INTERMITTENT URETHRAL CATHETERIZATION IN A PERSON WITH SPINAL CORD INJURY: A CASE REPORT

Cateterismo uretral intermitente na pessoa com lesão medular: estudo de caso

Cateterismo uretral intermitente en la persona con lesión medular: informe de caso

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ABSTRACT

Background: changes in bladder function are common among people with spinal cord injuries, increasing the risk of incontinence, urinary retention, and urinary tract infections. In this context, intermittent urethral catheterization (IUC) is a fundamental nursing intervention in rehabilitation for urinary control and the prevention of complications. **Objective:** to identify the benefits derived from care provided by a Specialist Nurse in Rehabilitation Nursing in the functional recovery of individuals with incomplete dorsal spinal cord injury, with an emphasis on IUC. **Methodology:** descriptive, observational, and retrospective clinical case report, based on the nursing process and guided by the CAseREport guidelines. Data collection took place between October and November 2025, following a D2–D5 laminectomy for an intradural lipoma. The patient participated in a rehabilitation program consisting of 15 sessions. Bladder and urinary function was monitored through clinical records and a voiding diary. **Results:** there was an increase in the intervals between catheterizations, a predominance of spontaneous voids, and an absence of complications, allowing for the discontinuation of the IUC and the restoration of effective urinary elimination. **Conclusion:** IUC proved to be decisive in the recovery of bladder function, resulting in health gains and reinforcing the role of rehabilitation nursing. Motivation, health literacy, and the incomplete nature of the injury stand out as facilitating factors.

Keywords: intermittent urethral catheterization; spinal cord diseases; rehabilitation nursing; case reports

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RESUMO

Enquadramento: alterações da função vesical são frequentes na pessoa com lesão medular, aumentando o risco de incontinência, retenção urinária e infeções do trato urinário. Neste contexto, o cateterismo uretral intermitente (CUI) constitui uma intervenção de enfermagem em reabilitação (ER) fundamental para o controlo urinário e prevenção de complicações. **Objetivo:** identificar os ganhos potenciados pela prestação de cuidados do Enfermeiro Especialista em Enfermagem de Reabilitação na recuperação funcional da pessoa com lesão medular incompleta a nível dorsal, com ênfase no CUI. **Metodologia:** relato de caso clínico descritivo, observacional e retrospetivo, baseado no processo de enfermagem, orientado pelas guidelines CAseREport. A recolha de dados decorreu entre outubro e novembro de 2025, após laminectomia D2–D5 por lipoma intradural. A pessoa integrou um programa de reabilitação com 15 sessões. A evolução vesico-urinária foi monitorizada através de registos clínicos e do diário miccional. **Resultados:** verificou-se aumento dos intervalos entre cateterismos, predominância de micções espontâneas e ausência de complicações, permitindo suspender o CUI e restabelecer a eliminação urinária eficaz. **Conclusão:** o CUI revelou-se determinante na recuperação da função vesical, traduzindo-se em ganhos em saúde, reforçando o papel da ER. Destacam-se como fatores facilitadores a motivação, a literacia em saúde e o carácter incompleto da lesão.

Palavras-chave: cateterismo uretral intermitente; doenças da medula espinhal; enfermagem em reabilitação; estudo de caso

RESUMEN

Marco contextual: las alteraciones de la función vesical son frecuentes en las personas con lesión medular, lo que aumenta el riesgo de incontinencia, retención urinaria e infecciones del tracto urinario. En este contexto, el cateterismo uretral intermitente (CUI) constituye una intervención de enfermería en rehabilitación fundamental para el control urinario y la prevención de complicaciones. **Objetivo:** identificar los beneficios que aporta la atención prestada por el enfermero especialista en enfermería de rehabilitación en la recuperación funcional de las personas con lesión medular incompleta a nivel dorsal, con especial énfasis en el CUI. **Metodología:** informe de caso clínico descriptivo, observacional y retrospectivo, basado en el proceso de enfermería y orientado por las directrices CAseREport. La recopilación de datos se llevó a cabo entre octubre y noviembre de 2025, tras una laminectomía D2–D5 por lipoma intradural. La persona se incorporó a un programa de rehabilitación de 15 sesiones. La evolución vesicourinaria se monitorizó mediante registros clínicos y el diario miccional. **Resultados:** se observó un aumento de los intervalos entre cateterismos, predominio de micciones espontáneas y ausencia de complicaciones, lo que permitió suspender el CUI y restablecer la eliminación urinaria eficaz. **Conclusión:** el CUI resultó determinante en la recuperación de la función vesical, lo que se tradujo en mejoras en la salud y reforzó el papel de la enfermería de rehabilitación. Destacan como factores facilitadores la motivación, la alfabetización en salud y el carácter incompleto de la lesión.

Palabras clave: cateterismo uretral intermitente; enfermedades de la médula espinal; enfermería en rehabilitación; informes de casos

INTRODUCTION

According to the World Health Organization, it is estimated that in 2021, approximately 15.4 million people worldwide will be affected by spinal cord disorders. Most cases are caused by trauma, resulting from falls, traffic accidents, or acts of violence (World Health Organization, 2024).

Spinal cord disorders constitute a serious and complex neurological condition that can lead to motor, sensory, autonomic, and visceral deficits. These conditions predominantly occur in young people and those of reproductive age, carrying significant social and functional implications (Assis et al., 2020).

The interruption of communication between the central nervous system and the urinary tract leads to neurogenic bladder dysfunction, manifested as urinary incontinence or retention, increasing the risk of urinary tract infections and compromising quality of life (Gedde et al., 2019; Pereira et al., 2025).

In this context, IUC emerges as an essential continence management strategy, contributing to adequate bladder emptying, preservation of renal function, and promotion of autonomy. Despite the available evidence, the consistent application of IUC requires adequate training for healthcare professionals and patient education, as these factors are critical to the intervention's effectiveness (Assis et al., 2020; Nascimento, 2020).

In this context, the present case study is grounded in Afaf Meleis's Transitions Model, enabling an understanding of the process by which individuals with spinal cord injury adapt to their new health condition and acquire self-care skills, particularly regarding bladder control (Meleis, 2010).

Thus, this clinical case study aims to identify the health gains resulting from the intervention of the Specialist Nurse in Rehabilitation Nursing (SNRN) in the functional recovery of individuals with spinal cord injuries, with an emphasis on the use of the IUC as an intervention that promotes self-care, independence, and quality of life.

BACKGROUND

Approximately 85% of people with spinal cord injuries experience urinary dysfunction, and IUC is the most recommended method for bladder emptying in this group (Faleiros et al., 2021). In neurological disorders of the urinary tract, post-void residual urine is common, and in some cases, the person may be unable to urinate spontaneously. When the spinal cord injury occurs above D2, the bladder tends to be spastic; when it occurs below that level, the bladder will be flaccid. It is important to note that self-catheterization may be unfeasible in people with high spinal cord injuries, although, with improved motor function, many are able to acquire this skill (Ordem dos Enfermeiros [OE], 2009).

IUC is considered a clean technique, involving hand and genital hygiene, followed by the insertion of a lubricated catheter into the bladder through the urethra, allowing for periodic emptying, verification of urine volume, and other urine characteristics. The procedure should be performed at regular intervals or according to the sensation of bladder fullness (Faleiros et al., 2021; OE, 2009). The scientific literature of recent decades confirms the

effectiveness of IUC in promoting bladder function, preventing urological complications, and improving the quality of life for people with spinal cord injury (Morooka & Faro, 2002; Nascimento, 2020; OE, 2009).

According to the Guide to Best Practices for People with Spinal Cord Injuries (OE, 2009), the objectives of IUC are:

- To empower the individual by teaching methods for resolving problems related to the urinary system;
- To protect kidney function;
- To ensure regular and complete bladder emptying;
- Maintain urinary continence, preventing reflux urination;
- Preserve vesicourethral valve function;
- Prevent recurrent urinary tract infections;
- Promote the person's autonomy, strengthen their self-image and self-confidence, and foster acceptance of their health condition.

The frequency of IUC should be adjusted according to the type of bladder at intervals ranging from three to six hours, considering fluid intake, bladder type, and response to training. The technique and positioning differ between males and females due to anatomical differences (OE, 2009).

Before each procedure and depending on the person's level of independence and balance, they should be assisted to the restroom to encourage spontaneous urination. In the case of a spastic bladder, stimulation of the suprapubic region is recommended, while in the case of a flaccid bladder, the Valsalva maneuver should be performed by forcefully exhaling against a closed glottis, thereby increasing intra-abdominal pressure (Faleiros et al., 2021; Hoeman, 2011; OE, 2009).

After urination, an IUC should be performed to assess residual urine volume, ensuring that the bladder does not contain volumes exceeding 300–400 mL during a single catheterization. If volumes consistently below 200 mL are recorded, the intervals between catheterizations may be increased; if they exceed 300 mL, fluid intake should be restricted. Between each catheterization, the volume of fluids ingested should not exceed 150 mL, while maintaining, however, a minimum total daily intake of 1200 mL (OE, 2009).

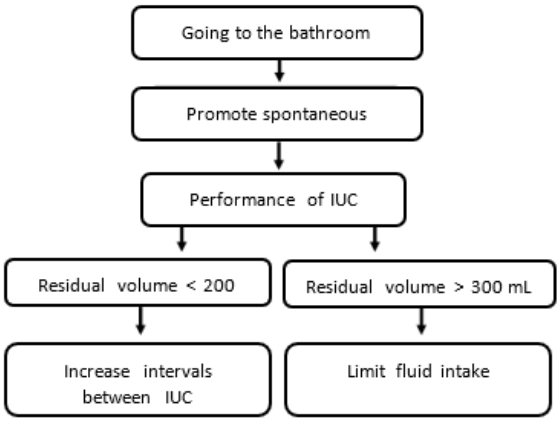

Figure 1

Flowchart of the IUC procedure

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The role of the Rehabilitation Nurse Specialist is essential in the functional assessment, planning, and implementation of educational interventions that empower individuals to achieve self-control and self-catheterization, contributing to social reintegration and independence in activities of daily living (Faleiros et al., 2021). Initially, the technique must be taught and practiced under the supervision of the Rehabilitation Nurse Specialist and subsequently performed by the individual themselves or by a caregiver, once they have been properly instructed (OE, 2009).

Although widely described in the literature, this technique remains underutilized in clinical practice. Thus, the primary objective of this case report is to share the experience of applying IUC, highlighting the benefits facilitated by the care provided by the Rehabilitation Nurse Specialist, thereby contributing to the strengthening of scientific evidence and the improvement of care for individuals with spinal cord injury.

This study is based on Afaf Meleis's Transitions Model, which conceptualizes the transition from dependence to autonomy as a dynamic process influenced by personal, environmental, and health-related factors, and which can be assessed through response patterns and outcome indicators, such as the acquisition of skills, the level of autonomy, and the capacity for self-care (Meleis, 2010). In this context, the Rehabilitation Nurse Specialist plays a central role as a facilitator of the transition by identifying vulnerabilities, promoting adaptive strategies, and providing progressive training in the IUC technique, enabling the individual to achieve mastery of bladder self-control.

METHODOLOGY

This article presents a case report of a person with a spinal cord injury resulting from a dorsal intradural lipoma, treated using the IUC technique in a surgical unit. The study aims to identify the interventions performed by the Rehabilitation Nurse Specialist team and the health benefits obtained by the person with the spinal cord injury.

This is a descriptive, observational, and retrospective clinical case report involving a 38-year-old male diagnosed with a dorsal intradural lipoma, who was hospitalized in a surgical ward for five weeks between October and November 2025. This methodological approach is suitable for an in-depth and contextualized analysis of a complex clinical phenomenon, allowing for a detailed description of the Rehabilitation Nurse Specialist intervention and the associated health benefits.

The inclusion criteria for the case were: an adult with incomplete spinal cord injury, manual dexterity, indication for IUC, enrollment in a rehabilitation program, and informed consent to participate in the study. The selection of this case is justified by its clinical uniqueness, particularly the vesicoureteral functional recovery associated with the structured rehabilitation intervention.

His medical history includes peripheral neuropathy and rhinosinusitis. He underwent a D2-D5 laminectomy on October 2, 2025. This clinical case is considered unique, as the patient was, at the time of admission, self-sufficient and independent in his activities of daily living, with no motor deficits. However, following surgery to remove the dorsal intradural lipoma, he developed motor, sensory, and proprioceptive deficits. Being a young and

motivated individual, through intensive rehabilitation training, he was able to progressively reverse his vesicoureteral dysfunction using the IUC technique.

This individual was enrolled in a functional motor rehabilitation program consisting of a total of 15 sessions, each lasting approximately 50 minutes. Criteria were established for suspending or postponing sessions, specifically the presence of headaches, general malaise, or the scheduling of additional diagnostic tests coinciding with the session times.

To assess progress and bladder-urinary recovery, clinical evaluations recorded in the Sclinic® computer system were used, as well as the voiding diary.

The variables monitored included: post-void residual volume, frequency and intervals of urge incontinence, presence of spontaneous urination, occurrence of urinary tract infections, and level of independence in performing the technique.

The voiding diary is an essential tool for these individuals, allowing for a comprehensive and objective assessment of urinary patterns. Through it, it is possible to identify, in chronological order, the day and times of urination, the amount of fluids ingested, urine volume, the need or urgency to urinate, involuntary urine leakage, and activity at the time (Faleiros et al., 2021). This tool accompanies the individual during hospitalization and is also used in subsequent phases, particularly during assessment in rehabilitation facilities.

The use of standardized institutional clinical records and the voiding diary, a tool widely recommended in the literature, as well as the systematic recording of data by the same rehabilitation nursing team, contributed to the consistency and reliability of the information collected (Faleiros et al., 2021; OE, 2009).

This case report was structured in accordance with the CAseREport (CARE) guidelines, with necessary adaptations made to account for the specific nature of the clinical case.

The application of the CARE guidelines included a description of the clinical context, participant characteristics, the intervention performed, a timeline of the rehabilitation process, the outcomes achieved, and implications for clinical practice, as recommended for health-related case reports (Gagnier et al., 2013).

The intervention protocol included structured training in the IUC technique, with defined schedules, monitoring of post-void residual urine, and progressive adjustment of the intervals between catheterizations, integrated into an individualized rehabilitation nursing program.

It should be noted that the participant signed an informed, clear, and voluntary consent form for health interventions in accordance with Regulation Nº 15/2013 of the Directorate-General for Health, updated on November 4, 2015. The study received approval from the Health Ethics Committee, with approval code 2026-04. Anonymity and confidentiality of the data were ensured through the omission of identifying information and the protection of clinical data, in accordance with the ethical principles of the Declaration of Helsinki (World Medical Association, 2024).

RESULTS

The rehabilitation nursing program consisted of 15 sessions, each lasting approximately 50 minutes, during which various individualized interventions were implemented, tailored to the identified needs. In this specific case and considering the assumptions of Meleis's Theory of Transitions (Meleis, 2010) with a focus on vulnerabilities, response patterns, and emerging needs during the transition process, the nursing diagnosis of impaired bladder elimination was established as a priority. As part of the care process, the following rehabilitation nursing interventions were implemented:

- Monitor fluid intake;
- Insert a urinary catheter according to a predetermined schedule;
- Monitor urine output (according to defined intervals);
- Observe urine output (color, clarity, presence of sediment, hematuria, odor, volume);
- Identify complications (urinary leakage, sensation of bladder fullness, trauma, or presence of exudate);
- Assess potential for improving knowledge;
- Assess ability to use adaptive strategies for using the restroom;
- Assess management of the treatment regimen;
- Teach about management of the treatment regimen;
- Instruct on exercise patterns (IUC technique);
- Teach about exercise patterns (IUC technique);
- Provide training on exercise patterns (IUC technique);
- Assist with treatment regimen management;
- Encourage involvement in treatment regimen management;
- Provide devices for toilet use.

In the initial phase, the focus was on training and motivation for performing the technique. The individual received personalized guidance, considering their educational background, knowledge of urinary physiology, and the changes resulting from the spinal cord injury. The importance of going to the bathroom and performing the Valsalva maneuver (Faleiros et al., 2021; Hoeman, 2011) to initiate urination was explained, as well as hand and genital hygiene, the handling of clean and/or sterile supplies, the steps of the procedure, and the benefits of bladder training.

Next, the technique was demonstrated and performed step-by-step in a safe and controlled environment, with immediate answers to all questions raised by the individual, ensuring full understanding of each step. For reasons of comfort and safety, the technique was performed in bed, in accordance with the individual's functional limitations.

Only two instructional sessions were required, after which the individual gained the ability to perform the technique independently.

This procedure was maintained for 20 days (beginning on October 14 and ending on November 3, 2025). Initially, there was an 18-day period with four-hour intervals between each catheterization. Subsequently, there was a 2-day period with five-hour intervals. During the night, the patient remained in bed to ensure adequate rest; no complications were recorded throughout this

procedure, particularly urinary tract infections. The process was concluded when the residual urine volume after voiding was less than 50 mL.

In total, 74 IUC procedures were performed, of which 63 were accompanied by spontaneous voiding and 11 without spontaneous voiding. The data were analyzed descriptively, based on clinical records and the voiding diary, using frequency analysis, episode counting, and calculation of daily averages of residual volumes, without resorting to inferential statistics.

A graph showing the daily average residual volume over time is presented, revealing a progressive reduction in values. Figure 2 represents the temporal evolution of the average residual volume (mL) over the days of the rehabilitation nursing program (X-axis: days; Y-axis: average residual volume in mL). It should be noted that on the 18th day, the 5/5-hour IUC regimen began, and it was suspended on the 20th day.

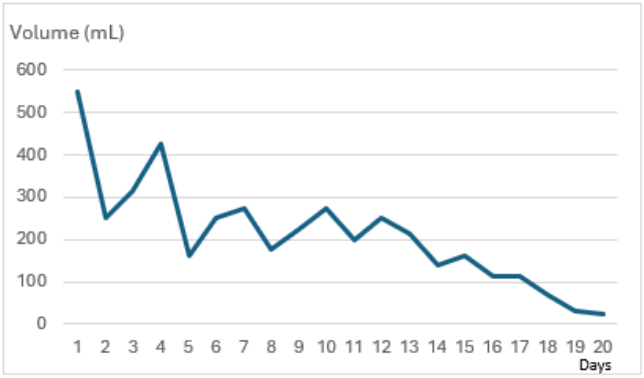

Figure 2

Diagram showing the average IUC volume throughout the rehabilitation nursing program

DISCUSSION

The gradual and complete recovery of bladder function observed in this clinical case demonstrates that IUC, when integrated into an individualized and systematic rehabilitation program, allows not only for the preservation of renal function but also for an improvement in quality of life, reinforcing the importance of interventions that promote and facilitate healthy transition processes sensitive to the person's particular needs, meanings, and conditions (Meleis, 2010). According to the Guide to Good Practices for People with Spinal Cord Injury (OE, 2009), empowering people with spinal cord injury is one of the main objectives of rehabilitation, which is confirmed by this case report.

The results obtained in this study suggest that the integration of IUC into a structured rehabilitation nursing program, combined with the educational intervention of the Rehabilitation Nurse Specialist, can contribute significantly to the recovery of bladder function and the promotion of self-care.

However, there is disagreement among authors regarding the performance of urodynamic studies. While some argue that IUC should only be initiated after a detailed urodynamic study has been performed (Fishberg et al., 2025; Sociedade Brasileira de Urologia, 2008), others consider that

people with spinal cord injuries should be advised to begin IUC regardless of whether such an examination is performed (Assis et al., 2020).

In clinical practice, it is observed that many hospitals do not offer this diagnostic test; consequently, it is often performed only months after the acute phase, usually during hospitalization in a rehabilitation unit. This situation leads to a delay in the initiation of IUC, which in turn delays the entire rehabilitation process for this type of intervention and hinders a speedy recovery. Thus, based on clinical experience, we reinforce the position of some authors who advocate for the initiation of IUC even in the absence of a prior urodynamic study, provided that the individual is enrolled in a continuous rehabilitation program and meets the essential clinical conditions for its implementation (Assis et al., 2020; Nascimento, 2020).

Beyond the technical aspects, this case highlights the importance of motivational and cognitive factors in the success of the rehabilitation process. It can be stated that the individual's motivation, dexterity, and health literacy were key elements in the success of the intervention. Active involvement, understanding of the procedure's stages, and commitment to self-management of the therapeutic regimen contributed decisively to the results achieved. This aligns with authors who note that motivation, dexterity, and mental ability are the keys to success (Assis et al., 2020).

This report describes a patient with an incomplete spinal cord injury, a condition that has significant implications for the success of the IUC regimen. The incomplete nature of the spinal cord injury is a key determinant of IUC success, as the partial preservation of neural pathways facilitates a better functional response, greater learning capacity, and increased autonomy in performing the procedure (Wu et al., 2024).

In this specific case, the IUC procedure was performed 74 times; of these, the patient achieved spontaneous voiding 63 times and did not achieve spontaneous voiding 11 times. Since spontaneous voiding outnumbered non-voiding episodes, this was an indication that the procedure was likely to proceed successfully.

Thus, the fact that the injury was incomplete and that an early rehabilitation program was initiated contributed to the greater effectiveness of the IUC intervention, as well as to a higher likelihood of the individual's active participation in the therapeutic regimen—factors that are reflected in the positive results obtained.

It is important to note, however, that this approach must be considered on a case-by-case basis, within an interdisciplinary context and with close monitoring, taking into account the individual's clinical characteristics and available resources; it should not be interpreted as a universal recommendation.

From a conceptual standpoint, the observed progress can be interpreted in light of Afaf Meleis's Transitions Model, demonstrating indicators of a healthy transition, namely the progressive acquisition of skills, increased autonomy, and mastery of bladder self-control throughout the rehabilitation process (Meleis, 2010).

However, it is important to note that the results presented should be interpreted with caution, as

this is a single-case study with specific clinical characteristics, namely an incomplete spinal cord injury and participation in a structured rehabilitation nursing program, which may limit its generalizability to other clinical contexts.

Nevertheless, this study contributes to rehabilitation nursing practice by highlighting the importance of early, structured, and person-centered intervention, as well as by reinforcing the role of Rehabilitation Nurse Specialist in empowering self-care, emphasizing the need for future research with larger samples and the development of clinical protocols in this area.

CONCLUSION

Given the objective of this study, it was found that the IUC intervention facilitated the recovery of bladder function, demonstrating a significant reduction in post-void residual urine and the restoration of spontaneous and effective urinary elimination. These results demonstrate that the use of IUC, under the guidance and supervision of the Rehabilitation Nurse Specialist, constitutes a fundamental intervention for promoting independence, bladder control, and quality of life in individuals with spinal cord injury.

The objectives defined for the rehabilitation program were fully achieved, confirming that IUC, when applied systematically and individually, was an effective strategy in preventing urological complications and in the functional rehabilitation of the neurogenic bladder. The study further reinforces the importance of the Rehabilitation Nurse Specialist skills as a facilitator and promoter of self-care, in conjunction with Afaf Meleis's Transitions Model (Meleis, 2010).

Key determinants of the observed health gains include the individual's motivation, health literacy, and the incomplete nature of the spinal cord injury, which enhanced adherence to the therapeutic regimen and the acquisition of skills for bladder self-control.

The report under review makes significant contributions to the fields of health sciences and nursing, highlighting the importance of an educational and rehabilitative approach to bladder training, as well as the need to raise awareness among multidisciplinary teams regarding the early implementation of IUC as a therapeutic and preventive intervention.

From a theoretical perspective, this study highlights the usefulness of Afaf Meleis's Transitions Model in understanding and guiding the transition process of individuals with spinal cord injuries, particularly in the shift from a state of dependence to autonomy in bladder self-control.

Implications for practice

This study reinforces the need for early, systematic, and individualized implementation of IUC in rehabilitation programs, as well as for structured educational intervention by Rehabilitation Nurse Specialist to empower individuals to manage their self-care. It also highlights the importance of continuous monitoring using tools such as a voiding diary and the adjustment of catheterization intervals based on clinical progress.

The results of this study are supported by scientific evidence that IUC positively contributes to the autonomy and independence of individuals with spinal cord injury. However, these results do not

allow for generalization of the data. Limitations include the nature of the study as a single-participant case study and the inability to control for external variables. Therefore, broader studies should be conducted, with well-defined protocols and/or decision-making algorithms in this area, to ensure greater scientific robustness.

CONFLICTS OF INTEREST

No conflicts of interest were identified.

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