

## INTRICATE EVOLUTION AND REHABILITATION CHALLENGES IN AN INCOMPLETE PARAPLEGIA AIS/FRANKEL C PATIENT WITH CAUDA EQUINA SYNDROME AND COMPLEX ONCOLOGIC AND VASCULAR COMORBIDITIES

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## Disclosure statement

**I have no actual or potential conflict of interest in relation to this program/presentation.**

## Background

- Traumatic spinal cord injury represents a severe condition with long-term consequences, often leading to paraplegia or tetraplegia, and having a profound impact on the patient's functional status and psychosocial well-being.
- When associated with cauda equina syndrome, the clinical picture becomes even more complex, due to the presence of lower motor neuron deficits, sphincter dysfunction, neuropathic pain, and sensory impairment.

\* Margetis K, Das JM, Emmady PD. Spinal Cord Injuries. 2025 Jun 2. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan–. PMID: 32809556.

\*\* Onose G. – Ghid de evaluare clinico-funcțională în RMFB, Ed. Universitară „Carol Davila”, 2011

\*\*\*<https://www.aurorahealthcare.org/services/aurora-spine-services/spinal-cord-injury>

\*\*\*<https://www.healthplexus.net/article/cauda-equina-syndrome-review-all-you-need-know?page=1>

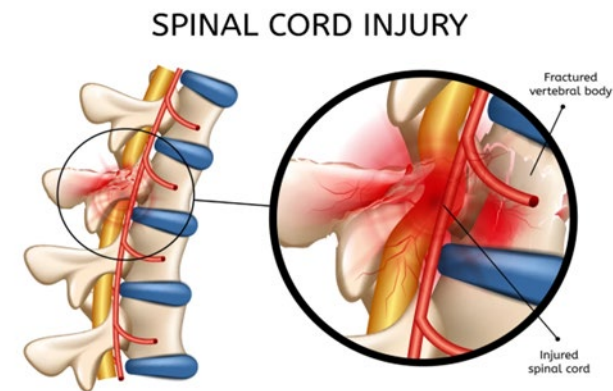


**Fig. 1.** The image shows an injury to the spinal cord and a fractured vertebra on part of the spine.\*\*\*

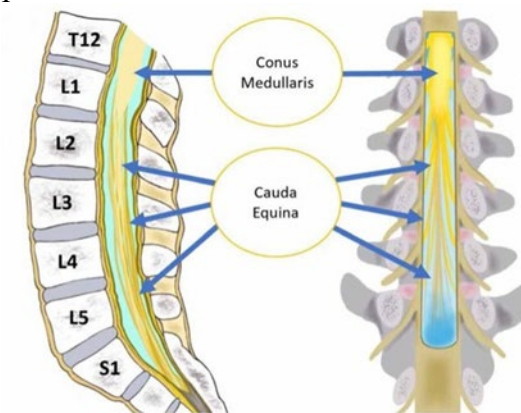


**Fig. 2.** Schematic representation showing the termination of the spinal cord as it ends in the conus medullaris (usually below L1) with nerve roots continuing caudally to become the cauda equina.\*\*\*

- Although spinal metastases are relatively common in the etiology of spinal cord injury, sacral involvement—particularly in colorectal cancer—is less frequent, but can result in pathological fractures and significant neurological deficits.
- In such complex clinical scenarios, the coexistence of multiple comorbidities requires an individualized and multidisciplinary rehabilitation approach, aimed at optimizing functional recovery and improving quality of life.\*

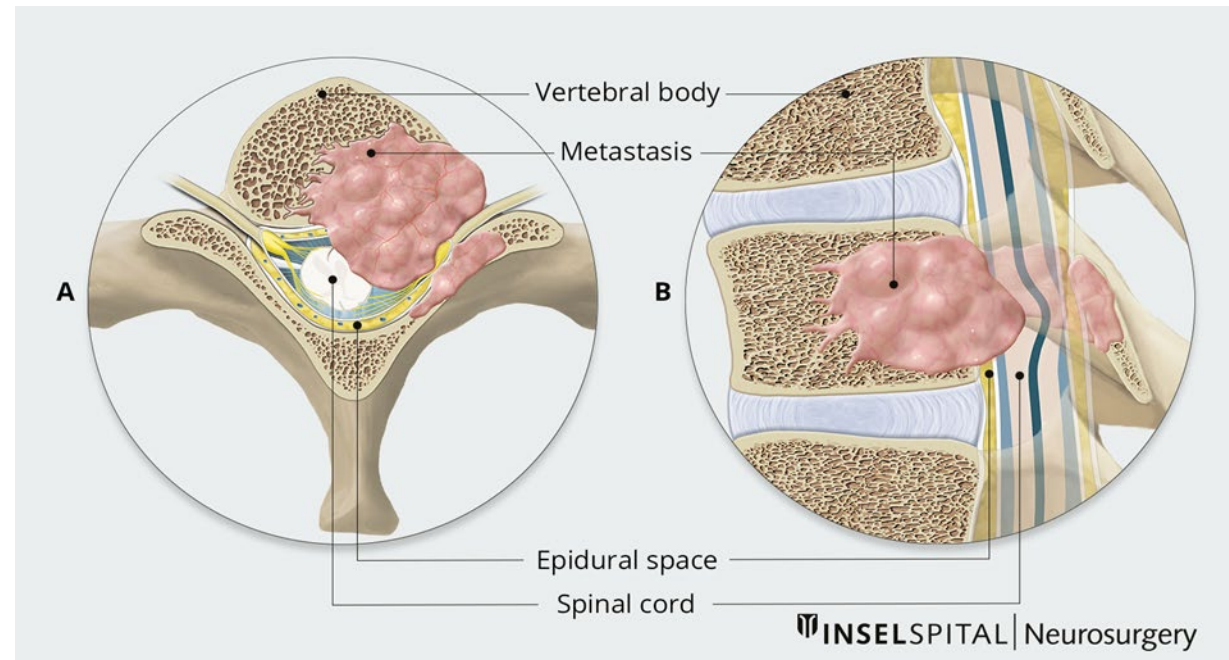


**Fig. 3.** Schematic representation of vertebral metastatic involvement with epidural extension and compression of neural structures, similar to the mechanism observed in this patient.\*\*

\* Ziu E, Viswanathan VK, Mesfin FB. Spinal Metastasis. [Updated 2023 Aug 14]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK441950/>

\*\*<https://neurochirurgie.insel.ch/en/diseases-specialities/spinal-disorders/vertebral-metastases>

## Case presentation

This paper presents a case report\* on neuromuscular rehabilitation in a patient with incomplete paraplegia AIS/Frankel C in the context of cauda equina syndrome, associated with an advanced oncological condition and multiple systemic complications.

The patient, M.C., aged 77 years old, was first admitted in 08.12.2025 to our clinic for:

- motor deficit characterized by incomplete paraplegia AIS/Frankel C,
- sphincter dysfunction,
- sensory deficits,
- intense lumbosacral and left shoulder pain,
- severe locomotor and self-care dysfunction,
- initiation of a rehabilitation program.

\* The patient has given his written informed consent to participate in this presentation and his agreement on processing personal data (Ethics Commission approval nr. 10088/27.02.2026)

## Heredocollateral history

No significant family history.

## Personal medical history

- Lumbosacral spinal cord injury associated with cauda equina syndrome following a S1 vertebral fracture on metastatic bone, treated with posterior spinal fixation (L4–S2) on 26.11.2025
- Locally advanced rectal carcinoma, diagnosed in July 2025. Chemotherapy and radiotherapy were initiated in September 2025 but discontinued after approximately two months
- Pulmonary embolism (segmental branch of the right pulmonary artery), middle lobe pulmonary nodule and pulmonary hypertension
- Generalized postmenopausal osteoporosis, diagnosed approximately 2 years ago, without documented follow-up, therapeutically neglected
- Incidental hepatic cyst, currently under observation
- Arterial hypertension (grade II)
- History of ischemic stroke (left MCA territory, 2013), with favorable motor recovery
- Cerebral small vessel disease
- Right pertrochanteric fracture, surgically treated (2013) – osteosynthesis with intramedullary nail and screw (MRI compatible)
- Left total hip arthroplasty (2013)
- Scapulohumeral periarthritis (right shoulder)
- Old rib fractures
- Small renal cysts
- Splenic calcifications
- Calcified uterine fibroids
- Multinodular goiter
- Cervical and thoracic spondylodiscarthrosis
- Neurogenic bladder – permanent urinary catheter, neurogenic bowel
- History of infections: urinary tract infection (*E. coli*) and urogenital candidiasis – treated

## *The history of the disease*

- A 77-year-old patient with multiple comorbidities, including rectal carcinoma diagnosed in July 2025. Chemotherapy and radiotherapy were initiated but discontinued after approximately two months.
- On 12 November 2025, the patient sustained a fall from standing height, resulting in a lumbosacral spinal cord injury with an S1 vertebral body fracture.
- Neurosurgical intervention was performed on 26 November 2025, consisting of posterior unilateral spinal fixation (L4–L5–S1–S2).
- Histopathological examination of two samples obtained from the S1 vertebral body confirmed bone metastasis of rectal origin in one sample, while the second showed osteoporotic changes

Imaging investigations performed during the neurosurgical hospitalization revealed the following findings:

## Thoracic CT:

Right pulmonary embolism (segmental branch)

Pulmonary nodular lesion ( $27 \times 15$  mm, right lung) + bilateral micronodules → suspicious for metastatic disease

Minimal left-sided pleural effusion

Dilated pulmonary trunk (39 mm) and ascending thoracic aorta (47 mm)

## Abdominal CT:

Hepatomegaly with diffuse steatosis + small hepatic cyst

Calcified uterine fibroids

Bilateral renal cysts (small, benign appearance)

## Pelvic CT:

S1–S2 fracture with displacement and L5–S1 anterolisthesis

Right pubic ramus fracture

Posterior spinal fixation L4–S2 (osteosynthesis material in situ)

Degenerative changes of the lumbar spine (disc space narrowing L1–S1)



Video 1,2 CT scan: chest, abdomen, and pelvis –  
17.11.2026



## *Objective clinical examination upon admission*

### GENERAL CLINICAL EXAMINATION

General condition: satisfactory; patient  
conscious, cooperative, oriented to time,  
place, and person.

BMI: underweight.

Facies: suffering.

Adipose tissue: poorly represented.

### LYMPHATIC SYSTEM

Superficial lymph nodes not palpable.

### CARDIOVASCULAR SYSTEM

Rhythmic heart sounds, with a grade IV/VI systolic murmur at the  
aortic area.

Jugular veins not distended.

Mild bilateral edema of the lower limbs

Blood pressure: 152/82 mmHg.

Heart rate: 79 bpm.

### UROGENITAL SYSTEM

Negative bilateral Giordano sign.

Patient with permanent urinary catheter.

### RESPIRATORY SYSTEM

Thorax with increased kyphosis; Vesicular breath  
sounds present bilaterally, slightly diminished at the  
bases; no rales on auscultation.  $SpO_2 = 96\%$   
spontaneously.

## INTEGUMENTS AND MUCOUS MEMBRANES

Pale, dehydrated; postoperative lumbosacral wound with partial dehiscence, serous discharge, and sutures in place; central venous catheter in the left femoral vein; periumbilical ecchymoses.



**Fig. 4.** Postoperative lumbosacral wound with partial dehiscence, serous discharge, and sutures in place

## NMAK examination

Conscious, cooperative, oriented to time, place, and person.

Cranial nerves within normal limits.

Motor deficit characterized by **incomplete paraplegia (AIS/Frankel C)**, with neurological level L1.

Muscle strength (MRC scale):

- Osteotendinous reflexes diminished bilaterally in the lower limbs
- Plantar reflexes in flexion bilaterally
- Hypoesthesia in the saddle area
- Neurogenic bladder (permanent urinary catheter)
- Neurogenic bowel

Right lower limb

|    |   |
|----|---|
| L2 | 2 |
| L3 | 2 |
| L4 | 2 |
| L5 | 3 |
| S1 | 3 |

Left lower limb

|    |   |
|----|---|
| L2 | 2 |
| L3 | 2 |
| L4 | 2 |
| L5 | 3 |
| S1 | 3 |

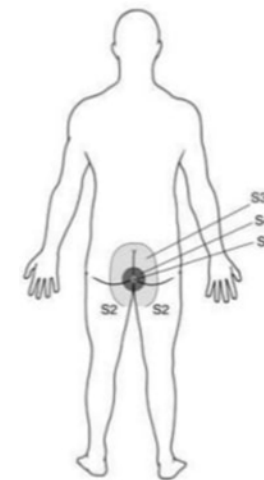


Illustration of saddle anesthesia;  
 - The S5, S4, and S3 nerves provide sensory innervation to the rectum, perineum, and inner thigh.

Source:  
 Journal of the American Academy of Orthopaedics Surgeons,  
<http://www.aaos.org>

**Fig. 5.** Illustration of saddle kypoesthesia/anesthesia\*

\*<https://www.orthobullets.com/spine/2065/cauda-equina-syndrome>

## **Left shoulder examination:**

Skin with relatively normal appearance, without evident inflammatory changes.

No obvious local swelling.

Pain present during both passive and active mobilization, of moderate to severe intensity, predominantly during abduction and external rotation, associated with crepitus during joint movement.

Range of motion:

- Active flexion: 120–130°; Passive: 150–160°
- Active extension: 20–25°; Passive: 30°
- Active abduction: 70–80°; Passive: 120–140°
- Active internal rotation: 80–90°; Passive: 90°
- Active external rotation: 60–70°; Passive: 70–80°

Muscle strength:

- Global decrease in muscle strength at the level of the left shoulder, more evident in painful movements:
- Abduction: MRC 3+/5
- External rotation: MRC 3+/5
- Flexion: MRC 4/5
- Internal rotation: MRC 4+/5

Strength reduction is both antalgic and structural.

Functional tests: nonspecific rotator cuff pain; no instability, no impingement pattern, no bicipital involvement

## **Functional status:**

The patient tolerates the supine position. During the neurosurgical hospitalization, passive range-of-motion exercises were performed. No out-of-bed or bedside mobilization was initiated. Mobilization is planned to be performed progressively, within tolerance.

# Congresul Național de Medicină Fizică, de Recuperare și Balneoclimatologie

Covasna, 23 – 25 Aprilie 2026

In our clinic, the patient was functionally assessed using standardized scales, including the AIS (ASIA Impairment Scale/Frankel), Modified Ashworth Scale, Functional Ambulation Categories (FAC), and Quality of Life (QoL) assessment. Functional independence in daily activities was evaluated using ADL/IADL scales, the Spinal Cord Independence Measure (SCIM), Barthel Index and the Visual Analog Scale (VAS) for pain.

| Scale                         | Initial admission | Final discharge |
|-------------------------------|-------------------|-----------------|
| AIS - motor score             | 74/100            | 82/100          |
| AIS - sensitive score         | 212/224           | 212/224         |
| Asworth and Penn              | 0/16              | 0/16            |
| FAC International Scale       | 0/5               | 2/5             |
| Life Quality Assessment (QOL) | 40/112            | 60/112          |
| ADL                           | 1/6               | 3/6             |
| IADL                          | 2/8               | 3/8             |
| Barthel Index                 | 15/100            | 30/100          |
| SCIM                          | 20/100            | 40/100          |
| VAS                           | 8/10              | 4/10            |

- The neurological examination according to AIS showed an incomplete spinal cord injury (AIS C) at the L1 neurological level.
- Motor function was preserved in the upper limbs and reduced in the lower limbs, with muscle strength between 2 and 3 on the MRC scale.
- Sensory deficits were present, but sacral sparing was preserved, confirming the incomplete lesion.
- Upper limb strength was normal from a neurological point of view (ASIA 5/5). Any decrease in strength was due to local pain or degenerative changes, not related to the spinal cord injury.

INTERNATIONAL STANDARDS FOR NEUROLOGICAL CLASSIFICATION OF SPINAL CORD INJURY (ISNCSCI)

Patient Name: \_\_\_\_\_ Date/Time of Exam: \_\_\_\_\_

Examiner Name: \_\_\_\_\_ Signature: \_\_\_\_\_

## RIGHT

### SENSORIAL

| KEY SENSORY POINTS | Light Touch (LTR) | Pin Prick (PPR) |
|--------------------|-------------------|-----------------|
| C2                 | 2                 | 2               |
| C3                 | 2                 | 2               |
| C4                 | 2                 | 2               |
| C5                 | 5                 | 2               |
| C6                 | 5                 | 2               |
| C7                 | 5                 | 2               |
| C8                 | 5                 | 2               |
| T1                 | 5                 | 2               |
| T2                 | 2                 | 2               |
| T3                 | 2                 | 2               |
| T4                 | 2                 | 2               |
| T5                 | 2                 | 2               |
| T6                 | 2                 | 2               |
| T7                 | 2                 | 2               |
| T8                 | 2                 | 2               |
| T9                 | 2                 | 2               |
| T10                | 2                 | 2               |
| T11                | 2                 | 2               |
| T12                | 2                 | 2               |
| L1                 | 2                 | 2               |
| L2                 | 2                 | 2               |
| L3                 | 2                 | 2               |
| L4                 | 2                 | 2               |
| L5                 | 3                 | 2               |
| S1                 | 3                 | 2               |
| S2                 | 1                 | 1               |
| S3                 | 1                 | 1               |
| S4-5               | 1                 | 1               |

### MOTOR

| KEY MUSCLES | Strength |
|-------------|----------|
| C5          | 5        |
| C6          | 5        |
| C7          | 5        |
| C8          | 5        |
| T1          | 5        |
| T2          | 2        |
| T3          | 2        |
| T4          | 2        |
| T5          | 2        |
| T6          | 2        |
| T7          | 2        |
| T8          | 2        |
| T9          | 2        |
| T10         | 2        |
| T11         | 2        |
| T12         | 2        |
| L1          | 2        |
| L2          | 2        |
| L3          | 2        |
| L4          | 2        |
| L5          | 3        |
| S1          | 3        |
| S2          | 1        |
| S3          | 1        |
| S4-5        | 1        |

## LEFT

### SENSORIAL

| KEY SENSORY POINTS | Light Touch (LTR) | Pin Prick (PPR) |
|--------------------|-------------------|-----------------|
| C2                 | 2                 | 2               |
| C3                 | 2                 | 2               |
| C4                 | 2                 | 2               |
| C5                 | 5                 | 2               |
| C6                 | 5                 | 2               |
| C7                 | 5                 | 2               |
| C8                 | 5                 | 2               |
| T1                 | 5                 | 2               |
| T2                 | 2                 | 2               |
| T3                 | 2                 | 2               |
| T4                 | 2                 | 2               |
| T5                 | 2                 | 2               |
| T6                 | 2                 | 2               |
| T7                 | 2                 | 2               |
| T8                 | 2                 | 2               |
| T9                 | 2                 | 2               |
| T10                | 2                 | 2               |
| T11                | 2                 | 2               |
| T12                | 2                 | 2               |
| L1                 | 2                 | 2               |
| L2                 | 2                 | 2               |
| L3                 | 2                 | 2               |
| L4                 | 2                 | 2               |
| L5                 | 3                 | 2               |
| S1                 | 3                 | 2               |
| S2                 | 1                 | 1               |
| S3                 | 1                 | 1               |
| S4-5               | 1                 | 1               |

### MOTOR

| KEY MUSCLES | Strength |
|-------------|----------|
| C5          | 5        |
| C6          | 5        |
| C7          | 5        |
| C8          | 5        |
| T1          | 5        |
| T2          | 2        |
| T3          | 2        |
| T4          | 2        |
| T5          | 2        |
| T6          | 2        |
| T7          | 2        |
| T8          | 2        |
| T9          | 2        |
| T10         | 2        |
| T11         | 2        |
| T12         | 2        |
| L1          | 2        |
| L2          | 2        |
| L3          | 2        |
| L4          | 2        |
| L5          | 3        |
| S1          | 3        |
| S2          | 1        |
| S3          | 1        |
| S4-5        | 1        |

RIGHT TOTALS (MAXIMUM): LTR 37, PPR 53, S4-5 53

LEFT TOTALS (MAXIMUM): LTR 53, PPR 53, S4-5 37

MOTOR SUBSCORES: UER 25, UEL 25, LER 12, LEL 12

SENSORY SUBSCORES: LTR 53, LTL 53, PPR 53, PPL 53

NEUROLOGICAL LEVELS: 1. SENSORY S1, 2. MOTOR L1, 3. NEUROLOGICAL LEVEL OF INJURY (NLI) L1

4. COMPLETE OR INCOMPLETE? Incomplete = Any sensory or motor function in S4-5. 5. ASIA IMPAIRMENT SCALE (AIS) C

6. ZONE OF PARTIAL PRESERVATION: SENSORY NA, MOTOR NA

\*<https://www.isncsialgorithm.com/Form>

This form may be copied freely but should not be altered without permission from the American Spinal Injury Association.

REV 04/19

**Fig. 6.** Initial neurological assessment using the ASIA Impairment Scale (AIS), performed at admission\*

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Covasna, 23 – 25 Aprilie 2026

At admission, the patient was classified as ASIA C, consistent with an incomplete spinal cord injury, characterized by preserved motor function below the neurological level, with the majority of key muscles graded below 3/5.

## MUSCLE GRADING

- 0 total paralysis
- 1 palpable or visible contraction
- 2 active movement, full range of motion, gravity eliminated
- 3 active movement, full range of motion, against gravity
- 4 active movement, full range of motion, against gravity and provides some resistance
- 5 active movement, full range of motion, against gravity and provides normal resistance
- 5\* muscle able to exert, in examiner's judgement, sufficient resistance to be considered normal if identifiable inhibiting factors were not present

NT not testable. Patient unable to reliably exert effort or muscle unavailable for testing due to factors such as immobilization, pain on effort or contracture.

\*Thomas FP, Woolsey RM – Acute Nontraumatic Myelopathies – in: Lin Vernon W (Ed.-in-Chief), Bono Christopher M, Cardenas Diana D (Associate Eds. et al.) - Spinal Cord Medicine Principles and Practice - Second Edition. Demos Medical Publishing, LLC., New York, 2010

\*\*Aito S (Coordinator) et al. - Submodule: Clinical assessment of patients with SCI - Doctor's Module - (<http://www.elearnsoci.org/>), 2012

## ASIA IMPAIRMENT SCALE

- ☐ **A = Complete:** No motor or sensory function is preserved in the sacral segments S4-S5.
- ☐ **B = Incomplete:** Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-S5.
- ☐ **C = Incomplete:** Motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a muscle grade less than 3.
- ☐ **D = Incomplete:** Motor function is preserved below the neurological level, and at least half of key muscles below the neurological level have a muscle grade of 3 or more.
- ☐ **E = Normal:** Motor and sensory function are normal.

## CLINICAL SYNDROMES (OPTIONAL)

- ☐ Central Cord
- ☐ Brown-Sequard
- ☐ Anterior Cord
- ☐ Conus Medullaris
- ☐ Cauda Equina

## STEPS IN CLASSIFICATION

The following order is recommended in determining the classification of individuals with SCI.

1. Determine sensory levels for right and left sides.
2. Determine motor levels for right and left sides.  
*Note: in regions where there is no myotome to test, the motor level is presumed to be the same as the sensory level.*
3. Determine the single neurological level.  
*This is the lowest segment where motor and sensory function is normal on both sides, and is the most cephalad of the sensory and motor levels determined in steps 1 and 2.*
4. Determine whether the injury is Complete or Incomplete (sacral sparing).  
*If voluntary anal contraction = No AND all S4-5 sensory scores = 0 AND any anal sensation = No, then injury is COMPLETE. Otherwise injury is incomplete.*

5. Determine ASIA Impairment Scale (AIS) Grade:

Is injury **Complete**?

NO

If YES, AIS=A Record ZPP

(For ZPP record lowest dermatome or myotome on each side with some (non-zero score) preservation)

Is injury **motor incomplete**?

YES

If NO, AIS=B

(Yes=voluntary anal contraction OR motor function more than three levels below the motor level on a given side.)

Are **at least half of the key muscles below the (single) neurological level graded 3 or better?**

NO

AIS=C

YES

AIS=D

**If sensation and motor function is normal in all segments, AIS=E**  
*Note: AIS E is used in follow up testing when an individual with a documented SCI has recovered normal function. If at initial testing no deficits are found, the individual is neurologically intact; the ASIA Impairment Scale does not apply.*

Fig. 7. Frankel scale\*

(\*[http://www.asia-spinalinjury.org/publications/59544\\_sc\\_Exam\\_Sheet\\_r4.pdf](http://www.asia-spinalinjury.org/publications/59544_sc_Exam_Sheet_r4.pdf);  
<http://www.scribd.com/doc/37064936/2006-Classif-Worksheet> with some adding)

## SCALA DE EVALUARE CUANTIFICATĂ A QOL

(după Flanagan modificată – instrument agreat de OMS)

|                                                                                                                          | INCANTAT | MULȚUMIT | MAI<br>DEGRABĂ<br>MULȚUMIT | "AȘA<br>ȘI<br>AȘA" | MAI<br>DEGRABĂ<br>NEMULȚUMIT | NEMULȚUMIT | NEFERICIT |
|--------------------------------------------------------------------------------------------------------------------------|----------|----------|----------------------------|--------------------|------------------------------|------------|-----------|
| 1 Confortul material: casă, mâncare, facilități casnice, securitate financiară                                           | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 2 Sănătatea: buna formă fizică și vigoarea                                                                               | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 3 Relații cu părinții, frații/surorile, alte rude: comunicare, vizite, ajutorare                                         | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 4 Rolul parental: creșterea copiilor                                                                                     | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 5 Relația matrimonială sau de concubinaj                                                                                 | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 6 Prieteni apropiați                                                                                                     | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 7 Ajutorarea și încurajarea celorlalți, acțiuni de voluntariat, oferi de sfaturi                                         | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 8 Participarea în organizații și activități publice                                                                      | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 9 Autoperfecționarea: participare la diverse forme de învățământ, îmbunătățirea nivelului de înțelegere și de cunoaștere | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 10 Autocunoașterea, cunoașterea propriilor calități și limite, cunoașterea înțelesului vieții                            | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 11 Munca – la serviciu sau acasă                                                                                         | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 12 Exprimarea creativă a personalității                                                                                  | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 13 Socializarea: întâlniri interpersonale, relaționare, petreceri                                                        | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 14 Lectura, audițiile muzicale, vizionarea de divertisment                                                               | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 15 Participarea la acțiuni recreative active                                                                             | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |
| 16 Independența, capacitatea de rezolvare propriile probleme                                                             | 7        | 6        | 5                          | 4                  | 3                            | 2          | 1         |

Scor total = \_\_\_\_\_ / 112

### Notă pentru pacient:

- se recomandă completarea răspunsurilor la toate întrebările, chiar și la cele care nu par să aibă o legătură directă cu preocupările dvs.
- se va încerca să se dea un singur răspuns (număr) la fiecare întrebare

### Notă pentru examiner:

- acolo unde pacientul nu a completat opțiunea de răspuns, se va compensa lipsa informației conform următoarei convenții: se va introduce valoarea medie a rezultatului scorului întrebării respective

(Flanagan – 1982 - citat de Burckhardt, 1993)

(Burckhardt CS, Anderson KL – The Quality of Life Scale (QOLS): Reliability, Validity, and Utilization. BioMed Central:1-7, 2003; <http://www.hqlo.com/content/1/1/60>)

**Fig. 9. Life Quality Assessment (QOL)\***

\*<https://ro.scribd.com/document/495015965/QOL>

Quality of life was significantly impaired, predominantly due to physical limitations, chronic pain, and loss of independence, although social and emotional support remained relatively preserved.

| Scale                         | Initial admission | Final discharge |
|-------------------------------|-------------------|-----------------|
| Life Quality Assessment (QOL) | 40/112            | 60/112          |

## EVALUAREA SPASTICITĂȚII - SCALA ASHWORTH MODIFICATĂ

0 = fără spasticitate (reflex de întindere absent - fără creșterea tonusului muscular)  
 1 = spasticitate discretă (creșterea ușoară a tonusului muscular cu simpla senzație de "acroșaj" sau minimă senzație de rezistență la mobilizarea segmentului respectiv în flexie/ extensie, adducție/ abducție, etc.)  
 1+ = spasticitate ușoară (creșterea ușoară a tonusului muscular, manifestată prin senzație de acroșaj, urmată de rezistență minimă la mobilizare, pe un parcurs mai mic decât jumătatea rămasă din excursie)  
 2 = spasticitate moderată (creșterea mai importantă a tonusului muscular în cea mai mare parte a parcursului de mișcare, dar segmentul rămâne ușor mobilizabil)  
 3 = spasticitate severă (creșterea considerabilă a tonusului muscular - mișcarea pasivă e dificilă)  
 4 = spasticitate marcată (rigiditate segmentară în flexie, extensie, adducție sau abducție - mișcarea pasivă e imposibilă)  
 (Ashworth B. Preliminary trial of carisprodol in multiple sclerosis. Practitioner; 192: 540, 1964 and  
<http://www.neurosurgical.ca/ClinicalAssistant/scales/ashworth.html> )

## GRADAREA FRECVENȚEI SPASMULUI (conform Spasm Frequency Scale):

0 - fără spasme  
 1 - 1 spasm pe zi sau mai rar  
 2 - 1 – 5 spasme pe zi  
 3 - 6 – 9 spasme pe zi  
 4 - 10 sau mai multe spasme pe zi  
 (Penn RD. Intrathecal baclofen for severe spasticity. Ann N Y Acad Sci;153:157, 1988)

| Gradul spasticității |     | Frecvența spasmelor |     |
|----------------------|-----|---------------------|-----|
| STG.                 | DR. | STG.                | DR. |
|                      |     | MEMBRU SUP.         |     |
|                      |     | MEMBRU INF.         |     |

Fig. 10. Modified Ashworth Scale\*

\*<https://ro.scribd.com/doc/212730827/Scala-Ashworth>

No spasticity was observed (Modified Ashworth Scale = 0).  
 No spasms were reported or observed (Spasm Frequency Scale = 0).

| Scale            | Initial admission | Final discharge |
|------------------|-------------------|-----------------|
| Asworth and Penn | 0/16              | 0/16            |

## The international Scale FAC (Functional Ambulation Categories)

| Nr. | Categorie                    | Caracterizare                                                                                                            |
|-----|------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 0   | Nefuncționalitate            | Pacientul nu poate merge sau necesită ajutor de la 2 sau mai multe persoane                                              |
| 1   | Dependență - nivel 2         | Pacientul necesită sprijin ferm și continuu din partea unei persoane                                                     |
| 2   | Dependență - nivel 1         | Pacientul necesită sprijin continuu sau intermitent din partea unei persoane pentru ajutor cu echilibrul sau coordonarea |
| 3   | Dependență - supraveghere    | Pacientul necesită coordonarea verbală sau ajutor potențial din partea unei persoane fără contact fizic                  |
| 4   | Independență - pe teren plan | Pacientul poate merge independent pe teren plan, dar necesită ajutor la scări, pante sau suprafețe denivelate            |
| 5   | Independență                 | Pacientul poate merge independent oriunde                                                                                |

At admission, the patient was unable to walk (FAC 0).

| Scale                   | Initial admission | Final discharge |
|-------------------------|-------------------|-----------------|
| FAC International Scale | 0/5               | 2/5             |

Fig. 11. FAC International Scale\*

\* <https://ro.scribd.com/document/990784851/Functional-Ambulation-Classification-FAC>

# Congresul Național de Medicină Fizică, de Recuperare și Balneoclimatologie

Iasna, 23 – 25 Aprilie 2026

| „Scala de evaluare a independenței în activitățile zilnice (ADL) |                                                                                                                                                                                                                         |                                                                                                                                                     |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Activitate                                                       | Independență/ Autonomie: (1 punct)                                                                                                                                                                                      | Dependență: (0 puncte)                                                                                                                              |
|                                                                  | Fără supervizare, direcționare sau asistență personală                                                                                                                                                                  | Cu supervizare, direcționare asistență personală sau îngrijire totală                                                                               |
| Igiena corporală<br>Puncte:.....                                 | <b>(1 punct)</b> Se spală complet singur sau are nevoie de ajutor în spălarea unei regiuni a corpului cum ar fi spatul, zona genitală sau extremitățile dizabiliate                                                     | <b>(0 puncte)</b> Are nevoie de ajutor la spălarea mai multor părți ale corpului sau la ieșirea din cadă sau duș. Necesită ajutor total la spălare. |
| Îmbrăcare<br>Puncte:.....                                        | <b>(1 punct)</b> Își scoate hainele din dulap sau sertare și se îmbracă complet inclusiv cu haine de exterior cu nasturi/ fermoare. Poate să aibă nevoie de ajutor la încălțat (legatul șireturilor și al cataramelor). | <b>(0 puncte)</b> Are nevoie de ajutor la îmbrăcare sau trebuie să fie îmbrăcat complet de către o altă persoană.                                   |
| Mersul la toaletă<br>Puncte:.....                                | <b>(1 punct)</b> Merge la toaletă, se ridică și se așează pe toaletă, își poate aranja corespunzător hainele, își curăță zona genitală fără ajutor.                                                                     | <b>(0 puncte)</b> Are nevoie de ajutor la transferul pe toaletă, curățarea zonei genitale, utilizarea colacului de toaletă.                         |
| Transferul<br>Puncte:.....                                       | <b>(1 punct)</b> Se mută în/ din pat sau scaun, neasistat. Pentru transfer sunt acceptabile dispozitivele mecanice asistive                                                                                             | <b>(0 puncte)</b> Are nevoie de ajutor la trecerea din pat pe scaun sau necesită un transfer complet                                                |
| Continența sfincteriană<br>Puncte:.....                          | <b>(1 punct)</b> Control complet sfincterian, vezical și anal.                                                                                                                                                          | <b>(0 puncte)</b> Incontinența, parțială, sau totală la nivelul colonului și a vezicii urinare.                                                     |
| Alimentația<br>Puncte:.....                                      | <b>(1 punct)</b> Duce mâncarea din farfurie la gură fără ajutor. Prepararea mâncării poate fi făcută de o altă persoană.                                                                                                | <b>(0 puncte)</b> Are nevoie de ajutor parțial sau total la alimentație sau necesită alimentație parenterală”                                       |

Cheie de scor:

6 puncte: pacient independent

2 puncte: înalt grad de dependență

4 puncte: dependență moderată

0 puncte: dependență totală

At the time of initial evaluation, the patient was highly dependent in activities of daily living (ADL), with an estimated score of approximately 1/6.

| Scale | Initial admission | Final discharge |
|-------|-------------------|-----------------|
| ADL   | 1/6               | 3/6             |

\* Wallace M and Shelkey M, Katz Index of Independence in Activities of Daily Living (ADL). New York University College of Nursing, Issue Number 2, Revised 2007 – <https://www.alz.org/careplanning/downloads/katz-adl.pdf>

**Fig. 12. Activities of Daily Living**

## Scala IADL ( Instrumental Activities of Daily Living)

Nume pacient: \_\_\_\_\_ Data examinării: \_\_\_\_\_

|                   | ACTIVITATEA                                                                               | SCOR |
|-------------------|-------------------------------------------------------------------------------------------|------|
| <b>A</b>          | <b>ABILITATEA DE A UTILIZA TELEFONUL</b>                                                  |      |
|                   | 1. Foloseste telefonul din proprie initiativa, caută si formează numere, etc.             | 1    |
|                   | 2. Formează câteva numere bine cunoscute                                                  |      |
|                   | 3. Raspunde la telefon dar nu poate suna                                                  |      |
| <b>B</b>          | <b>EFFECTUAREA CUMPARATURILOR</b>                                                         |      |
|                   | 1. Face toate cumparaturile independent                                                   | 1    |
|                   | 2. Face cumparaturi simple                                                                |      |
|                   | 3. Necesita insotitor la fiecare iesire la cumparaturi                                    | 0    |
| <b>C</b>          | <b>PREGARIREA HRANEI</b>                                                                  |      |
|                   | 1. Planifica, prepara si serveste masa adecvat independent                                | 1    |
|                   | 2. Prepara mancarea adecvat dacă ingredientele sunt pregatite                             |      |
|                   | 3. Incalzește si serveste mancarea independent                                            | 0    |
| <b>D</b>          | <b>INTRETINEREA CASEI</b>                                                                 |      |
|                   | 1. Intretine ordinea si curatenia in casa, cu ajutor ocazional ( "la curatenia mare")     | 1    |
|                   | 2. Realizează sarcini usoare> spala vase, face patul                                      |      |
|                   | 3. Realizează sarcini usoare dar nu poate mentine un nivel adecvat de de curatenie        |      |
|                   | 4. Necesita ajutor si la sarcinile usoare                                                 |      |
| <b>E</b>          | <b>SPALAREA HAINELOR</b>                                                                  |      |
|                   | 1. Spala hainele complet                                                                  | 1    |
|                   | 2. Spala hainele de mici dimensiuni (sosete)                                              |      |
|                   | 3. Nu spala haine deloc                                                                   | 0    |
| <b>F</b>          | <b>MOD DE TRANSPORT</b>                                                                   |      |
|                   | 1. Se deplasează cu mijloacele de transport in comun/conduce masina                       | 1    |
|                   | 2. Solicita si se deplasează cu taxi                                                      |      |
|                   | 3. Se deplasează cu mijloacele de transport in comun dacă este insotit                    |      |
|                   | 4. Se deplasează cu taxi insotit                                                          | 0    |
| <b>G</b>          | <b>RESPONSABILITATEA PROPRIEI MEDICATII</b>                                               |      |
|                   | 1. Isi gestionează singur si corect medicatia                                             | 1    |
|                   | 2. Isi ia singur medicatia dacă este pregatita de o alta persoana                         | 0    |
|                   | 3. Nu isi poate lua singur medicatia                                                      |      |
| <b>H</b>          | <b>GESTIONAREA FINANTELOR</b>                                                             |      |
|                   | 1. Gestionează independent toate finantele (facturi, plata servicii)                      | 1    |
|                   | 2. Gestionează cheltuieli zilnice dar are nevoie de ajutor la banca, mari cheltuieli, etc |      |
|                   | 3. Incapabil de a-si gestiona veniturile                                                  | 0    |
| <b>SCOR TOTAL</b> |                                                                                           |      |

The patient demonstrated severe dependence in instrumental activities of daily living (IADL), with limited ability to perform complex tasks independently (estimated score 2/8).

| Scale | Initial admission | Final discharge |
|-------|-------------------|-----------------|
| IADL  | 2/8               | 3/8             |

Fig. 13. Instrumental activities of daily living\*

\*<https://ro.scribd.com/document/370098279/IADL-Romana>

## Indicele Barthel

Nume pacient: \_\_\_\_\_ Data examinării: \_\_\_\_\_

| Nr. crt.          | ACTIVITATEA                                                                                                                                                                                                                                                                    | SCOR |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1                 | <b>ALIMENTARE</b><br>0 = imposibilă<br>5 = ajutor pentru a tăia, a întindeutul, etc., sau are nevoie de dietă modificată<br>10 = independent                                                                                                                                   |      |
| 2                 | <b>BAIA</b><br>0 = dependent<br>5 = independent (sau poate intra doar la duș)                                                                                                                                                                                                  |      |
| 3                 | <b>TOALETĂ/AUTOÎNGRIJIRE</b><br>0 = dependent<br>5 = își poate îngriji singur fața/ părul/ dinții/ barba                                                                                                                                                                       |      |
| 4                 | <b>ÎMBRĂCAREA</b><br>0 = dependent<br>5 = are nevoie de ajutor, dar poate îndeplini aproape jumătate din acțiuni fără asistență<br>10 = independent (inclusiv nasturi, fermoare, șireturi, etc.)                                                                               |      |
| 5                 | <b>TRANZIT INTESTINAL</b><br>0 = incontinent (sau are nevoi de clisme)<br>5 = accidente ocazionale<br>10 = continent                                                                                                                                                           |      |
| 6                 | <b>MICȚIUNE</b><br>0 = incontinent sau cateterizat și incapabil să se descurce singur<br>5 = accidente ocazionale<br>10 = continent                                                                                                                                            |      |
| 7                 | <b>UTILIZARE WC</b><br>0 = dependent<br>5 = are nevoie de oarecare ajutor<br>10 = independent                                                                                                                                                                                  |      |
| 8                 | <b>TRANSFERURI (DIN PAT ÎN SCAUN ȘI ÎN APA)</b><br>0 = incapabil, nu are echilibru în poziția șezând<br>5 = ajutor important (1 sau 2 persoane, suport fizic), poate să șadă<br>10 = ajutor minor (verbal sau suport fizic)<br>15 = independent                                |      |
| 9                 | <b>MOBILITATE (PE TEREN PLAT)</b><br>0 = imobil sau < 50 de 45 m.<br>5 = independent în fotoliu rulant, inclusiv cu țuturi, ≥ 45 m.<br>10 = merge cu ajutorul unei persoane (verbal sau fizic) ≥ 45 m.<br>15 = independent (dar poate folosi un mijloc asistiv, de ex. baston) |      |
| 10                | <b>SCĂRI</b><br>0 = incapabil<br>5 = are nevoie de ajutor (verbal, fizic, din partea altei persoane sau un mijloc de susținere)<br>10 = independent                                                                                                                            |      |
| <b>SCOR TOTAL</b> |                                                                                                                                                                                                                                                                                |      |

The patient presented a very low Barthel Index score (15/100), reflecting severe functional dependence in basic activities of daily living.

| Scale         | Initial admission | Final discharge |
|---------------|-------------------|-----------------|
| Barthel Index | 15/100            | 30/100          |

Interpretare: 0-20 = dependență totală, 21-60 = dependență severă,  
 61-90 = dependență moderată, 91-99 = dependență ușoară,  
 100 = independent.

Fig. 14. Barthel Index\*

Măsura independenței funcționale la pacienții cu leziune medulară (SCIM)

| FUNCTIA EVALUATA                   | ACTIVITATI                                             | SCOR MAXIM | INTERNARE | EXTERNARE |
|------------------------------------|--------------------------------------------------------|------------|-----------|-----------|
| AUTO-INGRIJIRE                     | 1. Alimentatia                                         | 3          |           |           |
|                                    | 2A. Spalarea extremitatii superioare                   | 3          |           |           |
|                                    | 2B. Spalarea extremitatii inferioare                   | 3          |           |           |
|                                    | 3A. Imbracarea extremitatii superioare                 | 4          |           |           |
|                                    | 3B. Imbracarea extremitatii inferioare                 | 4          |           |           |
|                                    | 4. Ingrijire, toaletare                                | 3          |           |           |
| Scor total auto-ingrijire          |                                                        | 20         |           |           |
| RESPIRATIA SI FUNCTIA SFINCTERIANA | 5. Respiratia                                          | 10         |           |           |
|                                    | 6. Functia vezicala                                    | 15         |           |           |
|                                    | 7. Tranzitul intestinal                                | 10         |           |           |
|                                    | 8. Folosirea toaletei                                  | 5          |           |           |
| Scor total respiratie, sfinctere   |                                                        | 40         |           |           |
| MOBILITATEA                        | 9. Mobilizarea in pat/actiuni de prevenire a escadelor | 6          |           |           |
|                                    | 10. Transfer din pat in fotoliu rulant                 | 2          |           |           |
|                                    | 11. Transfer din fotoliu rulant pe toaleta/in cada     | 2          |           |           |
|                                    | 12. Mobilitate in interiorul locuintei                 | 8          |           |           |
|                                    | 13. Mobilitate pe distante moderate (10-100m)          | 8          |           |           |
|                                    | 14. Mobilitate in exteriorul locuintei (peste 100m)    | 8          |           |           |
|                                    | 15. Urcarea treptelor                                  | 3          |           |           |
|                                    | 16. Transfer de pe fotoliu rulant in autoturism        | 2          |           |           |
|                                    | 17. Transfer de la nivelul solului in fotoliu rulant   | 1          |           |           |
| Scor total mobilitate              |                                                        | 40         |           |           |
| Scor total SCIM                    |                                                        | 100        |           |           |

The SCIM score was markedly reduced (20/100), highlighting severe functional dependence, particularly in mobility and sphincter control.

| Scale | Initial admission | Final discharge |
|-------|-------------------|-----------------|
| SCIM  | 20/100            | 40/100          |

Fig. 15. Spinal Cord Independence Measure\*

\*<https://ro.scribd.com/document/575842987/Masura-independentei-functionale-la-pacientii-cu-leziune-medulara>

## *Paraclinically*

### LABORATORY INVESTIGATIONS:

- Moderate normocytic normochromic anemia (Hb = 8.2 g/dL)
- Marked inflammatory syndrome
- Severe hypoalbuminemia
- Severe hypokalemia (K = 2.5 mmol/L).

### ECG:

- Sinus rhythm, heart rate 87 bpm, with multiple premature ventricular contractions, and flattened T waves in the inferolateral leads.

During hospitalization in both our department and the Neurosurgery Department, the patient underwent serial imaging evaluations to assess clinical status and disease progression.

Imaging studies (X-ray, CT, MRI) revealed:

Thoracic level:

Progressive pulmonary tumor (right lung) with bilateral pulmonary nodules

Mediastinal lymphadenopathy and pleural effusion

Suspicion of bone metastasis (left humeral head)

Abdominal–pelvic level:

Hepatic lesion (suspicious for metastasis)

Bilateral hydronephrosis

Rectal wall thickening (known oncologic pathology)

Calcified uterine fibroids

Spine:

Postoperative status with spinal fixation (L4–S2)

Findings suggestive of secondary bone involvement

Associated findings:

Degenerative musculoskeletal changes

Old rib fractures

Renal cysts

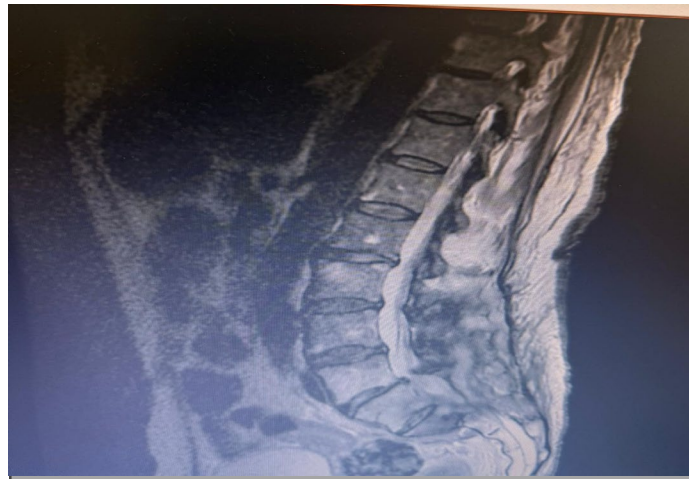
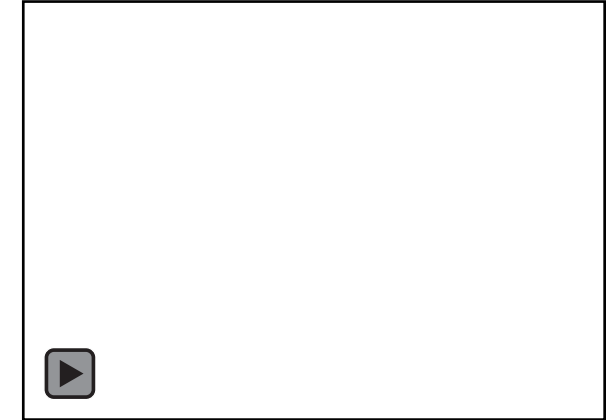


Fig. 16. Lumbar spine MRI, 27.01.2026



Video 3. Thoracic CT (non-contrast  
+ contrast-enhanced), 14.01.2026



Fig. 17. Abdominal and pelvic CT (contrast-  
enhanced), 05.03.2026

## DIAGNOSIS

Based on the anamnesis, clinical and paraclinical data, the positive diagnosis can be formulated as follows:

- Incomplete paraplegia (AIS/Frankel C), severe, with neurological level at L1, secondary to lumbosacral spinal cord injury associated with cauda equina syndrome following a pathological S1 vertebral fracture on metastatic bone, treated with posterior spinal fixation (L4–S2) on 26.11.2025.
- Neurogenic bladder (indwelling urinary catheter) and neurogenic bowel
- Locally advanced rectal carcinoma with bone metastasis, previously treated with chemotherapy and radiotherapy (discontinued)
- Pulmonary embolism (segmental branch of the right pulmonary artery) associated with pulmonary hypertension
- Progressive pulmonary nodular lesions, including bilateral micronodules and a subpleural nodule, with mediastinal lymphadenopathy
- Hepatic lesions suggestive of metastatic disease, Hepatic cyst
- Osteolytic lesion of the left humeral head (under evaluation)
- Scapulohumeral periarthrititis (right shoulder)
- Bilateral hydronephrosis (grade II)
- Arterial hypertension (grade II)
- History of ischemic stroke (left MCA territory) 2013
- Cerebral small vessel disease
- Multinodular goiter
- Cervical, thoracic and lumbar spondylosis and discopathy
- Generalized postmenopausal osteoporosis
- Recent right pubic ramus fracture
- History of right pertrochanteric fracture, surgically treated (intramedullary nail and screw fixation, 2013)
- Left total hip arthroplasty( 2013)
- Normocytic normochromic anemia
- Severe hypokalemia
- Hypoalbuminemia
- History of infections: urinary tract infection (E. coli, Proteus spp.), MRSA bacteremia, postoperative wound infection (Klebsiella MDR) – treated

## Evolution

- During hospitalization in our Rehabilitation Department, the patient received a comprehensive multidisciplinary management.
- In addition to the rehabilitation program, local wound care was performed, and the patient was closely monitored from a biological and imaging perspective. Multiple infections and associated complications were treated, and bladder re-education was initiated.

## *Evolution of the postoperative wound*

- The patient required multiple neurosurgical consultations for the evaluation of the postoperative wound evolution.
- Wound secretion culture obtained on 10.12.2025 identified multidrug-resistant *Klebsiella pneumoniae*, treated according to the antibiogram. Subsequently, on 14.02.2026, *Staphylococcus aureus* MRSA was isolated and managed in accordance with the antibiogram. Local wound care consisted of daily cleansing and dressing using Microdacyn and Sorbalgon.
- The clinical course was complicated by dehiscence of the inferior pole of the wound. In this context, the patient was transferred to the Neurosurgery Department for secondary suturing was performed on 15.01.2026. Local wound care was continued, and the cutaneous sutures were removed on 29.01.2026.



Initially, the wound was sutured, with mild postoperative inflammatory changes, partial dehiscence and whitish discharge.



The wound remains sutured, presenting clear signs of local infection, including purulent discharge, perilesional skin maceration, and increasing dehiscence.



Advanced wound dehiscence, with a wide open cavity and exposed underlying tissue.

**Figs. 18-20.** Evolution of the postoperative wound.



Advanced wound dehiscence with a wide open cavity. The neurosurgeon decided to perform secondary suturing



Re-sutured wound with sutures in place, presenting seropurulent discharge and mild perilesional inflammation.



Final stage showing complete wound closure with a well-healed linear scar, without signs of active inflammation.

**Figs. 21-23.** Evolution of the postoperative wound

## Infectious complications

In addition to local wound-related infections, the patient developed recurrent urinary tract infections and an episode of influenza, likely in the context of an underlying immunocompromised status. These were managed with targeted therapy based on antibiogram results and the recommendations of the infectious diseases specialist.

On 16.11.2025, urine culture was positive for ESBL-producing *E. coli* and antibiotic therapy was administered according to the antibiogram.

On 31.12.2025, the patient was diagnosed with a urinary tract infection caused by *Proteus* spp., treated according to the antibiogram.

On 14.01.2026, urine culture was positive for *Proteus* spp., and antibiotic therapy was administered according to the antibiogram.

On 26.01.2026, urine culture was positive for *Proteus* spp., treated according to the antibiogram.

On 09.01.2026, a confirmed Influenza A infection was documented, for which the patient received Oseltamivir 75 mg twice daily.

## Hemorrhagic complication

- On 06.03, the patient presented recurrent episodes of metrorrhagia associated with severe iron-deficiency anemia (Hb =7.5–8 g/dL).
- A multidisciplinary assessment was performed. The surgical evaluation excluded an active gastrointestinal source of bleeding, while gynecological examination identified a pelvic-abdominal tumor formation requiring further imaging and oncological evaluation.
- Cardiology consultation recommended temporary discontinuation of therapeutic anticoagulation due to bleeding risk, continuation at a prophylactic dose, given the high thromboembolic risk.
- Infectious diseases evaluation identified vaginal colonization with MDR *E. coli*, interpreted as contamination, not requiring systemic antibiotic therapy.
- The bleeding subsequently ceased, and the patient was discharged with the recommendation to pursue further gynecological and oncological evaluation.

## *Bladder re-education*

Bladder re-education was initiated by removal of the permanent urinary catheter, followed by intermittent catheterization every 4 hours. The patient initially regained spontaneous micturitions. However, the evolution was complicated by acute urinary retention, requiring re-catheterization. The patient was discharged with an permanent urinary catheter.

## Treatment

### 1. Hygienic-dietary regimen:

A balanced, protein-rich diet is recommended, with moderate sodium intake and adequate hydration (1.5–2 L/day). Pressure sore prevention measures are essential (anti-bedsore mattress, regular repositioning).

### 2. Medication:

During hospitalization, the patient received treatment with: anticoagulants (initially therapeutic, then prophylactic LMWH), antihypertensive agents, analgesics, neurotrophic and neuropathic pain medication (gabapentin), gastric protection, iron supplementation, electrolyte rebalancing (with potassium), albumin administration, urinary antiseptics, as well as supportive therapy. In addition, the patient received multiple courses of targeted antibiotic therapy according to antibiogram results, and antiviral treatment with Oseltamivir for Influenza A infection. Due to severe anemia, multiple transfusions were required. Pain management was also provided, including stepwise analgesic therapy with paracetamol, opioids when required, and neuropathic pain medication (gabapentin).

## Objectives

A complex, individualized rehabilitation program was implemented. The main objectives were to improve mobility and functional status, achieve adequate pain control, prevent secondary complications, provide patient education regarding the underlying pathology and facilitate social and family reintegration, with the aim of improving overall quality of life.

Regarding the **kinesiotherapy targets**, we focused on:

- prevention of pressure sores and deep vein thrombosis
- prevention of vicious posture
- maintenance of joint mobility and restoration of mobility at the level of the left shoulder
- restoration of muscle strength in the lower limbs and left upper limb
- restoration of motor control in the lower limbs
- learning transfers, resuming orthostatism, walking re-education
- improving coordination, control and balance
- functional training included Activities of Daily Living (ADL): mobility and transfers, sitting posture and balance, ambulation with a walker, dexterity, personal care, dressing, feeding, bathing, and hygiene

## *Pain management*

- An important component of the rehabilitation program was pain management. The patient presented significant mixed-type pain, predominantly located at the lumbosacral spine and left shoulder. The pain was multifactorial, mainly related to secondary bone involvement, including a suspected osteolytic lesion of the left humeral head and confirmed metastatic involvement at S1.
- Pain management included a multimodal approach, combining pharmacological treatment with physiotherapy modalities such as TENS and deep oscillation, as well as adapted kinesitherapy exercises.

## *The 4 major stages in the treatment of paraplegia:*

1. Nursing
2. Re-education in bed
3. Re-education sitting posture
4. Re-education for orthostatism and walking

## *Kinetotherapy*

### *Reeducation in bed*

The patient underwent the following bedside rehabilitation program:

Passive mobilizations to prevent joint ankylosis, avoid deformities, and ensure good circulation

Positioning to prevent contractures and harmful postures

Active mobilizations progressing from passive-active to active-assisted and active exercises with progressive resistance

Strengthening of muscles to prepare for lifting, transfers, and walking

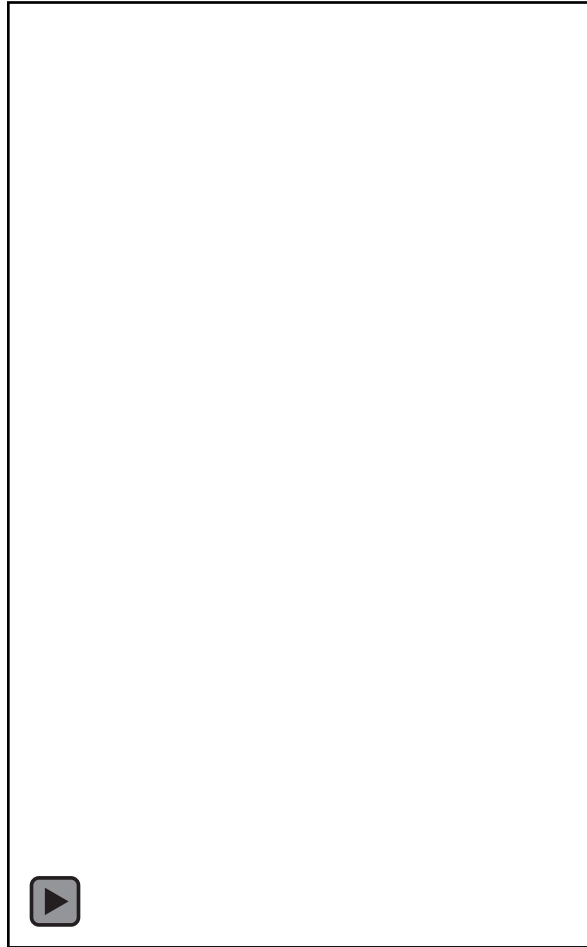
Readaptation to verticalization

### *Reeducation of sitting position*

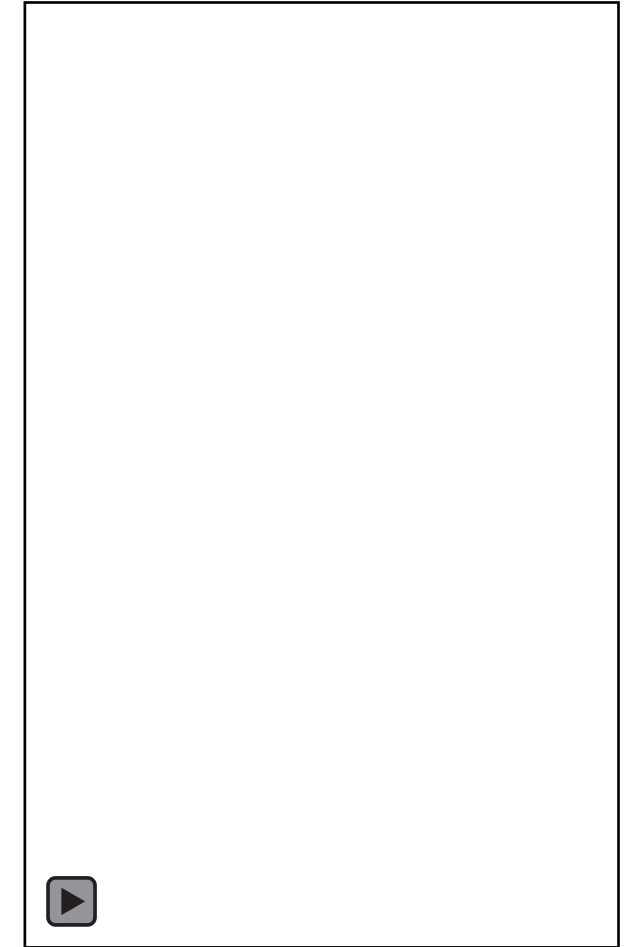
The patient followed the step-by-step readaptation from the lying position to the sitting position, at the beginning with lumbar corset and the lower legs extended - sitting elongated, then to the short sitting position - lower legs at the edge of the bed. This is also where the muscles of the upper body are practiced and exercises for lifting the seat (antero-post and laterality) in order to be able to learn transfer in the wheelchair



**Fig. 24.** The patient tolerates a shortened sitting position at the edge of the bed.



**Video 4.** Active pedaling exercises for both upper and lower limbs.



**Video 5.** Active pedaling exercises against resistance.

## Reeducation for standing and walking

In this patient, walking reeducation progressed gradually, starting from basic functional positions. The main stages included:

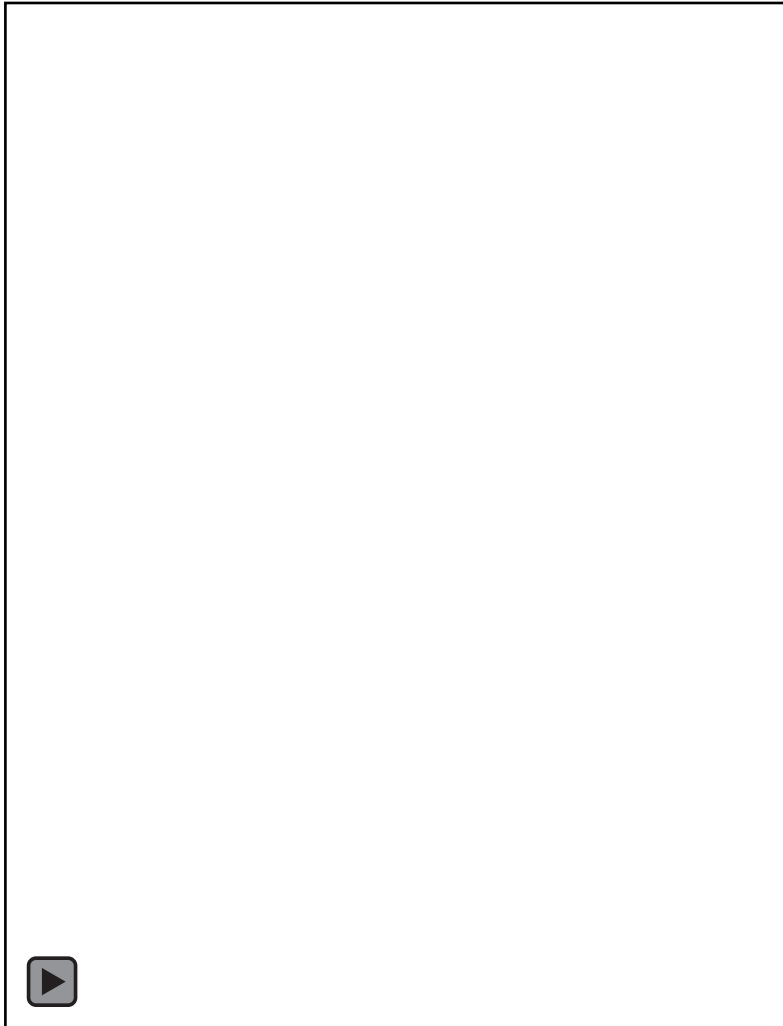
Assisted transition to the orthostatic position, initially with help from the physiotherapist and using supportive devices;

Maintaining balance in upright position, with close supervision;

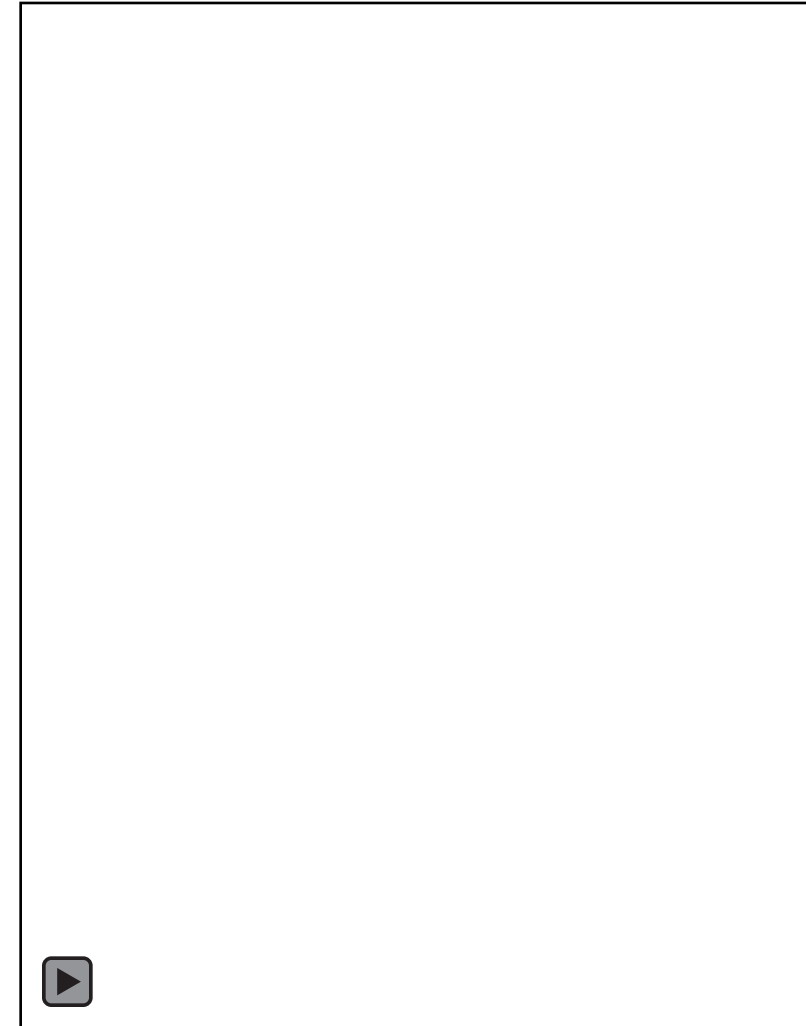
Initiation of gait training between parallel bars, with strong manual support and physical guidance from the therapist;

Gait training progressed to assisted ambulation with bilateral physiotherapist support, followed by ambulation with a walker, initially with moderate assistance and later with minimal support.

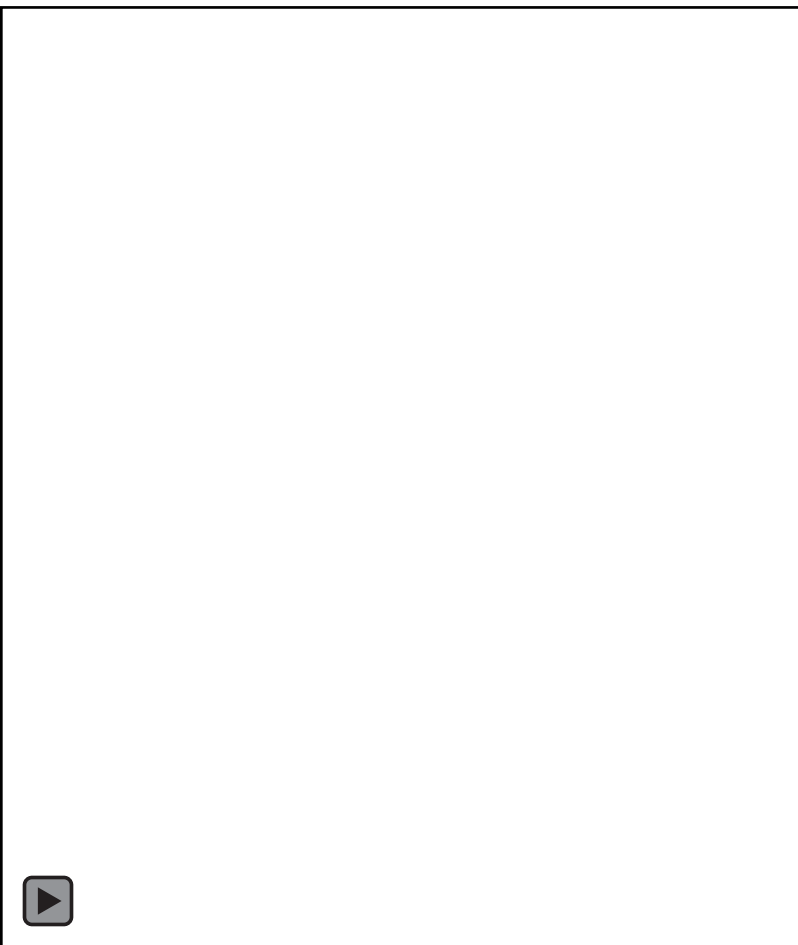
At discharge, the patient was able to perform ambulation with a walker.



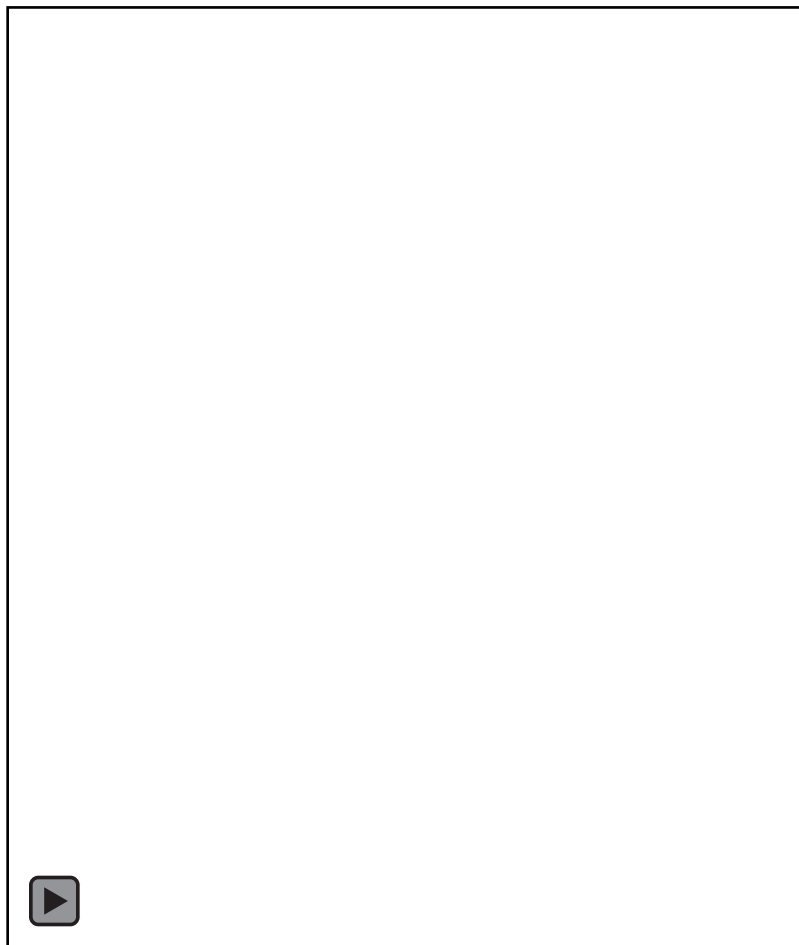
**Video 6.** Walking between parallel bars with bilateral support from physiotherapists.



**Video 7.** Walking with a high walker (axillary support):  
With bilateral support from physiotherapists.



**Video 8.** Walking with a walking frame:  
With bilateral support.



**Video 9.** Walking with a walking frame:  
Reduced assistance from physiotherapists.  
Clear functional improvement.



**Video 10.** Walking with bilateral support  
from physiotherapists.

## Complications

- Due to prolonged immobilization and the underlying oncological condition, the patient was at increased risk of developing thromboembolic complications, including deep vein thrombosis and pulmonary embolism.
- Respiratory complications were also possible, such as respiratory infections, hypoventilation, and worsening of pleural effusion.
- The patient presented a high risk of infectious complications, including urinary tract infections due to neurogenic bladder and catheterization, as well as postoperative wound infections and potential septic evolution.
- Neurological complications included persistence or worsening of motor deficit, sensory disturbances, and long-term sphincter dysfunction, in the context of cauda equina syndrome.
- Musculoskeletal complications could develop as a result of immobilization and underlying disease, including joint stiffness, muscle contractures, chronic pain, and an increased risk of pathological fractures.
- Given the oncological background, there was a risk of disease progression, with the development of new metastatic lesions and worsening of oncological pain.
- The patient also had an increased risk of pressure ulcers, severe physical deconditioning and psychological complications such as depression.

## Evolution

During multiple hospitalizations in our clinic, the patient benefited from adequate pharmacological treatment (including management of comorbidities) and a complex rehabilitation program, with a slow but favorable evolution. This was influenced by multiple complications and the patient's overall clinical condition. Improvement was reflected by increasing scores on the evaluated scales and by achieving walking with support (walking frame) over medium distances. Pain intensity decreased during hospitalization, contributing to better participation in the rehabilitation program. Bladder reeducation was initiated; however, due to associated complications, the patient was discharged with a permanent urinary catheter. At discharge, the patient was able to walk over medium distances with a walking frame under supervision.

During hospitalization, the patient showed overall functional improvement across all evaluated scales.

Motor function and functional independence improved, as reflected by increased AIS motor, Barthel Index, FIM motor, and SCIM scores.

Mobility progressed from non-ambulatory status to assisted ambulation, with improvement in FAC score.

Activities of daily living and instrumental activities also improved, indicating a higher level of autonomy.

Pain intensity decreased significantly, while quality of life showed a noticeable improvement.

Cognitive status remained stable, with slight improvement, and no spasticity or spasms were observed throughout hospitalization.

| Scale                         | Initial admission | Final discharge |
|-------------------------------|-------------------|-----------------|
| AIS - motor score             | 74/100            | 82/100          |
| AIS - sensitive score         | 212/224           | 212/224         |
| Asworth and Penn              | 0/16              | 0/16            |
| FAC International Scale       | 0/5               | 2/5             |
| Life Quality Assessment (QOL) | 40/112            | 60/112          |
| ADL                           | 1/6               | 3/6             |
| IADL                          | 2/8               | 3/8             |
| Barthel Index                 | 15/100            | 30/100          |
| SCIM                          | 20/100            | 40/100          |
| VAS                           | 8/10              | 4/10            |



## Recommendations

- Further adherence to an individualized rehabilitation program is recommended, according to the instructions provided at discharge, with the aim of maintaining functional gains and preventing complications.
- Adaptation of the home environment to reduce the risk of falls (installation of grab bars, removal of loose rugs, adequate lighting).
- Use of a walking aid (walking frame) for safe mobilization.
- Supervision and assistance during transfers and ambulation.
- Use of assistive devices (raised toilet seat, shower chair, hospital bed if needed).
- Family/caregiver support for daily activities.
- Referral to a palliative care service for comprehensive supportive management.
- The patient is discharged with an permanent urinary catheter in place. Maintain proper catheter hygiene, including daily local care with water and mild soap. Ensure adequate hydration. Monitor urine output, color, and clarity. Seek urgent medical attention in case of: absence of urine output (possible catheter obstruction), lower abdominal pain, fever, chills, signs of infection, hematuria or foul-smelling urine. The urinary catheter should be replaced every 3 weeks, or earlier if clinically indicated. Follow-up with urology is recommended.
- Regular follow-up is advised in the following specialties: physical and rehabilitation medicine, oncology, neurosurgery (for postoperative spinal status), urology (for neurogenic bladder), and cardiology.
- Balneary treatment is contraindicated in the current context, given the underlying oncological disease and the risk of progression.
- Further imaging investigations are recommended for disease staging and monitoring, including follow-up CT scans and MRI of the pelvis for better characterization of pelvic pathology.
- Continuous monitoring for complications such as thromboembolic events, infections, and further neurological deterioration is also required.
- Oncological evaluation is essential in order to establish the appropriate therapeutic strategy and specific oncological treatment.

## Conclusion

A complex clinical and paraclinical approach, combined with an individualized rehabilitation program, led to improvement in lower limb motor control and functional status in a patient with incomplete paraplegia (AIS C) in the context of cauda equina syndrome, associated with advanced oncological disease and multiple systemic complications.

Although the main functional goal—assisted ambulation over medium distances—was achieved at discharge, the long-term prognosis remains unfavorable due to the severe oncological condition. Continued multidisciplinary management and individualized rehabilitation are essential to maintain function, autonomy and quality of life.

## Case particularities

This case illustrates the association between a severe neurological deficit and advanced cancer. A particular aspect is the functional improvement achieved during rehabilitation despite the severe underlying oncological condition and multiple complications. This reinforces the value of integrating rehabilitation into oncological care.

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**Thank you for your attention!**

**Even in advanced disease,  
rehabilitation can still  
make a meaningful  
difference!**

