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ENFERMAGEM DE REABILITAÇÃO NA RECUPERAÇÃO FUNCIONAL DA PESSOA COM LESÃO MEDULAR: RELATO DE CASO

REHABILITATION NURSING CARE IN FUNCTIONAL RECOVERY OF INDIVIDUALS WITH SPINAL CORD INJURY: A CASE REPORT

ENFERMERÍA DE REHABILITACIÓN EN LA RECUPERACIÓN FUNCIONAL DE PERSONAS CON LESIÓN MEDULAR: INFORME DE CASO

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RESUMO

Introdução: A lesão medular afeta milhões de pessoas, comprometendo a função motora e sensorial. O Enfermeiro Especialista em Enfermagem de Reabilitação desempenha um papel fundamental na transição da pessoa da independência para uma dependência total ou moderada.

Metodologia: Foi realizado um estudo de caso clínico no período de junho a julho 2023, centrado numa pessoa com recuperação motora clinicamente improvável. Um programa de reabilitação funcional motora foi implementado, monitorizando-se a evolução através de instrumentos de avaliação validados para a área da especialidade.

Resultados: O Índice de Barthel evoluiu de um grau de dependência elevado para moderado; na Medida de Independência Funcional, a independência motora aumentou de 15 para 52. A pessoa adquiriu equilíbrio estático e dinâmico sentado, com melhorias na força muscular dos membros inferiores.

Discussão: Apesar dos dados iniciais sugerirem uma incapacidade na recuperação motora, observou-se uma melhoria considerável, especialmente a nível proximal. Houve também progresso no autocuidado e na capacidade se transferir com material de apoio para a cadeira de rodas e independência na mobilidade em cadeira de rodas. Limitações no estudo incluíram recursos limitados e exclusão de alguns focos como eliminação intestinal e vesical.

Conclusão: Uma intervenção sistemática de enfermagem de reabilitação pode resultar em ganhos significativos em saúde, promovendo a adaptação da pessoa à sua nova condição e autonomia no quotidiano, incluindo a reversão de défices motores.

Descritores: Lesões da Medula Espinhal; Estado Funcional; Enfermagem de Reabilitação; Relatos de Casos.

ABSTRACT

Introduction: Spinal cord injury affects millions of people, compromising both motor and sensory functions. The Specialist Nurse in Rehabilitation Nursing plays a crucial role in guiding individuals through the transition from independence to either total or moderate dependence.

Methodology: A clinical case study was conducted from June to July 2023, focusing on an individual with clinically unlikely motor recovery. A motor functional rehabilitation program was implemented, with progress monitored using validated assessment tools specific to the specialty area.

Results: The Barthel Index improved from a high level of dependence to a moderate level. In the Functional Independence Measure, motor independence increased from 15 to 52. The patient achieved both static and dynamic sitting balance, with improvements in lower limb muscle strength.

Discussion: Despite initial data suggesting a motor recovery impairment, considerable improvement was observed, especially at a proximal level. There was also progress in self-care and the ability to transfer with assistive devices to the wheelchair, as well as independence in wheelchair mobility. Study limitations included limited resources and the exclusion of some aspects such as bowel and bladder elimination.

Conclusion: A systematic rehabilitation nursing intervention can result in significant health gains, promoting the individual's adaptation to their new condition and autonomy in daily life, including the reversal of motor deficits.

Descriptors: Spinal Cord Injury; Functional Status; Rehabilitation Nursing; Case Reports.

RESUMEN

Introducción: La lesión medular afecta a millones de personas, comprometiendo la función motora y sensorial. El Enfermero Especialista en Enfermería de Rehabilitación desempeña un papel fundamental en la transición de la persona desde la independencia hacia una dependencia total a moderada.

Metodología: Se llevó a cabo un estudio de caso clínico en el período de junio a julio de 2023, centrado en una persona con una recuperación motora clínicamente improbable. Se implementó un programa de rehabilitación funcional motora, monitoreando la evolución a través de instrumentos de evaluación validados para el área de especialización.

Resultados: El Índice de Barthel evolucionó de um grado de dependência elevado a moderado; en la Medida de Independencia Funcional, la independencia motora aumentó de 15 a 52. La persona adquirió equilibrio estático y dinámico em posición sentada, com mejoras em la fuerza muscular de los miembros inferiores.

Discusión: Apesar dos dados iniciais sugerirem uma incapacidade na recuperação motora, observou-se uma melhoria considerável, especialmente a nível proximal. Houve também progresso no autocuidado e na capacidade se transferir com material de apoio para a cadeira de rodas e independência na mobilidade em cadeira de rodas. Limitações no estudo incluíram recursos limitados e exclusão de alguns focos como eliminação intestinal e vesical.

Conclusión: Uma intervenção sistemática de enfermagem de reabilitação pode resultar em ganhos significativos em saúde, promovendo a adaptação da pessoa à sua nova condição e autonomia no quotidiano, incluindo a reversão de défices motores.

Descriptores: Lesiones de la Médula Espinhal; Estado Funcional; Enfermería em Rehabilitació; Informes de Casos.

INTRODUCTION

Spinal cord injury is undoubtedly a very serious type of injury, causing dysfunctions that have a significant impact on a person's quality of life [1,2]. Of the many disabling conditions that can affect humans, spinal cord injury is one of the most dramatic, with a profound impact on the quality of life of those affected [3]. In this context, when we consider the physiological importance of the spinal cord, not only as a transmitter of impulses and messages from the brain to all parts of the body and vice versa, but also as a nerve center in itself, controlling functions such as posture, bladder and bowel elimination, sexual function, breathing and temperature regulation, we realize the consequences that an injury at this level can have [4].

After a spinal cord injury occurs, the spinal nerves that are located above the injury function normally, while those located at the site of the injury or below it can no longer send "messages" to the brain or to any part of the body, as they did previously [4].

Research shows that a person who suffers a spinal cord injury experiences numerous losses, affecting to varying degrees the ability to satisfy their self-care, leading to compromised self-image, self-esteem, and the social role they previously played [1,2,3,5].

All changes related to this condition have a significant impact on the quality of life of the person and their family and may even lead to the deconstruction of the family and social dynamics in which the person is inserted [1,3].

According to the World Health Organization, it is estimated that approximately 15 million people currently suffer from spinal cord injuries, resulting from trauma or non-traumatic causes. Spinal injuries are one of the main causes of long-term disability. The severity and symptoms vary depending on the severity of the injury and its location and may result in complete or incomplete loss of sensory and/or motor functions below the injury [6]. Functional recovery after spinal cord injuries is a complex process that involves biological, psychosocial, and environmental factors. It is recommended that the therapeutic intervention plan be implemented early, aiming to increase autonomy and maximize the person's active participation [3]. This is a complex process that requires the collaboration of a multidisciplinary team, highlighting the fundamental role played by the Specialist Nurse in Rehabilitation Nursing (SNRN) [1,3].

In this context, the SNRN plays a fundamental role, with an emphasis on restoring the person's independence or, when this is not possible, on promoting maximum independence and quality of life, in the shortest possible time, through a dynamic process focused not only on physical aspects, but also on mental, spiritual, social and economic aspects.

The SNRN's skills are essential in the rehabilitation process of people with spinal cord injuries, from admission to discharge, with a focus on promoting maximum possible autonomy and adapting care to the specific needs of each user.

The aims of Rehabilitation Nursing (RN) are broad and must be outlined individually, with the active collaboration of the person, with the main aim of improving their life and providing a practical and permanent improvement in function [1,5]. Sousa et. al mapped nursing interventions that promote the independence and autonomy of people with spinal cord injuries in the acute and post-acute phases, demonstrating that specific interventions aimed at these people contributed to the reduction of disabilities and promoted the recovery of independence, especially in mobility, bladder and bowel elimination, skin integrity, sexuality and psychological well-being. The implementation of an adequate and timely rehabilitation program, initiated in the acute and subacute phases, can mitigate the impacts on the lives of people with spinal cord injuries [1]. Regarding the area of mobility, passive mobilization of the lower limbs, isometric exercises, active and active-assisted exercises, balance training and the use of a static cycle ergometer are recommended to promote functionality [1,5]. The upper limbs, in paraplegic people, must be strengthened to compensate for the functionality of the lower limbs [4]. The design of this case was based on Meleis' theory [7], which argues that nurses should play a crucial role in the health/illness transition process and be skilled in enabling the person to actively participate in their own rehabilitation process. This includes assessing the person's capacity to engage as an agent in the recovery of their ongoing and effective autonomy.

METHODOLOGY

Given the issues outlined in the previous chapter, we decided to report a case study that addresses the provision of RN care in the daily routine of the Neuro-traumatology service, aimed at a person with a medical diagnosis of extensive and irreversible spinal cord injury.

This case study aims to identify the benefits of the SNRN's work in the functional recovery of a person with irreversible spinal cord injury.

A retrospective analysis was carried out on the intervention carried out by the SNRN covering the period between June and July 2023. This type of study "reflects the profession's interest in organizing its work, based on establishing its actions in the analysis of the patient's history" [8] (pg. 372).

This case report refers to a person diagnosed with dorsal disc herniation at level D7-D8, and it is considered a unique case. At a clinical level, the motor

deficits were considered irreversible and without any type of recovery due to prolonged spinal cord compression. This person was included in a rehabilitation nursing program and a total of 18 sessions were carried out, each lasting approximately 40 minutes.

The following criteria were established to suspend or postpone the rehabilitation sessions: lack of interest in participating in the rehabilitation program at the beginning of the session, presence of nausea, systolic blood pressure <90 mmHg, temperature >38ºC and completion of complementary diagnostic tests at the time of the sessions.

The included participant signed the informed, informed and free consent for health acts/interventions, in accordance with standard no. 015/2013 of the Directorate-General for Health. The study received a favorable opinion from the Ethics Committee for Health, with approval code 2024-22, and was authorized by the Board of Directors of the institution. Assessment instruments recommended by the Portuguese Nursing Association [9] were used to document specialist care, including: assessment of muscle movement using the Medical Research Council Muscle Scale (MRC), Barthel Index, Functional Independence Measure (FIM), as well as specific assessments of static and dynamic balance recommended by the information system in force during hospitalization. In addition, instruments were used to assess the level of self-care related to hygiene and sanitary use.

This case study was organized considering the CAse REport (CARE) guidelines [10], providing a better structuring of this case report. The necessary adaptations were made to adapt the report to the specific context of the case under analysis.

CASE PRESENTATION

Anamnesis

The anamnesis is essential to achieve a complete and accurate understanding of the person, by identifying their current health status, personal history, symptoms presented, among others. This step is fundamental, as it guides the SNRN in defining a personalized care plan, adjusted to the specific needs of the user, promoting a holistic and person-centered approach.

This case report describes a 65-year-old male person, previously independent in activities of daily living (ADL) and walking, with a personal history of glaucoma, peripheral arterial disease and former smoker (47 cigarettes per day). He lives in an apartment with his mother, and he is her caregiver.

He went to the Hospital on 06/12/2023 due to a progressive decrease in the strength of his lower limbs since 06/07/2023, with paresthesia of the lower limbs up to the root of the thigh, associated with the inability to walk since 06/09/2023.

He was admitted with a diagnosis of dorsal disc herniation D7-D8 with spinal cord compression. Upon admission, he presented maintained strength in the left lower limb and grade 2 strength in thigh and plantar flexion, grade 3 strength in leg extension and grade 1 in dorsiflexion of the right lower limb. However, on 06/16/2023, he presented plegia of the right lower limb and generalized grade 2 strength in the left lower limb. He underwent a D7-D8 costotransversectomy and emergency discectomy due to worsening motor deficits. Clinically, the lesion presented significant extension, resulting in clinically irreversible motor function of the lower limbs.

REHABILITATION NURSING ASSESSMENT

An initial assessment of the person was carried out, which included the following items present in the information system of the service in question:

- Consciousness (Glasgow Coma Scale) - conscious and oriented in time, space and person, Score 15;
- Communication - little communicative, but without changes;
- Ventilation - without changes;
- Cognitive assessment (FIM) - without changes;
- Muscle movement in body segments (MRC Scale) - Grade 5 in the upper limbs; left lower limb presents grade 1 strength in hip flexors and extensors, knee flexors, knee extensors, dorsiflexion and plantar flexion, finger flexors and extensors. Right lower limb presents grade 0 strength;
- Sensitivity and proprioception - ASIA Classification A; sensory level T7-T8. No sensitivity in the perineal region. Presents proprioceptive deficits on the right;
- Joint stiffness - none;
- Body balance - no static and dynamic body balance; Self-care (Barthel Index) - highly dependent self-care;
- Functional capacity (FIM) - 14/91 points, totally dependent;
- Risk of pressure ulcer (Braden Scale) - high risk of pressure ulcer;
- Risk of falls (Morse Scale) - low risk of falls;
- Bladder elimination - catheterized with long-term urinary catheter No. 16;
- Bowel elimination - constipated, with institution of bowel training, on alternate days.

To develop the RN program, the following focuses were identified, using the language of the International Classification for Nursing Practice and the Nursing Care Documentary Standard for the Rehabilitation Nursing Specialty, according to the information system adopted in the service:

- Selfcare;
- Muscle movement;
- Body balance;
- Moving.

It is important to highlight that the RN program could have been designed more comprehensively, including other equally relevant focuses of care. However, we chose to prioritize the needs of the person, aiming at a rapid reintegration into ADLs.

In this way, based on the selected focuses of care, the Nursing diagnoses in Sclinico were established, following the documentary standard of nursing care for the specialty. Based on the focuses outlined, RE interventions were initially prescribed, as shown in Table 1.

Table 1 – Focuses and interventions of RN

Atention focus	Interventions of RN
Highly compromised muscle movement	• To assess muscle movement (MRC Scale); • To perform muscle exercises (passive and passive/assisted mobilizations of the lower limbs: toe flexion/extension, tibiotarsal inversion/eversion, dorsiflexion/plantar flexion, knee flexion/extension, internal and external rotation, abduction/adduction and hip flexion/extension, internal and external rotation with knee and hip flexion) - 1 series of 10 repetitions • To encourage muscle exercises: self-mobilizations, rolls, bridge exercises - 1 series of 10 repetitions; • To instruct on muscle exercises: muscle strengthening exercises with elastic bands and electric cycle ergometer; • To perform joint muscle exercise techniques using devices: pilates ball, elastic bands and electric cycle ergometer (series of 10 repetitions, according to the person's tolerance).
Compromised body balance, to a high degree	• To assess body balance (static and dynamic balance while sitting) • To perform positioning techniques to promote body balance: postural correction, exercise in a sitting position (hands on the bed and feet on the floor; arms stretched forward, right, left and feet on the floor); • To encourage training body balance (exercises in a wheelchair with push-ups, lateral trunk tilt and trunk flexion).
Transferring compromised, to a high degree	• To assess their transferring; • To instruct the transfer with a device (transfer technique with a transfer board); • To encourage the transfer.
Potential to improve capacity for use of adaptive strategies	• To assess ability to use adaptive strategies to transfer; • To instruct to transfer with device (slide transfer board); • To provide device to transfer • To train transferring with devices.
Highly compromised self-care	• To assess self-care (Barthel Index and FIM).

Atention focus	Interventions of RN
Potential for reconstruction of autonomy, to a moderate degree	• To assess the potential for rebuilding autonomy; • To encourage the person to take care of themselves (eating, hygiene and sanitation); • To encourage progress; • To encourage hope.

Subtitles: MRC - Medical Research Council; MI - Lower Limbs; MIF - Functional Independence Measure

RESULTS

The RN program included 18 sessions, each lasting approximately 40 minutes. Throughout the program, the exercises became progressively more complex, adapting them to the specific needs of the individual to promote a more personalized and effective approach to RN. The data obtained were subjected to detailed analysis and organized into tables, reflecting the evaluation of the scores on the previously mentioned scales. This approach allowed a systematic and comparative visualization of the evolution of the indicators, providing a deeper understanding of the individual's progress throughout the rehabilitation program sessions. Regarding the evaluation of self-care using the Barthel Index, a transition was observed from the individual's state of total dependence in the 1st session to moderate dependence at the end of the rehabilitation nursing program, as shown in Table 2.

Table 2 - Evaluation of self-care using the Barthel Index

Item/Description	1st session	7th session	18th session
Feeding	10	10	10
Transfers	0	5	10
Toilet	0	0	0
Toilet use	0	0	5
Bathing	0	0	0
Going up and down stairs	0	0	0
Dressing	5	5	5
Bowel control	0	0	0
Urinary control	0	10	10
Mobility	0	0	5
Total	15 Total dependece	30 Severe dependence	45 Moderate dependence

Subtitle: Score: 0-20 Total dependence; 21-40 Severe dependence; 41-60 Moderate dependence; 61-100 Mild dependence

Regarding self-care: hygiene, a significant change was observed from the 7th session onwards, going from a high level of dependence to a moderate level of self-care, as indicated in Table 3.

Table 3 - Assessment of Self-Care: Hygiene

Item/Description	1st session	7th session	18th session
Drying the lower half of the body	D	AP	AP
Washing the lower half of the body	D	D	AP
Getting bathing supplies	D	D	AP
Washing the upper half of the body	D	AP	I
Drying the upper half of the body	D	AP	I
Turning on the tap and adjusting the water temperature	D	D	AP
Total	High degree (18)	High degree (15)	Moderate degree (8)

Subtitle: AP - needs help from someone; I - completely independent; D - dependent, does not participate

Regarding Self-Care: Sanitary Use, a high level of dependence was initially observed, evolving throughout the program to a moderate level of self-care, as assessed and recorded in Table 4.

Table 4 - Assessment of Self-Care: Sanitary Use

Item/Description	1st session	7th session	18th session
Positioning on the toilet/toilet	D	AP	AP
Performing intimate hygiene after urinating/having a bowel movement	D	D	AP
Taking off clothes	D	AP	AP
Putting on clothes	D	AP	AP
Standing up from the toilet	D	AP	AP
Total	High degree (15)	High degree (11)	Moderate degree (10)

Subtitle: AP - needs help from someone; I - completely independent; D - dependent, does not participate

During the sessions, the assessment of muscle strength in the lower limbs was monitored in each segment, in order to observe any changes throughout the program (Table 5).

Table 5 - Assessment of muscle movement in the lower limbs using the modified Medical Research Council scale

Muscle movement Segments	1st session	7th session	18th session
Right coxofemoral	0/5	0/5	1/5
Left coxofemoral	1/5	1/5	3/5
Right knee	0/5	0/5	0/5
Left knee	1/5	1/5	2/5
Right tibiotarsal	0/5	0/5	0/5
Left tibiotarsal	1/5	2/5	2/5

Subtitle: Degree 0/5 - no palpable or visible muscle contraction; Degree 1/5 - palpable or visible contraction, but no limb movement; Degree 2/5 - movement without overcoming gravity throughout almost the entire joint range; Degree 3/5 - movement that overcomes gravity throughout almost the entire joint range but does not overcome resistance; Degree 4/5 - movement against moderate resistance throughout the entire joint range, which overcomes gravity; Degree 5/5 - normal strength.

To determine the type of motor dependence, the FIM scale (motor subtotal) was used, thus allowing the transcription of the gains achieved throughout the program (Table 6).

Table 6 - Assessment of the Functional Independence Measure (motor subtotal)

Item/Description	1st session	7th session	18th session
Self-care	8	15	28
Sphincter control	2	2	2
Mobility	3	9	15
Locomotion	2	5	7
FIM (motor subtotal)	15	31	52

Subtitle: Total motor dependence - 13; Total motor independence - 91. Levels: 1 - Total help; 2 - Maximum help (>25%); 3 - Moderate help (>50%); 4 - Minimum help (>75%); 5- Supervision; 6 - Modified independence (technical help); 7 - Complete independence

Body balance was assessed according to the information system adopted in the service. Table 7 describes the degree of development and acquisition of static and dynamic balance while seated throughout the program.

Table 7 - Analysis of the assessment of body balance

Item/Description	1st session	7th session	18th session
Static sitting balance	No	Yes	Yes
Dynamic sitting balance	No	No	Yes

DISCUSSION

Based on the data obtained, we can conclude that the RN program had an effective impact on promoting the functional recovery of the person described in this case.

Based on the motor deficits initially identified, the clinical data suggested that functional recovery would be unlikely due to prolonged spinal cord compression. Therefore, given the clinical assessment that indicated irreversibility of these motor deficits, training was provided to promote the person's independence in moving around in a wheelchair and in transferring between the chair and the bed using a transfer board.

However, throughout the rehabilitation program, a surprising improvement in the levels of muscle strength at the level of the various segments of the lower limbs was observed, contrary to initial expectations. In addition, there was a notable improvement in static and dynamic balance while sitting.

Given the initial expectation of no motor recovery due to the spinal cord compression to which he had been subjected, the SNRN intervention focused on promoting the person's independence in his ADLs. The main objective was to enable the person to achieve the highest possible degree of autonomy in their activities of daily living, which was also in line with the person's own objective, which was outlined together with them. This was reflected in improvements in the scales used throughout the sessions, resulting in significant gains for the person's health.

According to Sousa et. al. [1], who mapped studies related to people with spinal cord injuries in the acute and subacute phases, there are several areas of nursing intervention in this type of person, one of which is mobility management, referring to functionality training, which was the focus of this case report.

In this case, we observed, based on the Barthel Index, a progression from total dependence to moderate dependence throughout the rehabilitation program. This result is in line with authors [1], who highlight the importance of training in activities of daily living (ADL). With regard specifically to self-care for hygiene and use of the toilet, an evolution was observed from a high degree to a moderate degree. Several studies [1,4] highlight the use of FIM in people with this type of pathology. Therefore, in this study, the motor subscale of FIM was applied, since the person did not present cognitive alterations.

In view of the motor deficits observed, muscle strengthening training was performed with an electric cycle ergometer, which is in line with the authors Gaspar et al. [5] and Panisset et al. [11], who point out that this type of exercise in people with complete spinal cord injury can promote the recovery of lower limb strength.

However, during the process, we identified some limitations in the SNRN approach. These include challenges in some sessions that did not meet the inclusion criteria or that did not result in a complete rehabilitation program, in addition to the restriction of the availability of the RN team due to the limited staffing of nurses in the service. Despite these limitations, we highlight the effort of the multidisciplinary team in promoting the functional recovery of the person, allowing independence in a wheelchair and autonomy to perform transfers using the transfer board between the bed and the wheelchair. This achievement provided greater freedom in people's daily lives.

Although significant progress has been made, we recognize that there are still a number of pending interventions that should have been carried out due to the lack of time and considering the importance of patient autonomy and their goals of reintegration into daily life, we chose not to focus on the area of elimination management (bladder and bowel). However, these limitations are in line with Henriques and Fumincelli [12] who state that the rehabilitation program should be realistic, focused on "the person's goals, helping them to bring them closer to reality, with hope" (pg. 433). Before this episode, the person played the role of caregiver for their mother, highlighting the relevance of rehabilitation not only focused on the person themselves, but also on their role within the family. Therefore, in this process we also focused on the area of intervention of psychological well-being management [1]. Throughout the process, it was crucial to emphasize progress and nurture hope in the person, especially when faced with the transition from full independence to total dependence in their ADLs, becoming unable to care for their mother. This made it possible to have an "effective coping process (...) more active participation with

more initiative and motivation in the rehabilitation process" [12] (pg. 433). Interventions that promote psychological well-being are essential both for promoting mental health and for improving adaptive coping strategies [1]. This case highlighted the need to improve and deepen our knowledge and interventions in relation to people with similar injuries, as well as highlighting the importance of strengthening the team and its knowledge of the specificities of this type of person to ensure more effective action by the SNRN.

CONCLUSION

The implementation of a structured program, focused on the real needs of the individual, proved to be effective in promoting functional recovery and autonomy. Over the course of 18 sessions, significant progress was made in the initially outlined areas, such as self-care, muscle movement, body balance and transfer, using adaptive strategies, namely wheelchair training to promote independence. This integrated approach allowed a transition from total to moderate dependence, highlighting the positive impact of careful and systematic planning of RN care. Thus, the results obtained suggest that RN care should be adapted to the specificities of each individual, with a view to significantly improving quality of life and independence in the recovery process.

However, it is important to highlight the limitations of this study, which were addressed throughout the article. Future research may contribute to the improvement of the interventions described, as well as to assess their applicability in different clinical contexts.

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Conceptualization: AI

Data Curation: AI

Formal analysis: IA, RC

Investigation: IA, RC

Methodology: IA

Project Management: IA

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Software: IA, RC

Supervision: IA

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I, the author of this work, declare that there are no conflicts of interest.

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