# Promotion of Functional Independence in the Self-care Deficit of the Elderly Person with Orthopedic Disease and Technology

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**Abstract.** Functional disability can arise at any time in the life cycle of the elderly person, impairing autonomy and independence in their daily life activities. Making early intervention by the Rehabilitation Nursing Specialist (RNS) essential to maximize independence in self-care and improve quality of life through physical and emotional recovery, with verification of health gains. **Objective**: Acquire RNS skills through an intervention program for people with orthopedic disease with self-care deficit and demonstrate health gains. **Methodology:** Training of functional activities in elderly people with orthopedic disease, with intervention based on the Yin Case Studies (2018), Orem's Self-Care Nursing Deficit Theory (SNDT), Lopes Mid-Range Theory (2006), through the ENCS instruments and Barthel Index. **Results:** Health gains in functionality with decrease in self-care deficit. **Conclusion:** Acquisition of RNS skills by providing specialized care to the person with orthopedic disease, improving the capacity of functional and self-care activities, promoting autonomy and quality of life.

**Keywords:** Person · Nurse specialist in rehabilitation nursing · Self-care

## 1 Introduction

Health is defined as a condition we face at the moment, from which we do not suffer from pathologies, deficits, inaptitudes or needs [1], but in a sudden and unforeseen way, the state of acute illness appears, generally transitory, which interrupts sometimes severely the normal way of life, and there is no time to adapt to new conditions [2].

The orthopedic service welcomes people of different ages, victims of accidents with bone fractures and traumatic injuries, not only affecting the bone structure, but also the structures surrounding it, causing injury to the surrounding soft tissues, hemorrhages, joint effusions, hemarthrosis, dislocations and muscle ruptures [3], causing immobility, pain, functional limitation and anxiety.

Autonomy in daily life activities is vital, regardless of a person's age [4] where early recovery is consistent with the prevention of hospital infections, joint stiffness, decreased


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muscle strength, promoting a return to family, social and professional environments, and active reintegration into society. This makes early RNS intervention, in this area, important for the reduction of dependency, length of stay, and complications, evidencing gains in health and quality of life [5].

This work aims at the acquisition of RNS skills, through an intervention program for people with orthopedic problems of a traumatic nature, for whom it is necessary to create appropriate strategies for training self-care [6] and functionality [7] to return to active life.

RNS being responsible for generating, executing and supervising specific patient rehabilitation plans, based on possible and current problems of the people, based on Orem's theory of self-care, in the sense of developing capacities of adaptation in the processes of evolution between health and disease promoting self-control and self-care in the person [8].

SNDT consists in helping the person, until he/she is able to help himself/herself, giving him/her the necessary skills and knowledge to be able to take care of him/herself, being the self-care, a set of activities that promote the progress and maturity of the person in a certain period of time, with the objective of maintaining and preserving life [9].

RNS provides care to minimize the effects of the self-care deficit [7], but it is important to emphasize that the relationship nurse-doctor, through trust, proximity and availability [10], is an important step towards the success of this same intervention.

## 2 Methodology

Three case studies were carried out, through the approach to the method of [11] based on sources of evidence, direct observation, interview, based on documents, allowing to maintain in a holistic way the particularities of the real events, in the life cycle of each individual [11]. Based on the middle range theory [12], based on a therapeutic relational intervention between nurse-patients, supported by diagnostic evaluation and therapeutic intervention, based on strategies such as interviewing the sick person, the family and data collection[12].

The main tool used for data collection was the Elderly Nursing Core Set [13], based on the International Classification of Functionality (ICF) which evaluates the disability of the person or population according to the health context [14, 15], using a unique, standardized language, describing health and the conditions associated with it, through a conceptual arrangement of information extensible to personal health care, in which the needs of nursing care are defined [16].

The selection criteria in the person with orthopedic disease were highlighted, focusing on traumatic orthopedic situations, including 3 people (A1, A2, A3) admitted to the orthopedic service, of working age and integrated into professional life, manifesting changes in mobility caused by traumatic injuries, subject to surgical intervention. This is identified by letters and numbers to hide their identity, protecting their intimacy and confidentiality [17].

This being an intentional and rational selection sampling, because the members of the population are chosen due to the relationship between them and the purposes of the study [18], not probabilistic, and representative by the various variables [19]. The characteristics of the participants of this study are presented in Table 1.

**Table 1.** Sociodemographic characterization of study participants.

| Case study | A1 | A2 | A3 |
|---|---|---|---|
| Age | 68 | 60 | 58 |
| Gender | Male | Female | Female |
| Nationality | Portuguese | Portuguese | Portuguese |
| Marital status | Married | Married | Married |
| Family attaché | Wife and child | Husband and son | Husband and two sons |
| Level of eduation | 9th year of school | Teaching degree | Teaching degree |
| Profession | Building and construction | 1st cycle teacher | 2nd cycle teacher |

The mean age of study participants is 48.60 years with a standard deviation of 8.21 years of age. It is verified that 66.66% of the population is female and with higher academic level, and in general in professional working age.

Strategies were developed that initiated the Diagnostic Assessment Process through the medium range methodology [12], with consultation of the clinical process in a computer system, approaching the person through interview and observation, evaluating knowledge, disabilities, motivations, potentialities and objectives following the therapeutic intervention for recovery and rehabilitation. The first moment of evaluation related to the diagnostic evaluation occurred in the first uprising after the surgical intervention, the second moment is materialized on the day of discharge, after the therapeutic intervention of RNS.

## 3 Plan of Intervention

A rehabilitation program, helps adaptation to a new condition and improvement of the quality of life [20], which reinforces these cares, as an area specialized in maintenance, promoting comfort and quality throughout the life cycle, preventing complications, disabilities caused by illness or accident, based on decision making for the design of intervention plans in various areas including motor training and self-care [21]. This plan was adapted to functional limitations and comorbidities [22], according to people's needs, as well as personal preferences, environment and resources, and is described in Table 2.

**Table 2.** Motor functional rehabilitation intervention plan.

| Indicators of results | Objectives | Interventions | Expected results |
|---|---|---|---|
| Knowledge about people | - To know the expectations of the person, taking into account their personal goals and health project [8]<br>- Assess functional capacity to obtain necessary information and be able to plan interventions [23] | - Provide a calm and welcoming environment [24]<br>- To evaluate the person through subjective and objective examination [25] and to collect pertinent information [8] in observation and interview<br>- To use scales and measurement instruments8, such as the ENCS [26], Barthel Index [27], to verify physical and motor capacity [28]<br>- Prepare registration documents, field notes [12] and Clinical record<br>- Implementation and evaluation of an intervention plan with the use of evaluation instruments according to the diagnoses identified [30] | - Selection of a program adapted to the needs of each person [28, 29]<br>- The person must feel, encouraged and accompanied [30], from the beginning to the end of the program |
| Training for self-care | - To enable the functioning of the self-care, helping the family in the management of the disease, allowing to enhance the autonomy and well-being [7] | - Assess potential for rebuilding autonomy:<br>- Encourage self-care [30];<br>- Promote awareness and autonomy to perform tasks that allow independence at home [28]<br>- Enhance respiratory control through the dissociation of breathing times and diaphragmatic breathing, relaxation techniques and rest positions [32] | - Improvement in quality of life [22, 29, 31, 33, 34] |

(*continued*)

**Table 2.** (*continued*)

| Indicators of results | Objectives | Interventions | Expected results |
|---|---|---|---|
| Increased physical capacity in muscle and joint movement | - Prevent muscle contractures, activate circulation, vascular dynamics; avoid pain, joint injuries, maintaining tone, strength and function [23]<br>- To enable the increase of strength, muscle tone, maintaining an adequate level of muscle strength for safe walking, transference, up and down stairs safely [36] | - To perform early mobilizations in all joint segments still in bed, isometric and isotonic exercises with passive and active mobilizations assisted in the operated limb and active exercises with the contralateral limb [35, 37]<br>- Isometrics applied to the abdominal muscles, buttocks and quadriceps, extension of the popliteal region against the mattress surface, and use of a reduced volume roller, for 4 s, 2 series of 10 repetitions [38]<br>- Isotonic with free active exercises, assisted, resisted from unaffected limbs; assisted non-resisted active in the operated limb (without load) according to the tolerance, at the level of the hip joint perform flexion, extension, abduction, knee extension and flexion, tibiotarsis, flexion and extension, 2 series of 10 repetitions [38]<br>- Therapeutic activities: rolling; bridge and elbow loading [39] | -To prevent the reduction of joint amplitude and complications associated with inactivity and prolonged bed rest [40] |
| Functional state improvement in body balance | - Increase volume and muscle strength, physical resistance, improve body balance [41] | - Train balance [41] assess blood pressure and heart rate to maintain clinical safety [42], put on elastic stockings<br>- To assist in the promotion of static and dynamic balance sitting in bed [39] and to encourage orthostatic balance training, dynamic, static with support from the walker, twice a day, in the raising and return to bed [43] | - Body awareness, correct posture, maintenance of balance [44], preventing and correcting postural defects [45] |

(*continued*)

**Table 2.** (*continued*)

| Indicators of results | Objectives | Interventions | Expected results |
|---|---|---|---|
| Functional state improvement in transfers | - Training for safe transfer techniques and gait training [46] | Assist in the transfer to an armchair, with no load on the affected member:<br>- Maintain a safe environment, with an armchair next to the bed, with the wheels locked<br>- Person sitting on the bed, with feet resting on the ground; closed and adherent shoes<br>- Instruct to transfer with device (walker), to chair<br>- Use the same technique to transfer to the bed [46] | - Training to walk [47] |
| Functional state improvement in gait with gait aid | - To be able to walk with a walking aid, to promote locomotion autonomy [47] | - Encourage, assist, train to walk with walking aid, selected according to needs45:<br>- Walking for greater stability [46] (Cases A2 and A3);<br>- Maintain body alignment;<br>- Moving forward with walker, moving forward with the affected lower limb (no load), and then with the healthy lower limb, walking a distance of 6 m (do not exceed the base of the walker while walking);<br>- Advance with the 2 axillary support crutches (Case A1), transferring to them the weight of the body, with a 3 point walk, walk 10 m;<br>- Descend and ascend scales;<br>- Climbing stairs (2 repetitions), advance first with the unaffected limb, followed by the crutches and finally the affected limb;<br>- Going down stairs (2 repetitions), moving forward with the axillary crutches, then with the affected limb and then the unaffected limb [46] | - Reduce the load on intervened structures, improve the balance and reduce pain [46]<br>- Improvement in physical resistance and functional capacity [48] |

(*continued*)

**Table 2.** (*continued*)

| Indicators of results | Objectives | Interventions | Expected results |
|---|---|---|---|
| Evaluation | - Quantify [25], and monitor health gains, produce sensitive indicators aiming at continuous quality improvement in health [21] | - Evaluate results at the beginning and end of the program [25], identify physiological adaptations [28] | - Confer significant gains in health [49], mobility and self-confidence [41], self-care and self-management [7] |

Considering also the safety, pain, tiredness, intensity and rhythm of the exercises, it is necessary to plan periods of rest with the person, in order to be able to perform the activities when the person presents more energy [23], and thus obtain gains and progress in the exercises. Once the intervention plan has been defined, the analysis of the gains in terms of functionality and self-care, as a result of RN care, is highlighted.

## 4 Results and Discussion

The moment of individual presentation of each case study [11] has arrived, it is not only based on the description, it forms hypotheses based on the data obtained [18], derived from the facts observed during the data collection, are analyzed and presented, allowing the logical connection with the object under study and the proposed problem [18]. The evaluation of the gains obtained after the RNS intervention are described in Table 3.

All cases, in general, obtained visible gains. In the analysis of the data, it can be seen that the case study A1 distinguished itself in the global score of the functional with 14.00% of gains, compared to A2 and A3, obtaining in the globality 9.00% of score after intervention. But it was at the level of the self-care parameter that the gains were more evident, reaching in general 19%. The learning and memory functions presented the most significant value in case A1, with 8.00%, noting that A3 shows no deficit in this parameter.

There are still no problems in terms of communication and relationship with caregivers.

Regarding the Barthel Index, gains of 31.6 score were achieved after intervention, where all cases evolved from a severe to moderate dependence.

Functional gains were also observed regarding the ability to walk with a walking aid with the objective of autonomy in locomotion [47]. In the A1 study, tolerance in a 30 m walk with axillary crutches, as well as up and down stairs [46] in 2 series and 4 repetitions, the A2 case presented an evolution from walker to ergonomic crutches tolerating the distance of 10 m, while the A3 person was able to walk 10 m and transfer to a chair. Briefly, at the level of training for AVD [50], we verified gains in transfers

**Table 3.** Evaluation of gains according to the ENCS scale

| Cases | Evaluation | Global functionality score | Self-care | Learning and memory functions | Communication | Relationship with friends and caretakers | Barthel index |
|---|---|---|---|---|---|---|---|
| A1 | Initial | 21.00% | 44.00% | 8.00% | 0.00% | 0.00% | 30 |
| | Final | 7.00% | 17.00% | 0.00% | 0.00% | 0.00% | 70 |
| | **Gains** | **14.00%** | **27.00%** | **8.00%** | **0.00%** | **0.00%** | **40** |
| A2 | Initial | 15.00% | 35.00% | 4.00% | 0.00% | 0.00% | 50 |
| | Final | 7.00% | 17.00% | 0.00% | 0.00% | 0.00% | 75 |
| | **Gains** | **8.00%** | **18.00%** | **4.00%** | **0.00%** | **0.00%** | **25** |
| A3 | Initial | 12.00% | 31.00% | 0.00% | 0.00% | 0.00% | 40 |
| | Final | 7.00% | 19.00% | 0.00% | 0.00% | 0.00% | 70 |
| | **Gains** | **5.00%** | **12.00%** | **0.00%** | **0.00%** | **0.00%** | **30** |
| **Average Gain per score** | | **9.00%** | **19.00%** | **6.00%** | **0.00%** | **0.00%** | **31.6** |

and mobility in studies A1, A2, A3, going up and down stairs and eating in person A1, as well as bathing also in A1 and A2 and use of toilet in studies A1, A2, A3. It should also be noted the early discharge in these people, as a result of the RNS intervention, which after this enabled them to adapt at home.

## 5 Conclusion

According to the results verified in this work, the importance of the Rehabilitation Nursing in an orthopedic service is affirmed, besides the visible gains in the use of the ENCS, the number of days of hospitalization was reduced, after the application of the intervention plan. In these case studies, the advantages of early lifting and mobilization after surgery were verified, being fundamental to restore a set of organic changes incited by inactivity in the bed [46].

The importance of applying a methodical and organized register, with the purpose of providing health professionals with a tool for collecting information that can measure the gains in functionality, is demonstrated [51].

Being the responsibility of the RNS, to evaluate the impact of the change in functional capacity on the quality of life and comfort of the person in all phases of the life cycle, with emphasis on functionality and independence in various contexts It is essential, to enable the person with disability or with limitation of their activity and/or restriction of participation for reinsertion and exercise of citizenship [8], the early recovery of the person of working age, becomes important to be able to return to society and social life, avoiding complications such as depression, anxiety and disabilities, being these people in most cases the source of family income.

It is verified that the sensible gains as a result of the RN care, demonstrate improvement in the quality standards and excellence of care in the various contexts of practice,

recognizing this specialty as a reference for prevention and recovery of the person [21]. Being profitable in the future new studies in this field to demonstrate the importance of RNS, in other contexts of practice and in its ability to recover and/or adapt the different areas of functionality in the person with disabilities.

Faced with this context, it was possible to acquire RNS skills by planning interventions, based on functionality, promoting education, setting goals and commitment, walking the path of rehabilitation alongside the person, providing them with capabilities and tools to maximize their functionality.

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