. Métodos: para a construção dessa revisão narrativa foi feito uma busca de dados na literatura por meio de consulta nas bases de dados eletrônicos: SciElo, Bireme, PubMed, Lilacs, Google Acadêmico e livros especializados na área. Foram excluídos quaisquer artigos que abordassem o acidente vascular encefálico na fase crônica e os que foram publicados anteriormente ao ano 2000. Resultados: Dentre os artigos analisados, a fisioterapia pode ser considerada uma grande aliada na reabilitação, diminuindo assim riscos de complicações clínicas, ao atuar precocemente na fase hospitalar do paciente pós-AVE. Conclusão: Através da mobilização precoce, observa-se a relevância da intervenção fisioterapêutica na prevenção de complicações clínicas, ganhos motores na realização das atividades de vida diária (AVDs) e na qualidade de vida (QV) desses pacientes.

Descritores: Reabilitação; Fisioterapia; Acidente vascular encefálico; Mobilização precoce.

Resumen

Fisioterapia en el accidente vascular encefálico en la fase aguda intra-hospitalaria: Una revisión bibliográfica

Introducción: La rehabilitación precoz en pacientes con Accidente Vascular Encefálico (AVE) es un componente importante en la interdisciplinaridad en el ámbito hospitalario ya que además de varias otras intervenciones, culminan con la movilización precoz, retirando al paciente del lecho lo más pronto posible. Las directrices recomiendan el inicio de la fisioterapia motora lo más temprana posible, a pesar de que los resultados de estudios publicados aún no son concluyentes en cuanto a los beneficios relevantes de estas intervenciones. Objetivo: Analizar la importancia de la actuación del fisioterapeuta en la fase aguda del AVE en el ambiente hospitalario a través de una revisión narrativa de la literatura. Métodos: para la construcción de esta revisión narrativa se hizo una búsqueda de

datos en la literatura por medio de consulta en las bases de datos electrónicos: SciElo, Bireme, PubMed, Lilacs, Google Académico y libros especializados en el área. Se excluyeron cualesquiera artículos que abordasen el Accidente Vascular Encefálico en la fase crónica y los que fueron publicados anteriormente al año 2000. Resultados: Entre los artículos analizados la fisioterapia puede ser considerada una gran aliada en la rehabilitación, disminuyendo así, riesgos de complicaciones clínicas, en la fase hospitalaria del paciente post-AVE. Conclusión: A través de la movilización precoz, se observa la relevancia de la intervención fisioterapéutica en la prevención de complicaciones clínicas, ganancias motoras en la realización de las actividades de vida diaria (AVDs) y en la calidad de vida (QV) de esos pacientes.

Palabras clave: Rehabilitación; Fisioterapia; Accidente vascular encefálico; Movilización precoz.

Introduction

Strokes affect people of all ages, being the leading cause of disability in adults worldwide and the fourth most common cause of death in developed countries.[1] They occur predominantly when an ischemia in the brain occurs due to sudden interruption of local vascularization.[2] Strokes can also occur due to hemorrhages caused by the rupture of a blood vessel and extravasation of blood in the spaces around the brain cells, such that these cells die when they stop receiving oxygen and nutrients through the blood, leading to loss of neuronal functions. The signs and symptoms will depend on the region of the brain that is affected.[3,4] Another form would be a transient ischemic attack (TIA), which is defined as a transient episode of neurological dysfunction without acute infarction.[5]

Ischemic strokes are the most frequent, corresponding to 85% of the cases in the world, while hemorrhagic ones, where there is a situation that is often much more serious, are responsible for 15% of the cases. The main risk factors for cerebral ischemia are: hypertension (main), diabetes mellitus, dyslipidemia, smoking, age (over 50 years), race (black), gender (male), dilated and restrictive heart diseases, valve prosthesis, acute myocardial infarction, atrial fibrillation, positive family history and TIA.[3,6,7]

Hemorrhagic strokes occur by the flooding of the subarachnoid space with blood. The most common cause is spontaneous rupture of a saccular aneurysm that is usually located in arteries of the Wills Polygon, and affects people over 35 years of age. Another cause is arteriovenous vascular malformation that ruptures, which occurs most frequently between 10 and 30 years of age. The most common locations of these aneurysms are in the anterior communicating and posterior communicating arteries at the junction with the internal carotid and at the middle cerebral artery bifurcation.[7] Saccular aneurysms are segmental dilatations of intracranial arteries, mostly located in the Willis Polygon or at the origin of the cerebellar arteries, while also occurring in the anterior communicating artery, followed by the posterior communicant and the bifurcation of the trunk of the middle cerebral. This means that most of the aneurysms responsible for bleeding are in the circulation of the carotid territory and anterior region. The most common manifestations are sudden severe headache, vomiting, syncope and a stiff neck. The episode may occur after physical exertion or sexual intercourse and may progress with lowering of consciousness and entry into coma due to intracranial hypertension.[3,7,8] The risk factors include: age between 35-65 years, smoking, alcoholism, arterial hypertension, positive family history and some genetic syndromes.[4]

Hemorrhagic intra-parenquimatous strokes are acute and spontaneous formations of hematomas in the brain parenchyma. They account for slightly more than half of hemorrhagic strokes. The second most frequent type is subarachnoid hemorrhages, which are more related to arterial hypertension and are being lethal, leading to death in the first few hours or days in most cases. They are caused by ruptures of a vessel located in the cerebral parenchyma that does not communicate with the subarachnoid space.[9]

Several factors predispose one to ischemic and hemorrhagic strokes, including: atrial fibrillation and other diseases of the heart; hypertension; diabetes mellitus; smoking; race; age; alcohol and other drugs; socioeconomic factors; family history; oral contraceptives; sedentary lifestyle; high cholesterol and triglycerides; as well as high levels of homocysteine. Patients may still experience persistent severe headaches; difficulty in swallowing, speaking, or understanding speech; blurred or double vision; dizziness with no defined cause; imbalance and lack of coordination when walking or sudden falls; paralysis; and weakness or numbness of upper limbs, lower limbs or the face on one or both sides of the body.[4,10]

Neuronal cell death occurs in both ischemic and hemorrhagic strokes. When there is an area in the brain

that does not receive blood supply for a certain time, the neuronal cells are in distress until the bloodstream is restored, but if this lasts for a long time (hours), these cells die and cause irreversible damage to the brain.

Strokes have an important impact on the world public health, since they are one of the main causes of neurological incapacities with important motor and cognitive dysfunctions. So, the rapid identification of symptoms is very important for diagnosis and appropriate treatment, because the sooner the treatment begins, the greater the reduction of damage and incapacity.[6]

In the initial phase of the stroke, usually in the first 4 days after admission to hospital, the patient becomes more immobilized, promoting the installation of diverse clinical complications that, consequently, will interfere in functionality and in the development of ADLs.[4,11] Based on this context, what should be the role of physiotherapy in the hospital approach during the acute phase?

Currently, early mobilization has been recommended in the therapeutic approach to patients, since this can prevent or reduce the complications resulting from the disease.[12] Therefore, one must analyze the impact of physiotherapy on patients of such events and assess the feasibility and benefits that this practice could provide.[13]

In these patients, physical therapy is seen as highly relevant to the treatment of the symptoms and changes resulting from these events and to restore functions that have been totally or partially lost, reducing sequelae and promoting an improvement in QoL. The improvement of the functionality of these patients is the responsibility of the physiotherapy service, which in turn must establish early rehabilitation strategies and pay attention to the patient's most important needs in order to achieve a positive functional response.[8,13]

The present study aims to verify through a literature review of the narrative focus, the relevance of early mobilization in patients with strokes, the most effective physiotherapeutic methods for treatment and their application.

Literature review

Strokes are manifestations in which there is an interruption of blood flow to the brain, which can cause cellular lesions and alterations in the neurological functions.[14] They are a disorder that affects the central nervous system, either by an interruption of blood flow, causing a lack of oxygen in the brain for at least five minutes, leading to death of neuronal cells, often generating loss of function, leading to language disturbances, loss of balance or coordination, visual disturbances, as well as loss of anal and bladder sphincter control. They may also be due to cerebral hemorrhages, a blood vessel rupture and extravasation of blood in the local neuronal cells, whose basic causal mechanism is the hyaline degeneration of cerebral intraparenchymal arteries. Strokes are the main manifestations associated with systemic arterial hypertension.[8,15,16]

Post-stroke patients may present motor and sensory deficits, such as decrease in the mobility of upper and lower limbs contralateral to the injury, proprioceptive and motor changes, hyporeflexia or hyperreflexia, spasticity, paresis, apraxia, changes in gait, balance, communication and perception. The most important motor deficit leading to muscle tone modification is hemiplegia (paralysis of one side of the body) and hemiparesis (difficulty in moving one side of the body).[3,8]

The clinical condition presented by the patients is determined by aspects such as: (a) area of the lesion; (b) type of stroke; (c) location; (d) extension of the lesion. Therefore, one must observe the first symptoms, the rapidity of their evolution and, based on the identification of the lesion, to draw up the best treatment and the behavior to be adopted.[17]

Acute phase of stroke

In ischemic strokes, acute arterial occlusion is most often caused by a thrombus from an area that is distant from the affected site, which may be the heart or an extra-cranial artery, such as the carotid, aorta or vertebral, which follows the blood flow and obstructs an artery of smaller caliber, which is called an embolism. Ischemia can also be caused by a thrombus formed on the atheroma plaque in the clogged artery itself, called atherothrombosis.[18]

It has been recommended that any patient with focal neurological deficit, such as dizziness, nystagmus, hemiplegia and other conditions, which last for more than 15 minutes should be admitted to the hospital immediately, so that vital signs can be monitored and evaluated promptly by a multidisciplinary team, so the event is quickly identified through clinical examinations and the correct therapy can be applied in order to minimize brain damage.[4,18]

According to Ratton, (2005)[4] there are many ways to diagnose strokes. The diagnosis is initially based on the patient's clinical history and his / her reports; or through clinical exams, imaging, metabolic

exams, among others, which leads to confirmation of the diagnosis so that the best intervention can be performed as early as possible, avoiding or minimizing subsequent complications.

The occurrence of complications, such as urinary tract infections, pressure ulcers and pneumonia, in hospitalized patients in whom a stroke may be present is related to age, length of hospital stay, and the presence of invasive devices.[19]

Epidemiology

Brain strokes are one of the leading causes of death and sequelae. The World Health Organization (WHO) estimates that strokes will be the world's second-leading cause of death by 2030, accounting for 12.2% of predicted deaths in that year.20 In Brazil, there are approximately 68,000 deaths from the disease each year, being the leading cause of death and disability in the country, generating significant economic and social impacts, which makes the governments consider new measures to fight the disease, working mainly in prevention, since 90% of cases are avoidable. Because of this, the so-called "Stroke Care Line" was created in emergency care networks and emergencies covering various sectors, including residential care and rehabilitation programs.[6,8]

Treatment of strokes in the acute phase

In general, the treatment for the control and prevention of strokes aims to reduce or prevent the occurrence of damage, in order to promote a good functional recovery after the episode and avoid its recurrence. It should be emphasized that bed restriction may favor the installation of clinical and functional secondary complications. Early mobilization involves withdrawal of the patient from the bed within 24 hours after the event in order to reduce secondary complications.[8,21]

Still according to Gobbato (2013),[21] rehabilitation in an acute AVE begins by a comprehensive and fast evaluation, so that the treatment becomes precocious and efficient. The functional independence of individuals is important in the rehabilitation process, since their goal, along with that of the therapist, is to return to their ADLs.

According to Teasell et al. (2003),[22] strong evidence exists that early care of strokes is associated with a reduction in the number of deaths and with independence after hospital discharge. Early mobilization can be focused through sitting positions and in orthostatism, in addition to gait training. Physical therapy plays an important role in the creation of strategies for early rehabilitation, focusing on the functional changes and the objective of each patient according to his or her prognosis.

According to The European Stroke Organization,[24] the treatment of strokes consists of a mix of acute care and early physiotherapeutic rehabilitation, which has proved successful in reducing the number of deaths, physical dependence and hospitalization, as well as in improving the functionality of the individuals affected by such an event. For effective treatment, an agile, coordinated, multidisciplinary team with specialization in the care of patients with stroke is necessary.

Regardless of which type of stroke the patient presents on admission to the emergency department, he or she should be evaluated by a multidisciplinary team, including a physiotherapist recognized by Resolution-COFFITO n° 501, qualified to work in healthcare in emergency units. In this way, these professionals can jointly provide constant management and monitoring to minimize the sequelae of the injury caused by the acute event. Physiotherapeutic, including motor (active or passive), rehabilitation in these patients should be started, preferably, within the first 24-48 hours, and be performed daily. The earlier rehabilitation starts, the better the recovery and the less cerebral changes and complications will result from the event.8,9 In addition, rehabilitation brings benefits to the musculoskeletal and circulatory system, with long-term functional improvement and reductions in severe complications when compared to conventional therapy.[8]

Objectives of physiotherapy in the treatment and rehabilitation of acute strokes

The acute phase becomes the best time for physiotherapeutic intervention, because it is when one has the greatest window of opportunity to rescue the neurons that have not yet died or to create new connections in place of those who have died, which must be done in a gradual and progressive way, depending on the clinical conditions of the patient. This requires great attention on the part of the team, with pre-established admission criteria and special attention to acute treatment and the earliest possible functional and social rehabilitation.[9,25,26]

In the acute phase of the in-hospital stroke, physiotherapeutic rehabilitation aims to maintain airway permeability, as well as to make a rapid evaluation of motor function, sensory and functional changes, in order to guide the therapy. The role of physical therapy is also to make individuals who have

disabilities, changes in functional movements, changes in communication, difficulty in understanding, seeing, mental and psychological confusion, return to their functionality within the individuality of each person, through therapeutic mechanisms that should be focused on the difficulty of each patient. Physical therapy should be started as soon as possible, in the first days after the event, together with a family member, in order to avoid complications secondary to immobility, such as infections, pneumonia, deep vein thrombosis, pulmonary embolism, among others.[27,28]

Early physiotherapy in patients with strokes

Physical therapy is an important component in the approach to patients with strokes, so specialists in this field should be part of the nucleus of professionals who follow these individuals.[29] The incapacity generated by strokes and the consequences to the daily life functions of this population help to intensify the search of information on the best therapeutic measures for rehabilitation and consequent improvement of QoL.[30]

Motor activity is a major item to be worked on in these patients, since it contributes to their recovery and their fast return to ADLs, whereas bed rest, in addition to the time required, can be detrimental to a fast return.[8,30]

In the initial phase of the event, the restriction of patients to their beds can favor the installation of clinical complications that will interfere in their functional performance and ADLs. In recent years, early mobilization has been a leading choice in the prevention of complications from strokes. The physiotherapist aims to establish strategies for early rehabilitation and meet the main needs of the patient for a good functional recovery.[17]

Acute stroke care is characterized by fast evaluation and early treatment. There is strong evidence associating the reduction in the number of deaths, dependence and need for institutionalization after hospital discharge with the care of the patient in the acute phase of the event.[22]

The rehabilitation of these individuals in the acute in-hospital phase is aimed at improving and / or maintaining physical, intellectual, psychological and social functions, even if they already have some degree of disability, and should be initiated in the first days after the brain event as soon as possible.[28,31]

The study by Bernhardt et al. (2004)[32] on the feasibility of early mobilization found that bed rest did not bring any benefit. In contrast, early mobilization in the patients studied showed benefits in most cases.

Immobility can pose major risks of complications and death, depending on the patient's clinical conditions, so early mobilization has been introduced as part of the initial treatment of stroke patients.

The performance of physiotherapy in the treatment of acute strokes

According to several authors, the possibilities of therapeutics and their results vary according to the prognosis of each patient. Table 1 presents the practice of this intervention and its results:

Types of early mobilization after strokes

Most of the studies presented in Table 1 did not describe the best protocol of intervention during early mobilization.

Some authors affirm that any activity performed outside the bed can be considered to be an early mobilization, such as staying in orthostatism or sitting somewhere outside the bed at least twice a day.[13,32,33]

Valente et al. (2006)[34] carried out a study with 8 patients with acute stroke where the physiotherapy integrated passive mobilization, stretching, sensitivity stimulation and function training such as: sitting out of bed, standing, making functional activities throughout the day to stimulate memory and assist in motor relearning.

In their study with 13 patients with stroke, Escarcel et al. (2010)[35] used the maintenance of postures such as: sitting without support, standing with and without support support, standing on the healthy leg and then on the paretic leg. Change of postures like: sitting to standing, and standing to sitting; sitting on the edge of the bed for supine, supine for the edge of the bed; supine to the affected side and supine to the unaffected side; in the standing position, pick up an object on the ground.

Peter et al. (2007)[36] recommend physiotherapy, but say that the way it should be is performed is not clear. However, rehabilitation is recommended based on a good patient assessment. These authors point to scientific evidence on the use of functional electrical stimulation, muscle strength training without spasticity, gait training, aerobic training and induced restraint therapy. Although no consensus exists on the type of physiotherapeutic activity, it is recommended that rehabilitation be performed based on a good evaluation of the patient.

In relation to early mobilization, Mateus et al. (2017)[8] showed that the best effects of early mobilization occur when it is performed within 24

Table 1. Studies involving the performance of physiotherapy through early mobilization in the in-hospital phase in individuals with strokes

Author	Goals	Materials and methods	Results
Silva *et al.* (2013)	Systematization of the efficacy of early mobilization in the clinical complications observed in patients hospitalized for treatment of strokes.	Review of 10 articles published between 2006 and 2012, addressing early mobilization after strokes.	In the analysis of the articles, there was consensus regarding the efficacy of early mobilization in the prevention of clinical complications in patients hospitalized for treatment of strokes.
Escarcel *et al.* (2010)	Evaluation of postural control of patients hospitalized for stroke at the São Francisco de Paula University Hospital close to hospital discharge.	13 patients were evaluated after acute strokes, with a mean age of 59.54 ± 9.76 years.	Showed that most patients presented good postural control close to hospital discharge.
Valente *et al.* (2006)	Evaluation of whether physiotherapy in a hospital environment improves the function of the upper limb affected in patients after strokes. The secondary goals were to assess the muscle strength and sensitivity of this limb.	A study of 8 patients diagnosed with ischemic stroke who received standardized physiotherapy twice a day for the upper limb during the period of hospitalization in the Hospital São Paulo.	All patients with paresis motor showed improved strength secondary to the enhancement of function.
Gobbato (2013)	Evaluation of the benefit of early stroke mobilization in the first 48 hours, compared with routine motor physical therapy in the Porto Alegre hospital.	Randomized clinical trial with 37 patients with onset of stroke symptoms, divided into 2 groups, initiating early mobilization in the first 24 to 48 hours, or routine hospital physiotherapy by analyzing the risks and clinical complications secondary to mobility and immobility, functional improvement and hospitalization time.	There were no statistically significant differences between the two groups regarding the proportion of complications, mortality and functional results, but the recovery of the group receiving early mobilization was better.
Bernhardt *et al.* (2007)	Evaluation of early rehabilitation with an emphasis on how mobilization contributes to better post-stroke outcomes.	Randomized controlled trial with patients recruited from 2 stroke units in Melbourne.	The study concluded that very early treatment in patients with acute stroke is safe and feasible.
Mateus *et al.* (2017)	Identification of the repercussions of early mobilization compared to conventional therapy in patients after strokes in the hospitalization period.	Systematic review involving 7 studies developed during the outpatient rehabilitation phase of stroke patients published between 2012 and 2016.	Despite the lack of standardization of care, early mobilization in the first 24 hours after stroke brings long-term benefits and reduces severe complications, being more efficient than conventional therapy.

hours after the admission of patient, with benefits for the musculoskeletal and circulatory system, as well as long-term functional improvements and a reduction in serious complications. Silva, et al., (2013),[17] in their review of the literature on the effects of early mobilization on the clinical complications of the post-stroke patient, were able to provide evidence of safety and viability through articles with degree of evidence A and B approach in these individuals. In his pilot study, Gobbato (2013)[21] pointed out that early mobilization was safe, and that no differences existed between the two groups with regard to mortality and the number of falls in three months, with no clinical complications or neurological worsening during the intervention.

Conclusion

In recent years, many studies have been conducted on the efficacy of early stroke mobilization by addressing the various types of practice used to perform patient rehabilitation, providing a scientific basis to ensure this practice in the functional recovery of the individual. Although many authors are unable to reach a consensus on the best protocol to be used, this study demonstrates that most authors confirm the safety and viability of early mobilization and make it an important part of the patient's rehabilitation process after a stroke.

These same authors also suggest further studies on the subject, since this practice has already become part of the protocol of many emergency units in various parts of the world.

Physical therapy plays an important role in the rehabilitation of patients in the acute phase within the emergency treatment protocol of stroke units, enabling a full or partial return to functionality of the patient, his or her return to the ADLs and an improvement in the QoL. Patients must be fully managed by a multidisciplinary team in which all professionals interact and communicate with each other, developing the best care and best protocols, while respecting the field of specialization of each professional.

Referências

1. Hoffman R, Benz EJ, Heslop H. Hematology. 7. Ed. Elsevier; 2017. p. 2133-2141.
2. Binder MD, Hirokawa N, Windhorst U (Ed.). Encyclopedia of neuroscience. 2009. p. 573-578.
3. Spence DJ, Bernatt JMH. Acidente Vascular Cerebral: Prevenção, Tratamento e Reabilitação. 1. ed. Porto Alegre: Amgh Editora; 2013.
4. Ratton, JL. Emergências Médicas e Terapia Intensiva. 1. ed. Rio de Janeiro: Guanabara Koogan; 2005.
5. Easton JD, Saver Jl, Albers GW, et al. Definition And Evaluation Of Transient Ischemic Attack: A Scientific Statement For Healthcare Professionals From The American Heart Association/American Stroke Association Stroke Council. Stroke. 2009;40:2276.
6. Datasus [Internet]. Brasília (DF): (Departamento de Informática do Sistema Única de Saúde). Ministério da Saúde; 2016 [acesso em jun 2019]. Disponível em: <http://datasus.saude.gov.br/nucleos-regionais/sao-paulo/noticias-sao-paulo/666-datasus-e-fonte-para-pesquisa-inedita-sobre-avc-realizada-pelo-curso-de-fisioterapia-da-universidade-do-oeste-paulista-unoeste>
7. World Health Organization. (WHO). Disability and Rehabilitation Team. Promoting independence following a stroke: a guide for therapists and professionals working in primary health care. 1999. 120p.
8. Mateus AP, Ruivo EAB, Brito WA, et al. Mobilização precoce intra-hospitalar em pacientes após acidente vascular cerebral: revisão sistemática. Arq. Ciênc. Saúde. 2017 jul-set;24(3):08-13.
9. Miranda RCAN, Massaud RM, Silva GS. Acidente Vascular Cerebral - Prevenção, Tratamento Agudo e Reabilitação. 1. ed. Atheneu; 2015. 336p.
10. Vilaça CO, Freitas MR, Nascimento OJ, et al. Metabolismo da homocisteína em doenças neurológicas. Rev. bras. neurol. 2015;51(3):73-8.
11. Indredavik B, Rohweder G, Naalsund E, et al. Medical complications in a comprehensive stroke unit and an early supported discharge service. Stroke. 2008 Feb;39(2):414-20. Epub 2007 Dec 20.
12. Winstein CJ, Stein J, Arena R, et al. Guidelines for adult stroke rehabilitation and recovery: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke. 2016;(47)6:e98-e169.
13. Bernhardt J, Chan J, Nicola I, et al. Pouca terapia, pouca atividade física: reabilitação dentro dos primeiros 14 dias de cuidados da unidade de AVC organizado. J Rehabil Med. 2007;39(1):43-48.
14. Marques OS, Nogueira SPBO. Efeitos da Eletro-estimulação funcional e Kabat na funcionalidade do membro superior hemiparético. Revista Neurociências. 2011;19(4):694-701.
15. Rolim CL, Martins M. Qualidade do cuidado ao aci¬dente vascular cerebral isquêmico no SUS. Cad saúde pú¬blica [periódico na internet]. 2011:2106-16.
16. Smeltzer SC, Bare BG. Brunner & Suddarth/Tratado de Enfermagem médico-cirúrgica. 12. ed. Rio de Janeiro: Guanabara Koogan; 2012. 2238p.
17. Silva DCS, Nascimento CF, Brito ES. Efeitos da Mobili¬zação Precoce nas Complicações Clínicas Pós-AVC: Revisão da Li¬teratura. Rev. neurociênc. 2013;21(4):620-627.
18. Ferro J, Pimentel J. Neurologia Fundamental: princípios, diagnóstico e tratamento. Lisboa: Ed. Lidel. 2006. p.256.
19. Melo LS, Emerick LM, Alves PN, et al. Acidente vascular cerebral: achados clínicos e principais complicações. Revista de Atenção à Saúde (antiga Rev. Bras. Ciên. Saúde). 2016;14(48):48-53.
20. World Health Organization. (WHO). Health statistics and information systems – Projections of mortality and causes of death, 2015 and 2030. [Internet]. Geneva; 2013. Disponível em: <http://www.who.int/healthinfo/global_burden_disease/projections/em>.
21. Gobbato SRR. Ensaio Clínico Randomizado de Mobilização Precoce no AVC Isquêmico Agudo Comparado com Fisioterapia Motora de Rotina. Dissertação (Mestrado em Medicina) - Faculdade de Medicina, Universidade Federal do Rio Grande do Sul, Porto Alegre. p.27, 2013.
22. Teasell RW, Foley NC, Bhogal SK, et al. Evidence-Based Review of Stroke Rehabilitation. Top Stroke Rehabil. 2003;10(1):29-58.
23. AVERT Trial Collaboration group. Efficacy and safety of very early mobilisation within 24 h of stroke onset (AVERT): a randomised controlled trial. Lancet. 2015;386;9988:46-55.
24. The European Stroke Organization (ESO), Executive Committee, ESO Writing Committee. Guidelines for Management of Ischemic Stroke and Transient Ischemic Attack. Cerebrovasc Dis. 2008;25:457-507.
25. Murphy TH, Corbett D. Plasticity during stroke recovery: from synapse to behaviour. Nat Rev Neurosci. 2009;10:861-72.

26. Krakauer JW, Carmichael ST, Corbert D, et al. Getting neurorehabilitation right: what can be learned from animal models? Neurorehabil Neural Repair. 2012;26(8):923-931.
27. Stroke Unit Trialists' Collaboration. How do stroke units improve patient outcomes? A collaborative systematic review of the randomized trials. Stroke. 1997;28:2139-44.
28. National Stroke Foundation. Clinical guidelines for the acute stroke management. Stroke Foundation. Melbourne: National Stroke Foundation; 2007[acesso em jul 2019]. Dispoível em: <https://strokefoundation.org.au/-/media/58CC3729F-33C452B85F5B408D4971C81.ashx?la=en>
29. Aminoff MJ, Boller F, Swaab DF. Handbook of clinical neurology. Elsevier; 2013. p. 427-433.
30. Askim T, Bernhardt J, Salvesen O, et al. Physical activity early after stroke and its association to functional outcome 3 months later. J Stroke Cerebrovasc Dis. 2014;23(5):305-312.
31. World Health Organization. International Classification of Functioning Disability and Health. Geneva: World Health Organization; 2001. Disponível em: http://www.who.int/classifications/icf/en.
32. Bernhardt J, Dewey H, Thrift A, et al. Inactive and Alone: Physical Activity Within the First 14 Days of Acute Stroke Unit Care. Stroke. 2004 Apr;35(4):1005-9. Epub 2004 Feb 26.
33. Bernhardt J, Dewey H, Thrift A, et al. Very Early Rehabilitation Trial for Stroke (AVERT) - Phase II Safety and Feasibility. Stroke. 2008 Feb;39(2):390-6.
34. Valente SCF, Paula EB, Abranches M, et al. Resultados da fisioterapia hospitalar na função do membro superior comprometido após acidente vascular encefálico. Rev. Neurociência. 2006;14(3):122-126.
35. Escarcel BW, Müller MR, Rabuske M. Análise do controle postural de pacientes com AVC Isquêmico próximo a alta hospitalar. Rev. Neurociência. 2010;18(4):498-504.
36. Ringleb PA, Bousser M-G, Ford G, et al. Recomendações para o Tratamento do AVC Isquêmico e do Acidente Isquêmico Transitório 2008. Sociedade Europeia do AVC, a European Stroke Organization (ESO). 2007:19-20/67-76.
37. AVERT Trial Collaboration group. Efficacy and safety of very early mobilisation within 24 h of stroke onset (AVERT): a randomised controlled trial. Lancet. 2015;386(9988):46-55.