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## Importância da mobilidade para tetraplégicos e paraplégicos: implementação dos conhecimentos de enfermagem no cuidar multidimensional

Importance of mobility for quadriplegics and paraplegics: implementation of nursing knowledge in care multidimensional

Importancia de movilidad para tetraplégicos y paraplégicos: aplicación del conocimiento en enfermería en el cuidado multidimensional

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## ABSTRACT

**Objective:** To conduct a search of published scientific works about the importance of exercise in promoting multidimensional care for the paraplegic or quadriplegic individual, as well as to investigate the knowledge of nursing about the benefit of such activities and to clarify the role of the nurse in assisting the person paraplegic or quadriplegic. **Methods:** This is an integrative review, conducted in the databases LILACS, SciELO, MEDLINE, BDEF e CAPES portal, corresponding to the years from 2004 to 2014. **Results:** Patients affected by spinal cord injury have deficits of care and self-care. Thus it was found that exercise offers many benefits including biopsychosocial. **Conclusion:** It was observed that the practice of physical exercise does not yet have effectiveness, however, it is important that nurses know about these benefits to guide the patients' family members in the provision of quality care.

**Descriptors:** Healthcare, Exercise, Paraplegia, Quadriplegia, Nursing care.

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## RESUMO

**Objetivo:** Realizar uma busca das produções científicas publicadas a respeito da importância dos exercícios físicos na promoção do cuidar multidimensional ao indivíduo paraplégico ou quadriplégico, assim como investigar os conhecimentos da enfermagem sobre o benefício de tais atividades e esclarecer a atuação do enfermeiro na assistência a pessoa paraplégica ou tetraplégica. **Métodos:** Trata-se de uma revisão integrativa, realizada nas bases de dados LILACS, SciELO, MEDLINE, BDNF e portal da CAPES, correspondendo aos anos de 2004 a 2014. **Resultados:** Os pacientes acometidos por lesão medular apresentam déficits de cuidado e autocuidado. Dessa maneira, constatou-se que a prática de exercícios oferece diversos benefícios incluindo os biopsicossociais. **Conclusão:** Percebe-se que a prática dos exercícios físicos ainda não tem sua efetivação, contudo é importante o conhecimento da enfermagem sobre estes exercícios, bem como benefícios, a fim de nortear os familiares e prestar uma assistência de qualidade.

**Descritores:** Assistência à saúde, Exercício, Paraplegia, Quadriplegia, Assistência de enfermagem.

## RESUMEN

**Objetivo:** Realizar una búsqueda de trabajos científicos publicados sobre la importancia del ejercicio en la promoción de la atención multidimensional para el individuo parapléjico o tetrapléjico, así como investigar el conocimiento de enfermería sobre el beneficio de tales actividades y aclarar el papel de la enfermera en la asistencia a la persona parapléjico o tetrapléjico. **Métodos:** Se trata de una revisión integradora, llevado a cabo en las bases de datos de las LILACS, SciELO, MEDLINE, BDNF y portal CAPES, correspondientes a los años de 2004 a 2014. **Resultados:** Los pacientes afectados por lesiones de la médula espinal tienen déficit de atención y cuidado de sí mismos. Así, se encontró que el ejercicio ofrece muchos beneficios, incluyendo biopsicosociales. **Conclusión:** Se observó que la práctica de ejercicio físico aún no ha su eficacia, sin embargo, es importante que las enfermeras saben acerca de estos beneficios para orientar sus familiares y proporcionar una atención de calidad.

**Descriptorios:** Cuidado de la salud, Ejercicio, Paraplejia, Cuadriplejia, Cuidados de enfermería.

## INTRODUCTION

Health sciences have expanded mechanisms and care to ensure the right to quality of life and to enable social inclusion, regardless of the individual's health status. A public particularly worth mentioning are the individuals with special needs, because they have higher physical, psychological and social repercussions.

The Ministry of Health considers disability as any loss or abnormality of a psychological, physiological or anatomical structure and/or function that generates incapacity to perform activities within the standard considered normal to humans.<sup>1</sup> The National Health Policy for Individuals with Disabilities classifies special needs into five categories: motor, visual, auditory, mental and multiple disabilities, the last constitutes the presence of two or more deficiencies in the same individual.<sup>1</sup>

In Brazil, the most recurrent incidence is motor deficiency, caused mainly by spinal cord injury. Spinal

cord injuries can have different etiologies, of these, 80% are traumatic in origin, arising from firearm, cold steel, car accidents, sports and falls. The other 20% originate from non-traumatic causes, mainly by tumor, infectious, vascular and degenerative causes.<sup>2</sup>

Among the cases of spinal cord injury, representing a greater biopolitical, social and emotional impact, are the cases of quadriplegia, defined as lesions above the first segment of the thoracic vertebra (T1), affecting the upper body, upper and lower limbs, and paraplegia which are compromising injuries of spinal cord segments below T1, affecting the upper body and lower limbs.<sup>3</sup>

People with physical and functional disabilities have, especially, psych-biological needs of posture and locomotion compromised, interfering with all the physiological functioning of the body, reflecting on both emotional and social factors. These locomotion and exercise needs should also be understood as integrant factors to the physiological needs of each individual, being essential to improving their quality of life (QOL), passively or induced. Even if physical capacity is largely determined by unchangeable factors, such as age and level of injury, the changing aspects such as the physical fitness and body composition, suffer significant and positive influences to the implementation of physical activity programs performed in a systemic manner.<sup>4</sup>

Patients with tetraplegia and paraplegia consequently have the suppression of several basic human needs. Multidisciplinary care becomes an indispensable tool for quadriplegics and paraplegics, for it is a service that does not emphasize only a specific area, but the development of a care plan involving the multidisciplinary involvement with the physical educator, nutritionist and physiotherapist, so that with competence the public can be fully assisted.

It is important to highlight the role of nursing in this care sphere, given the assumption of Wanda Horta de Aguiar, which considers nursing as a science that provides care to the human being and not their illness or imbalance.

Nursing should have a more comprehensive approach by seeking knowledge of the importance of daily implementation of mobility and exercise needs, both to implement them, and to guide families on how to execute them, seeking to update their knowledge on a daily basis, due to the constant evolution of hospital and home equipment geared to the specificity of the patient, and partner up with other professionals, thereby allowing a planned and systematic care, thus, meet the patient and/or family in its entirety and in a humanized way.<sup>5,6</sup>

The lack of implementation of nursing care in need of movement and exercise is evidenced by the absence of curriculum matrices regarding special patient mobility and by the fact that the class of nurses is not commonly considered responsible for such assistance.<sup>6</sup> This statement confirms the importance of the study, which aims to provide subsidies for the enrichment of nursing professionals about

the importance of meeting the basic needs of movement and exercise.

In this context, the study aims to conduct a search of published scientific works about the importance of exercise in promoting multidimensional care to the individual paraplegic or quadriplegic, as well as to investigate the knowledge of nursing for the benefit of such activities and to clarify the nurse's role in assisting the person para or quadriplegic, based on the implementation of the practices of movement and mobility, associated with exercise.

## METHODS

The study deals with an integrative review, which aims to gather knowledge about a specific topic in a systematic and orderly manner, allowing to increase the knowledge about a particular studied area.<sup>7</sup> Thus, allowing the realization of a synthesis of research and information published and related to the theme in question, as well as critical reflection on the results, aiming to reach relevant conclusions.

To operationalize this review, the following steps were used: definition of the goal of the integrative review, definition of criteria for the selection of the sample, gathering of information to be extracted from selected articles, analysis of results, presentation and discussion of results.<sup>8</sup>

Data collection was performed through online search of national and international journals, from 2004 to 2014, on the multidimensional care of nursing, in particular, the locomotion and exercise needs. The search of the journals was through the periodic portal of Higher Education Personnel Improvement Center (CAPES), Latin American and Caribbean Health Sciences (LILACS), Scientific Electronic Library Online (SciELO), Nursing Databases (BDENF) and Medical Literature Analysis and Retrieval System Online (MEDLINE).

The criteria for the selection of the sample were established as: full articles availability; published in the last 11 years, that is, including the years 2004-2014; having as main subject the one expressed by the descriptor; edited in Portuguese, English and/or Spanish. The descriptors used in the search in the Descriptors in Health Sciences (DeCS) were "Paraplegia", "Quadriplegia", "Self-Care" and "Exercise". It was preferred to use the two types of spinal cord injury to enlarge the list of subjects covered, given the low rate of production involving the themes alone and thus allowing a better approach to the theme.

Initially using the descriptor "Self Care" search resulted in 4,394 articles before the adding of the inclusion criteria, of these, 1,418 were in the CAPES periodic portal, 2,064 in the LILACS electronic database, 274 in SciELO and 638 in BDENF. Regarding the descriptor "Exercise" 5,373 articles were found, 2,076 in the CAPES periodic portal, 2,204 in the LILACS electronic database, 997 in SciELO and 96 in BDENF. With regard to the descriptor "Paraplegia", it yielded 46,058 articles being, 45,453 in the CAPES periodical portal,

473 LILACS electronic database, 108 in SciELO and 24 in BDENF. Regarding the descriptor "Quadriplegia" 7,837 articles were reached, with 7,658 in the CAPES periodic portal, 138 in LILACS, 35 in SciELO and 6 in BDENF.

Then, refining the descriptors from the inclusion criteria described above, the following results were found: 694 articles relating to "Self-Care" being 177 in the CAPES periodic portal, 224 in LILACS, 35 in SciELO and 258 in BDENF; "Exercise" showed 1,615, with 98 in the CAPES periodic portal, 580 in LILACS, 898 in SciELO and 39 BDENF; "Paraplegia" resulting in 478 articles, of which 286 in the CAPES periodicals portal, 128 in LILACS, 61 in SciELO and 3 in BDENF and last "Quadriplegia" featuring 474 articles, and 396 in the CAPES periodicals portal, 52 in LILACS, 25 in SciELO and 1 in BDENF.

Noting a large number of journals with different approaches that do not always express the central idea of the content proposed by this study, we chose to carry out the cross between the four evenly descriptors in each of the electronic databases, believing that this way a more relevant result would be achieved. The descriptors were alternated as follows: "Paraplegia AND Exercise" in LILACS database, obtaining 6 articles, 2 articles in SciELO and 3 in CAPES periodic portal; "Tetraplegia AND Exercise" met two articles in LILACS; "Quadriplegia AND Selfcare" located two articles in Capes, 3 in LILACS and 2 in BDENF; "Paraplegia AND SelfCare", identified 2 articles in SciELO, 3 in LILACS, 2 in BDENF and 1 in CAPES.

Given the low sample size, it was decided, to make the crossing with the descriptors "Quadriplegia AND Exercise AND Selfcare", in the MEDLINE database, which resulted in two articles.

Of the crossing described above, 30 articles were gathered; however, after a thorough reading, it was noticed that only 27 fit the proposed theme. It was also noted that of the 27 articles, 10 were indexed in more than one database, excluding them from their repetitions, counting it only once, the total sample was reduced to 16 articles.

To analyze the content of publications a data collection instrument addressing the following variables was developed: the object of study, year of publication, professional category of authors, methodological approach, keywords, types of covered exercise and its scope in the different levels of functional disability, levels of spinal cord and/or nerve damage, as well as knowledge of nursing and evidence of the benefits from such knowledge.

After collecting the articles, there was a critical and reflective reading of the journals in a persistent and comprehensive way to evaluate the data in order to identify the most significant information for an in-depth study, providing the basis for the necessary discussions and later conclusions that allowed formulating the present study.

## RESULTS AND DISCUSSION

At first, the articles were characterized according to the year of publication, covering the period 2004-2014, database, language, journal and type of study. For better visualization of the results, the picture was categorized into publications that addressed paraplegia, quadriplegia and publications that addressed both categories simultaneously demonstrated in synthesis through Figures 1, 2 and 3.

**Figure 1** - Description of selected articles from 2004 to 2014, according to year of publication, database, language of publication, journal's name, type of study and category of paraplegia

Category	Article	Year	Database	Language of Publication	Name of periodic	Type of study
PARAPLEGIA	Article 1	2004	LILACS	Portuguese	Rev Bras Educ Fís Esp	Case
	Article 2	2006	LILACS	Portuguese	Arq Neuropsiquiatr	Research
	Article3	2007	BDENF	Portuguese	Acta Paul Enferm	Semi-experimental study
	Article 4	2008	CAPES	Portuguese	Rev Bras Med Esporte	Research
	Article 5	2010	LILACS	Portuguese	Rev Bras Med Esporte	Literature review
	Article 6	2011	SciELO	English	Rev Bras Med Esporte	Study
	Article 7	2013	BDENF	Portuguese	Rev Enferm UFSM	Quantitative approach

Source: Research data, in 2014.

**Figure 2** - Description of selected articles from 2004 to 2014, according to year of publication, database, language of publication, journals name, type of study and category of quadriplegia

Category	Article	Year	Database	Language of Publication	Name of Periodic	Type of Study
Quadriplegia	Article 8	2005	MEDLINE	English	Journal of Neurological Physical Therapy	Clinical Case
	Article 9	2010	BDENF	Portuguese	Rev Esc Enferm USP	Research
	Article 10	2010	LILACS	Spanish/Portuguese	J Bras Pneumol.	Research
	Article 11	2012	LILACS	English	Arq Neuropsiquiatr	Research

Source: Research data, in 2014.

**Figure 3** - Description of selected articles from 2004 to 2014, according to year of publication, database, language of publication, journal name, type of study and crossing categories of paraplegia and quadriplegia

Category	Article	Year	Database	Language of Publication	Name of the Periodic	Type of Study
PARAPLEGIA E QUADRIPLÉGIA	Article 12	2008	CAPES	Portuguese	Saúde Coletiva	Research
	Article 13	2008	MEDLINE	English	Arch Phys Med Rehabil	Prospective Study
	Article 14	2010	LILACS	Spanish	Rehabil. Integral	Research
	Article 15	2011	CAPES	English	Arq Neuropsiquiatr	Transversal Study
	Article 16	201	SciELO	Portuguese	Fisioter Mov	Research

Source: Research data, in 2014.

It was found through the analysis of the obtained studies, the predominance of publications in 2010, with five articles. By contrast, in 2013 we found only two articles, highlighting the lack of recent studies on the subject. This evidence may reflect the lack of interest of both governments and professionals, one for not encouraging research in the area, the other, regarding nurses, due to the fact that the majority of the articles found are mostly of the sports area and physical therapy.

Regarding the publication language of the articles, the Portuguese language stood out with nine publications, showing an improvement in Brazilian research, however, it is necessary greater investment in research and longing for knowledge of the particularities of this fragile public.

Research shows a predominance of studies involving paraplegia, demonstrating the need for further studies that reinforce the published research, also highlighting the benefits of exercise for quadriplegics.

Any injury that alters the neurological or spinal cord function is configured as a serious damage by causing complete or incomplete compromise of sensitive and responsive ways, interfering with the integration of muscle reflexes, resulting in numerous sensory-motor sequels.<sup>2</sup>

It is noteworthy that the treatment for this group of patients with disabilities should be optimized, enabling a more active lifestyle, particularly among quadriplegics. However, prior to determining an appropriate plan for increasing physical activity, a research about the changes in activity level is relevant, allowing a preliminary assessment of the limitations and potential for progression of the patient.<sup>9</sup>

Tetraplegic subjects with cervical level injury have severe respiratory failure caused by inefficient innervation of the diaphragm or the paralysis of the inspiratory and expiratory accessory ventilation muscles.<sup>10</sup> Some ventilatory exercises improve breathing resistance, decrease fatigue by means of specific techniques of inspiration and expiration using the glossopharyngeal muscles, and assist in postural stability, strategically using the respiration accessory muscles, increasing the vital forced capacity, allowing the individual with quadriplegia to conduct functional activities.<sup>11</sup>

A study conducted in the College of Physiotherapy in the University Center of Triangulo showed that inspiratory muscle training with a linear load resistor with low loads increases the strength of the inspiratory muscles, resulting in high values of Heart Rate Variability (HRV) and Respiratory Volume (RV), implying in improvement of the cough reflex, reducing the accumulation of secretions and thus reducing the frequency of respiratory infections that affect these patients, emphasizing the ease of applicability of this type of exercise favoring adherence to treatment.<sup>10</sup>

A research performed in the United States of America (USA) pointed out physical implications as important limitations in the context of QOL. The lack of movement and exercise can cause various complications, including: muscle atrophy, osteoporotic changes, most likely to contractures,

kidney stones, partial or complete loss of motor function and neurosensory changes, leading to vasomotor, bowel, bladder and sexual impairment, as well as the ventilatory changes in biochemical and metabolic levels, such as increased adipose tissue and decrease of low density lipoprotein (LDL).<sup>12-13-14</sup>

These metabolic changes have been reported in other studies. Among them, there is the body change, particularly caused by increase of plasmatic levels of low-density lipoprotein and reduction of high-density lipoproteins (HDL), which may cause various complications, amongst which insulin resistance and cardiovascular disorders.<sup>15</sup> However, the injured individuals are subjected to physical exercises, showing a development in physiological aspects and improvement of blood parameters suggestive of chronic diseases.<sup>16</sup>

According to this context, the Body Mass Index (BMI) is a limited resource to assess the body composition of spinal cord injured patients, given the commitment of sensory-motor conditions which influences the elements of body composition used to calculate body mass.<sup>14</sup> Thus, it is necessary that the multidisciplinary team knows about this feature for the implementation of physical exercises that meet the specific characteristics of the individual, allowing an adequate control of the answers to these activities.

According to the position of the American Heart Association, some sports activities such as resistance exercises offer benefits, including improvements in functional capacity, independence, and QOL, and in addition may offer to paraplegics psychological and social benefits, improvement in the development of daily life activities, besides correcting muscle imbalances resulting from wheelchair chronic propulsion.<sup>4</sup>

The partial or complete loss of motor function and sensitivity and the vasomotor commitment confirms the occurrence of the need for movement and exercise, being directly related to QOL.<sup>17,18</sup> Studies developed in the USA shows that the more severe the injury, the lower the related QOL score, also evidenced in a later study, in which the physical aspects have characterized as an important commitment to the welfare of the patient, emphasizing the role of nursing in the process of movement and mobility, spiritual and psychological rehabilitation, acting as a support for reorientation of life and new perspectives, based on their beliefs and motivations.<sup>12</sup>

It was found that exercise establishes a positive effect on the biochemical levels, maintaining the normal parameters as in the uninjured individuals, reducing the risk of developing vascular and metabolic diseases.<sup>15</sup> In addition, the exercises also work at an emotional level, improving the self-esteem of the disabled. Because the exercises provide increased resistance and muscle strength and improve the development of daily life activities, raises people's self-esteem, reduces anxiety and allows them to experience the feeling of independence, essential for a good quality of life.<sup>15</sup>

The understanding of such care by the multidimensional team is relevant, especially nursing, for being responsible from minimum to intensive care. There is a relevance in posture and mobility for the patient's stable condition, giving the benefits of a simple care as the support of the own weight by the patient, minimizing bone metabolic changes and the likelihood of kidney stones, and when associated with some physical activity, improves intestinal reflexes, strengthens remaining muscles and engages positively in the cardiovascular system.<sup>2</sup>

The study also suggests rehabilitation as a stimulus mechanism, increasing the levels of physical activity and maintaining a more active lifestyle for people with spinal cord injury, preferably in quadriplegic patients and in the home environment. Among the obstacles encountered to perform physical activities, US researchers reported emotional problems as an important barrier, emphasizing beyond the behavior strategies, a continued focus on the psycho-emotional aspects, even after a long time of discharge.<sup>9</sup>

The autonomic modulation during incremental exercise, allows the elevation of the HRV threshold, thereby reducing the SNS activity, decreasing the heart rate at rest and thus preventing cardiac complications.<sup>19</sup>

Surveys conducted in a rehabilitation center have shown that physical activity levels are higher at in-hospital rehabilitation, though they do not remain constant after discharge. The researchers hypothesize the lack of assistive mobility devices and appropriate domestic adaptations to cause regression or stagnation of rehabilitation.<sup>20</sup> According to this statement, it is possible to detect the relevance of a qualified nursing care, both for the assistance in the procedure, optimizing the care provided, as in guidance to patients and families as to the type of exercise offered in addition to the appropriate care before and after the session. It is important to note that people with irreversible physical disabilities remain with the same International Classification of Diseases (ICD), however, they do not remain with the same functionality classification.<sup>21</sup> After spinal or neurological damage an individual may suffer various functional changes.

In the face of that situation, the World Health Organization (WHO) established the International Classification of Functionality, Disability and Health (ICF) for the definition, measurement and policy for health and disability, allowing the patient to move through different functional levels in the course of their treatment, as well as expliciting the benefits of offered assistance and evaluating its quality.<sup>21,3</sup>

Nurses need to understand the rehabilitation not only as a process of recovery of motor function, but as an auxiliary mechanism for this patient to achieve the highest possible level of physical, spiritual and self-esteem functioning, even if this evolution occurs only in intrinsic levels.<sup>5</sup> Therefore, it is necessary knowledge and understanding of its essential elements and their applicability, requiring of these professionals specific knowledge and expertise of both the

multidimensional aspects of quadriplegia, as the correct use of ICF and ICD classification.

On the emotional level, people with quadriplegia and paraplegia experience social isolation, feelings of worthlessness, low self-esteem and even change in body image may be present, especially in cases of quadriplegia, where the loss of skin integrity is an aggravating factor in their general framework.<sup>22,9</sup>

It is observed that nursing recognizes the need to promote functional autonomy, mobility and stimulate the neuromuscular activity, linked other physiological needs. However, it is clear that the class does not know or does not use in their practice technical and scientific information that are sufficient to meet the commitments caused by quadriplegia and paraplegia.

## CONCLUSION

The patients affected by spinal cord injury have several deficits of care and self-care in all categories of Basic Human Needs, essentially the psychobiological, for it involves the most intimate care, including vital ones, especially tetraplegic patients undergoing care performed by others.

Increasingly, there are new researches on specific modalities of exercises for public that were apparently unable to practice them, like people with physical functional disabilities. Recent research shows the effect of activities in very characteristic physiological levels as resistance exercises, training of inspiratory muscles and the autonomic modulation during incremental exercise

However both national and international articles, reported the lack of research on exercise and physical activity levels in this scenario, highlighting the need for more studies on the modalities of exercise and determined levels of physical activity in addition to the professionals eagerness to acquire knowledge, specifically nursing for managing the care form that meets the needs of the individual holistically.

Even with all the theoretical framework about the benefits of exercise for the body and mind, it has no effectiveness yet for the public with paraplegia and quadriplegia, especially in the home environment, mainly by: lack of guidance to family, lack of resources or lack of exercise modalities. It is noticeable the weakness of nursing knowledge to serve the public with neurological and spinal injuries at the cervical level and the paucity of research in this sphere of assistance observed by the poor production of studies for this category.

The Nursing category, by maintaining a close and continuous contact with both the patient and the family, longs to know and understand the modalities of exercise and its benefits to guide the family and offer a focused care, not only limited aspects of their profession but attentive to the individual in its entirety. Nursing should not enter into areas beyond its ethical-legal competence but must transit through all environments that allow care, thereby

providing support to the trinomial family, individual and community, facilitating guidance through paths that enable improvement in quality of life.



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