



CASE REPORT

Rehabilitation Nursing Care for a patient undergoing corrective surgery for scoliosis: case report

Atención de Enfermería de Rehabilitación a un paciente sometido a cirugía correctiva de escoliosis: reporte de caso

Luís Sousa^{1,2}  , Carla Raposo^{1,3}  , Nelson Guerra¹  , Fabiana Faleiros⁴  , Geyslane Albuquerque⁵  , Sandy Severino¹ 

¹Atlântica School of Health (ESSATLA), Atlantic University, Nursing Department, Oeiras, Portugal.

²Comprehensive Health Research Centre, Évora, Portugal.

³Centro Hospitalar Universitário Lisboa Norte, Unidade Multidisciplinar de Dor. Lisboa, Portugal.

⁴Ribeirão Preto School of Nursing, University of São Paulo, Ribeirão Preto, Brazil.

⁵Nossa Senhora das Graças Faculty of Nursing, University of Pernambuco, Recife, Brazil.

Cite as: Sousa L, Raposo C, Guerra N, Faleiros F, Albuquerque G, Severino S. Rehabilitation Nursing Care for a patient undergoing corrective surgery for scoliosis: case report. *Salud, Ciencia y Tecnología*. 2024;4:785. <https://doi.org/10.56294/saludcyt2024785>

Submitted: 15-11-2023

Revised: 27-01-2023

Accepted: 12-03-2024

Published: 13-03-2024

Editor: Dr. William Castillo-González 

ABSTRACT

Introduction: scoliosis is characterized by three-dimensional changes in the spine, mainly in the thoracic and/or lumbar region, leading to musculoskeletal and pulmonary changes and changes in the person's functionality. After corrective spinal surgical intervention, the intervention of a rehabilitation nurse becomes essential, in order to guide and optimize the person's training and empowerment, in this phase of health-disease transition.

Clinical Case Report: clinical case study, inherent to the situation of a person undergoing corrective surgery for scoliosis. The nursing process was carried out, through data collection, evaluation, diagnosis survey, rehabilitation nursing interventions, and the respective results assessment. The numerical pain scale, the body balance assessment, the Barthel Index, the Functional Independence Measure and the Timed Up and Go test were used as assessment instruments. Based on the International Classification for Nursing Practice and the Rehabilitation Nurse Specialist standard of care document.

Discussion: the rehabilitation nursing plan implemented for the person undergoing corrective surgery for scoliosis contributed beneficially to the improvement of the ventilation pattern, muscle strength, mobility, gait, independence in carrying out self-care and increased functionality. There was an increase in knowledge and training in techniques to adapt to their situation, favoring a safe transition to home after hospital discharge.

Conclusion: in view of musculoskeletal and ventilatory changes, a Motor Functional Reeducation and Respiratory Functional Reeducation plan is extremely important, in association with the person's teaching and training plan.

Keywords: Scoliosis; Postoperative Period; Hospitals; Rehabilitation Nursing.

RESUMEN

Introducción: la escoliosis se caracteriza por cambios tridimensionales en la columna, principalmente en la región torácica y/o lumbar, provocando cambios musculoesqueléticos, pulmonares y cambios en la funcionalidad del paciente. Después de una intervención quirúrgica correctiva de la columna, la intervención de una enfermera rehabilitadora es imprescindible, tiene como finalidad orientar y optimizar la formación y el empoderamiento del paciente, en esta fase de transición salud-enfermedad.

Reporte de Caso Clínico: estudio de caso clínico, inherente a la situación de un paciente sometido a cirugía correctiva por escoliosis. El proceso de enfermería se realiza a través de la recolección de datos, evaluación, encuesta diagnóstica, intervenciones de enfermería de rehabilitación y la respectiva evaluación de resultados. Se utilizaron como instrumentos de evaluación la escala numérica de dolor, la evaluación del equilibrio corporal, el índice de Barthel, la medida de independencia funcional y la prueba Timed Up and Go. Basado en la Clasificación Internacional para la Práctica de Enfermería y el estándar documental de cuidados EEER.

Discusión: el plan de enfermería de rehabilitación implementado para el paciente sometido a una cirugía correctiva por escoliosis contribuyó beneficiosamente para mejorar el patrón ventilatorio, la fuerza muscular, la movilidad, la marcha, la independencia en el autocuidado y el aumento de la funcionalidad. Se incrementó el conocimiento y la formación en técnicas para que el paciente pueda adaptarse a su situación, favoreciendo una transición segura en la vuelta a casa tras el alta hospitalaria.

Conclusión: Ante los cambios musculoesqueléticos y ventilatorios, es de suma importancia un plan de Reeducción Funcional Motora y de Reeducción Funcional Respiratoria, asociado a un plan de enseñanza y de entrenamiento del paciente.

Palabras clave: Escoliosis; Periodo Postoperatorio; Hospitales; Enfermería de Rehabilitación.

INTRODUCTION

Scoliosis is defined as a three-dimensional change in the spine, in its shape and position. It is considered idiopathic, as its etiopathogenesis is unknown (around 80 %), it is not correlated to an effective cause or disease, it is assumed that its cause is multifactorial. It occurs mainly in childhood and its progression is accentuated during the growth phases.⁽¹⁾

The surgery is performed via a posterior route, with bone fusion performed by applying fixation material (screws) along the entire spine (vertebra to vertebra or groups of vertebrae).

Treatment is individualized, taking into account the type of scoliosis, its progression, severity of associated symptoms and the impact on the person's functionality and quality of life. Acceptance of the diagnosis of idiopathic scoliosis, a chronic disease, involves several adaptive measures for the person and their family.⁽¹⁾

Multiple disorders have been described in people with idiopathic scoliosis, ranging from muscular changes (including the ability to perform physical activity), balance, cardiorespiratory (imposed by the deformity of the rib cage and decreased lung function), psychological (due to changes in image and limitations), functional, existence of pain conditions and subsequently changes in the person's quality of life.⁽¹⁾

Information about the clinical situation and possible treatments becomes essential for the person, increasing their sense of security and control. It is essential for healthcare professionals to transmit careful information, depending on the person's needs and cognitive capacity, provided in a systematic way using various resources, such as information leaflets, videos and images.⁽²⁾

CASE REPORT

Ms. M, aged 32, lives with her husband, daughter (3 years old) and mother, in her own single-story house, without stairs, no architectural barriers were identified. She reports good socio-family support and stable work activity.

According to the person, they felt adapted to carrying out their Basic Activities of Daily Living (BADL) and Instrumental Activities of Daily Living (IADL). She reported acceptance of her body image, but was concerned about the evolution of her scoliosis in the aging process, which was the main motivation for undergoing corrective surgery.

Accompanied in a neurosurgery consultation, due to dorsolumbar scoliosis, with convex side on the right and concave on the left.

Admitted on 11/12/2023, underwent instrumentation and D5-L4 posterior arthrodesis with autologous graft of spinous processes on 11/13/2023, discharged from hospital on 11/18/2023. The surgery was uneventful, under general anesthesia, with no neurological deficits and good correction of the scoliosis curve. No need for transfusion support (intra and post-operatively), antibiotic and tranexamic acid protocol was performed.

Returns to the inpatient ward conscious, without hemodynamic changes, with the surgical drain clamped, Patient Controlled Analgesia (PCA) with intravenous fentanyl (initiated intraoperatively due to intense pain that was difficult to control), O2 2 L/min by nasal cannula and with a urinary catheter. Post-surgical care carried out by the nursing team of the inpatient ward: passive drain in the first 24 hours, active aspiration until 48 hours, with indication for removal later. Follow-up by the acute pain unit, with intravenous fentanyl PCA, remaining until the 2nd post-operative day, with rotation to guided multimodal analgesia and intravenous

rescue analgesia and subsequently per os. Suspension of oxygen supply and urinary catheter removed on the 2nd day. Mrs. M underwent an extra-long weight bearing control x-ray on 11/17/2023, confirming the discharge plan for the following day.

Rehabilitation Nursing Initial Assessment

The assessment carried out by the nurse specialist in rehabilitation nursing (NSRN) was based on:

- Pain assessment using a numerical scale;
- Muscle strength using the Medical Research Council muscle scale (MRC);⁽³⁾
- ADL using the Barthel Index ⁽³⁾;
- Functionality through the Functional Independence Measure (MIF);⁽³⁾
- Mobility and gait through the Timed Up and Go test (TUG).⁽³⁾

Individualized Rehabilitation Nursing (RN) care plan designed for the person undergoing corrective scoliosis surgery, executed and evaluated results sensitive to the intervention of the rehabilitation nurse. Intervention carried out concomitantly with general nursing care.

A rehabilitation nursing plan was implemented from the first post-operative day until hospital discharge (5 days), with intervention in the respective diagnoses:

- Diminished knowledge;
- Compromised ventilation;
- Decreased muscle movement;
- Compromised body balance;
- Compromised self-turning;
- Compromised standing;
- Impaired gait;
- Self-care Hygiene, Grooming, Dressing or Undressing, Toileting compromised.

All exercise techniques performed, and activities implemented were in accordance with the person's safety and tolerance, with a gradual increase in frequency, intensity and independence.

Table 1. Evaluation Instruments			
Evaluation Instruments		Initial Evaluation	Final Evaluation
Numeric Scale	Pain at rest	1 a 3/10	0/10
	Pain in motion	3 a 5/10	2/10
Respiratory rate		16 mrm	14 mrm
O2 Saturation Assessment		99 % with O ₂ at 2L/ min NC	99 % without O ₂ support
Medical Research Council Muscle Scale (MRC)		URL - 5 ULL - 5	URL - 5 ULL - 5
		LRL - 4 LLL - 4	LRL - 5 LLL - 5
Body Balance	Static sitting	Present	Present
	Dynamic sitting	Diminished	Present
	Static orthostatic	Present	Present
	Dynamic Orthostatic	Diminished	Present
Barthel Index		40/100	90/100
Self-Care		11	33
Sphincter control		2	14
Mobility/Transferring		4	24
Walking		4	14
Communication		14	14
MIF (total)		56/126	116/126
Timed up and Go (TUG)		20,15 seconds*	10,10 seconds
* Initial TUG assessment carried out on the 3rd post-operative day			

Throughout the hospitalization, teaching, instruction and training were carried out on:

Self-control of breathing pattern;

- Respiratory techniques to optimize ventilation;
- Muscle and joint exercise techniques and trunk movements to avoid;
- Body balance techniques;

- Adaptation techniques for positioning yourself, standing, walking, going up and down stairs;
- Use of auxiliary devices for self-care and adaptation of architectural barriers in the home.

After the rehabilitation nurse's intervention, throughout the hospital stay, the person demonstrated knowledge in the areas described, with the training to carry them out and adapt to their health-illness transition situation.

DISCUSSION

This clinical case is in line with the rest of the literature, demonstrating the importance of information, teaching and training the person throughout their surgical process (from surgical indication to returning home after surgery). The importance of the educational process of the person in a situation of illness is emphasized, increasing knowledge, adjusting realistic expectations, preparing, and carrying out BADL and IADL, and increasing the feeling of security for returning home, regardless of the level of functionality.⁽⁴⁾

This person gradually improved their ventilatory capacity through abdominal diaphragmatic breathing, rib opening exercises and deep breathing.

Regarding musculoskeletal deficits in people with scoliosis, such as reduced muscle strength and joint range of motion, there is a recommendation for pre- and post-operative rehabilitation programs that include muscle movement and strength exercises, joint range of motion, resistance and flexibility.^(2,5,6)

Several authors describe asymmetry in muscular activity, changes in proprioception and body balance. They report that the greatest gain in body stability is achieved 6 months after surgery.^(7,8) The person undergoing arthrodesis has a decrease in steering control and body stability up to 90 days after surgery, considering the existence of a rehabilitation program focused on postural control training to be extremely important.⁽⁹⁾

In the first 2 postoperative days, control of anxiety and the feeling of safety when performing muscle and joint exercises, rolling in bed, gradual lifting and walking, resulted in clear gains in the Barthel index and MIF complete independence in the final assessment. Results corroborated by other studies, in which there was an improvement in functionality and a reduction in costs.^(2,10)

This intervention plan reduces the existence of postoperative complications, improves pain control, rapid functional independence, and person satisfaction, with reduced healthcare costs.⁽¹¹⁾

CONCLUSIONS

The educational process carried out by the nurse with the person and the respiratory and motor functional re-education program enhance awareness, training, and adaptation to the health-disease transition situation.

Through respiratory functional re-education it was possible to optimize the oxygen suspension and improve the person's ventilation, essentially on the concave side.

At the level of Motor functional re-education, gains in muscle strengthening, body balance and gait are evident, optimizing independence in BADL and increasing functionality.

REFERENCES

1. Negrini S, Donzelli S, Aulisa AG, Czaprowski D, Schreiber S, de Mauroy JC, et al. 2016 SOSORT guidelines: orthopaedic and rehabilitation treatment of idiopathic scoliosis during growth. *Scoliosis Spinal Disord.* 2018 Jan 10; 13(1):1-48. <https://doi.org/10.1186/s13013-017-0145-8>
2. Debono B, Wainwright TW, Wang MY, Sigmundsson FG, Yang MM, Smid-Nanninga H, Bonnal A, Le Huec JC, Fawcett WJ, Ljungqvist O, Lonjon G. Consensus statement for perioperative care in lumbar spinal fusion: Enhanced Recovery After Surgery (ERAS®) Society recommendations. *Spine J.* 2021 May 1;21(5):729-52. <https://doi.org/10.1016/j.spinee.2021.01.001>
3. Sousa L., Carvalho ML. Pessoa com Osteoartrose na Anca e Joelho em Contexto de Internamento e Ortopedia. In C. Marques-Vieira, L. Sousa (Coords.). *Cuidados de Enfermagem de Reabilitação à Pessoa ao Longo da Vida*. Reimpressão 1ª Edição. Sintra: Sabooks Editora; 2023:405-420.
4. Barbosa LG, Frazão CD. Impact of demonstration in a realistic simulation environment as a postoperative education in patients' experience. *Einstein (São Paulo).* 2020 Mar 23;18:eAO4831. https://doi.org/10.31744/einstein_journal/2020AO4831.
5. Öztürk F, Deniz HG, Ayvaz ME, Demirkiran HG, Kinikli GI. The relationship between trunk assessments and quality of life in adolescent idiopathic scoliosis following surgery. *Turkish Journal of Physiotherapy Rehabilitation.* 2020 Apr 4;31(1):36-44. <https://doi.org/10.21653/tjpr.510994>
6. Rafferty A, Donne B, Kiely P, Fleming N. Functional deficits in post-operative adolescent idiopathic scoliosis. *Physiother. Pract. Res.* 2020 Jul 1;41(2):133-41. <https://doi.org/10.3233/PPR-190365>

7. Anari JB, Tatad AM, Cahill PJ, Flynn JM. The Impact of Posterior Spinal Fusion (PSF) on Coronal Balance in Adolescent Idiopathic Scoliosis (AIS): A New Classification and Trends in the Postoperative Period. *Journal of Pediatric Orthopaedics*. 2020 Jul 3;40(9):e788-93. <https://doi.org/10.1097/BPO.0000000000001622>
8. Osuka S, Sudo H, Yamada K, Tachi H, Watanabe K, Sentoku F, Chiba T, Iwasaki N, Mukaino M, Tohyama H. Effects of Posterior Spinal Correction and Fusion on Postural Stability in Patients with Adolescent Idiopathic Scoliosis. *Journal of Clinical Medicine*. 2022 Dec 29;12(1):270-0. <https://doi.org/10.3390/jcm12010270>
9. Li Y, Kakar RS, Fu YC, Walker M, Brown CN, Oswald TS, et al. Postural control of individuals with spinal fusion for adolescent idiopathic scoliosis. *Clinical Biomechanics*. 2019 Jan;61:46-51. <https://doi.org/10.1016/j.clinbiomech.2018.11.001>
10. Bazancir Z, Talu B, Korkmaz MF. Postoperative rehabilitation versus early mobilization following scoliosis surgery: A single-blind randomized clinical trial. *Journal of Orthopaedic Science*. 2021 Dec; <https://doi.org/10.1016/j.jos.2021.11.017>
11. Ding H, Hai Y, Guan L, Liu Y, Pan A, Han B. The outcome of enhanced recovery after surgery vs. a traditional pathway in adolescent idiopathic scoliosis surgery: A retrospective comparative study. *Frontiers in Surgery*. 2022 Oct 5;9: 989119. <https://doi.org/10.3389/fsurg.2022.989119>

FINANCING

The authors did not receive financing for the development of this research.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Conceptualization: Carla Raposo, Luís Sousa.

Methodology: Carla Raposo, Luís Sousa, Sandy Severino.

Drafting - original draft: Carla Raposo, Luís Sousa, Geyslane Albuquerque, Sandy Severino.

Writing - proofreading and editing: Luís Sousa, Carla Raposo, Sandy Severino, Nelson Guerra, Fabiana Faleiros, Geyslane Albuquerque.