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Original research article

Application of ICF grading nursing management in functional exercise and rehabilitation of patients with spinal cord injury

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Abstract
Purpose: Develop an International Classification of Functioning, Disability and Health (ICF)-based tiered nursing protocol for spinal cord injury (SCI) rehabilitation and evaluate its clinical impact.
Methods: In a randomized trial, 122 SCI patients were divided into control (standard care) vs observation groups. The observation group received ICF rehabilitation set (ICF-RS) assessments and tiered nursing interventions. Outcomes (therapeutic efficacy, pain progression, quality of life) were longitudinally evaluated at postoperative intervals for comparative effectiveness analysis.
Results: The observation group showed significantly higher rates of "excellent" or "good" clinical efficacy (81.89% vs 62.30%, $P < 0.05$) and lower rates of "ineffective" outcomes (11.47% vs 29.50%). Pain scores at three and five days postoperative were 2.57 ± 1.43 and 2.96 ± 1.34 respectively, both significantly lower than controls ($P < 0.01$; $P < 0.05$). Quality-of-life scores at 3/6 months postoperative were notably higher in the observation group ($P < 0.05$).
Conclusion: ICF-RS-based tiered nursing enhances functional recovery and long-term outcomes in postoperative SCI patients.

Keywords: Disability and Health (ICF); International Classification of Functioning; Nursing; Rehabilitation Exercise; Spinal Cord Injury (SCI)

Introduction

Spinal cord injury (SCI) is usually caused by external force to damage the spinal cord and surrounding tissues, often leading to motor, sensory, and autonomic dysfunction or loss. It can occur at any age and regardless of gender, and imposes a huge burden on patients, their families and society (Hao et al., 2021). With the development of emergency medicine and surgical technology, the mortality rate of SCI patients has been significantly reduced, but the disability rate is still very high, often accompanied by varying degrees of paraplegia or quadriplegia, which lasts a lifetime and seriously affects the quality of life of patients. Rehabilitation exercise is one of the most important treatments to promote postoperative functional recovery of SCI patients. Scientific and reasonable functional exercise can help to restore the patient's neurological function to the greatest extent and improve the patient's long-term quality of life (Yang et al., 2020; Zhang, 2021). Since the location and degree of SCI vary from patient to patient, the exercise methods that can be used after surgery should also be different, otherwise it may lead to poor rehabilitation effect or even aggravate the injury. Therefore, scientifically evaluating the patient's condition characteristics and formulating an individualized functional exercise plan will have a positive impact on the effect of postoperative rehabilitation treatment (Duan et al., 2021; Matlasová, 2011). In order to develop targeted rehabilitation training programs and improve the effectiveness of functional training for spinal cord injuries, the International Classification of Functioning, Disability and Health (ICF) was used to classify and evaluate the degree of injury of SCI patients and establish grading standards, thereby formulating bundled measures and programs for rehabilitation training to provide a reference for promoting the reconstruction and recovery of limb function in SCI patients.

Materials and methods

Study population

A total of 122 SCI patients who underwent surgical treatment in the Department of Spine Surgery at the Affiliated Jinling Hospital of Medical School of Nanjing University were enrolled in this study between February 2021 to May 2023 according to the inclusion and exclusion criteria. The cohort comprised 59 male and 63 female patients, with a mean age of 53.9 ± 3.7 years (range 20–70).

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Our study adhered to the tenets of the Declaration of Helsinki (as revised in 2013). It was approved by the Ethics Committee of the author's hospital (Registration ID: 2024DZKY-024-02). All participants provided written informed consent to participate.

Inclusion and exclusion criteria

The inclusion criteria were as follows: (1) age ≥ 18 years; (2) spinal cord injury located in the cervical (C1–C4), thoracic or lumbar spine, clinically diagnosed as spinal cord injury, and in accordance with the American Spinal Injury Association (ASIA) 2011 revised "International Standards for Neurological Classification of Spinal Cord Injury" AIS grade B, C, D, and E patients; (3) clear consciousness, normal intelligence, and able to communicate in daily language; (4) informed consent from patients and their families, and approval from the Medical Ethics Committee.

The exclusion criteria are as follows: (1) those who do not meet the inclusion criteria; (2) those who are in critical condition and whose vital signs are not stable; (3) those who have severe injuries to other organs (multiple injuries); (4) those who have mental disorders, cognitive, or language disorders; and (5) those who refuse to participate in this trial.

Patient grouping

Patients fulfilling the inclusion criteria were randomly assigned to either a control group or an observation group using a random number table method, with each cohort comprising 61 participants. The patients were divided into two groups. The control group received routine nursing care. In contrast, the observation group, on top of routine nursing, adopted the ICF-RS classification items to assess and grade the injury severity of SCI patients, and implemented bundled nursing measures. Table 1 presents the comparative demographic profiles and baseline clinical characteristics of both groups.

Table 1. General information of patients

Index	Control group (n = 61)	Observation group (n = 61)	t or χ^2 value	P-value
Age	51.65 ± 2.63	52.42 ± 11.77	t = –0.498	0.6196
Gender			χ^2 = 0.034	0.855
Male (%)	44.26	42.62		
Female (%)	55.74	57.38		
Cause of the injury			χ^2 = 1.990	0.574
Traffic accident injury	26	22		
High fall injury	21	18		
Accidental fall injury	11	16		
Others	3	5		
Location of the injury			χ^2 = 0.288	0.592
Thoracic vertebra (T1–T12)	9	7		
Lumbar vertebra (L1–L5)	52	54		
AIS classification			χ^2 = 3.435	0.179
A	0	0		
B	26	17		
C	18	19		
D	17	25		
E	0	0		
Average duration from injury to inclusion	2.33 ± 0.47	2.43 ± 0.5	t = –1.15	0.252

Control group

A total of 61 SCI patients were included in this study. Their average age was 51.65 ± 2.63 years, with 27 males and 34 females. The average duration of the disease was 8.19 ± 4.13 days. All patients were diagnosed via MRI and clinical examinations. Etiological analysis revealed that the injuries resulted from high falls in 21 cases (34.4%), traffic accidents in 26 cases (42.6%), accidental falls in 11 cases (18.0%), and other causes in 3 cases (4.9%). Regarding the severity of the injury, as classified by the AIS, there were no patients in grade A, 26 in grade B, 18 in grade C, 17 in grade D, and none in grade E.

Observation group

A total of 61 SCI patients were included in this study. Their average age was 52.42 ± 11.77 years, with 26 males and 35 females. The average duration of the disease was 7.88 ± 3.25 days. All patients were diagnosed via magnetic resonance imaging (MRI) and clinical examinations. Etiological analysis revealed that the injuries resulted from high falls in 18 cases (29.5%), traffic accidents in 22 cases (36.1%), accidental falls in 16 cases (26.2%), and other causes in 5 cases (8.2%). Regarding the severity of the injury, as classified by the AIS, there were no patients in grade A, 17 in grade B, 19 in grade C, 25 in grade D, and none in grade E.

Treatment methods and observation indicators

Rehabilitation nursing program for patients in the control group

The responsible nurse conducts daily assessments of the patient's physiological functions (including pain, lower limb mobility, gastrointestinal function, urinary/defecatory function, and psychological status) in accordance with standardized nursing procedures. Based on identified nursing issues, the nurse implements corresponding interventions. These primarily include: medication administration as prescribed, disease-specific health education, activities of daily living train-

ing, and psychological support. Particular emphasis is placed on guiding patients through active lower limb functional exercises.

Phase 1: Basic stage (Day 1)
① Deep breathing exercises: 5-second holds per repetition, 3–4 sets daily.
② Fist exercise: 10 repetitions per set, 2–3 sets daily.
③ Elbow flexion-extension: 10 repetitions per set, 2–3 sets daily.
④ Shoulder abduction-adduction: 10 repetitions per set, 2–3 sets daily.
⑤ Ankle pump exercises: 10 repetitions per set, 2–3 sets daily.
⑥ Knee flexion-extension: 10 repetitions per set, 2–3 sets daily.
⑦ Hip abduction-adduction: 10 repetitions per set, 2 sets daily.
Note: One additional set is added daily in a progressive manner.

Phase 2: Intensive stage (Days 2–7)
① Continuation of basic stage exercises.
② Straight leg raises: 10 repetitions per set, 2–3 sets daily.
③ Hip and knee flexion (maximal chest approximation): 10 repetitions per set, 2–3 sets daily.

Phase 3: Consolidation stage (Long-term maintenance)
① Continuation of intensive stage exercises.
② Five-point support technique: In supine position, patient elevates trunk using head, feet, and elbow supports (modified to three-point support using only head and feet for younger patients).
③ Prone extension exercises (swallow glide technique): In prone position, patient simultaneously extends upper and lower extremities while maintaining maximal cervical extension, with abdominal region as the sole contact point. Initial regimen begins with 30 repetitions daily, progressively increasing to 200 repetitions. Exercise intensity and duration should be gradually escalated, with a minimum maintenance period of three months for optimal therapeutic outcomes.

Rehabilitation intervention plan for patients in the observation group
The observation group implemented the ICF-RS to evaluate and classify the severity of SCI in patients, accompanied by bundled nursing interventions. In clinical practice, the ICF framework serves dual roles as both an assessment tool in nursing care and a component of nursing management (Cieza and Kostansjek, 2021; Jacob and Cox, 2017; Zhang et al., 2024). The quantitative assessment of physical function components within the ICF-RS encompasses eight distinct categories: sleep functions, emotional functions, pain perception, exercise tolerance, sexual functions, joint mobility, muscle strength functions, and urination functions (Gao et al., 2017). The physical function component (comprising nine items) demonstrated excellent model fit within the ICF-RS framework, effectively capturing the functional status of orthopedic inpatients. Within the context of this study, the category "b130 energy and drive functions" was excluded from the assessment due to poor model fit (Wang et al., 2022). Each functional category was evaluated using the standardized ICF 5-level qualifier scale (ranging from 0 to 4) (Gao et al., 2017). A rehabilitation team was established, comprising one specialist physician, two nurses, and one rehabilitation therapist. All patients in the intervention group underwent systematic one-on-one assessments by the team members, including comprehensive history-taking and physical examinations. Based on the spinal cord injury level and severity, combined with the eight categories of the ICF-RS, functional impairment severity was classified using ICF 5-level qualifiers (0–4). Personalized rehabilitation plans were subsequently formulated. Specific rehabilitation interventions are detailed in Table 2.

Observation indicators
(1) Efficacy evaluation
Based on postoperative recovery outcomes, two independent physicians evaluated treatment efficacy and classified the results into four categories: ① Excellent: complete resolution of clinical symptoms with full restoration of normal physical labor capacity; ② Good: significant symptom improvement with occasional low back and leg pain following physical exertion; ③ Fair: partial symptom relief but inability to perform physical labor; ④ Poor: no improvement or worsening of clinical symptoms (Wang, 2024).

(2) Visual Analogue Scale/Score (VAS)
Prepare an assessment tool with a standardized 10-cm horizontal line, with the left terminus anchored as "no pain (0 points)" and the right terminus defined as "unbearable severe pain (10 points)". Guide the subjects to independently mark a perpendicular line at the corresponding point along the continuous scale based on their individual pain experience. Quantitative standards for pain grading: 0 points represent a pain-free state, 1–3 points indicate mild pain perception, 4–6 points reflect moderate pain, and 7–10 points indicate severe pain response.

(3) Comparison of postoperative recovery status of patients
The two groups of patients were assessed for rehabilitation using the Short Form SF-36 at 1, 3, and 6 months after surgery, with scores ranging from 0 to 100. The higher the score, the better the quality of life.

Statistical methods
Statistical analysis was performed using SPSS 20.0. Measurement data were expressed as mean ± standard deviation and analyzed using Student's *t*-test, while enumeration data were presented as absolute values with percentages and analyzed using Pearson's χ^2 test. A significance level of $P < 0.05$ was applied.

Results

Effect of ICF-RS bundled care on efficacy
Two spinal surgeons independently assessed the therapeutic outcomes of both patient groups. As shown in Table 3, the observation group demonstrated superior clinical efficacy, with 34 (55.74%) and 16 (26.23%) patients achieving "excellent" and "good" results respectively, totaling 81.89% – significantly higher than the control group's 62.30% ($P < 0.05$). Conversely, the control group had a higher proportion of "ineffective" cases (18 patients, 29.50%) compared to the observation group (7 patients, 11.47%, $P < 0.05$). These findings indicate that the observation group's treatment outcomes were significantly better than those of the control group.

Table 2. Nursing measures for ICF-RS physical function classification

Category	Rehabilitation interventions	Classification				
		No impairment (level 0)	Mild impairment (level 1)	Moderate impairment (level 2)	Severe impairment (level 3)	Complete impairment (level 4)
Sleep function	① Maintaining an optimal ward sleep environment; ② Providing disease-specific education to alleviate psychological concerns; ③ Administering oral hypnotics as prescribed; ④ Implementing potent sedative medication per physician orders.	①	①②	①②③	①②③④	①②③④
Emotional function	① Permitting family accompaniment; ② Presenting representative successful cases with treatment outcomes and prognoses to enhance confidence in recovery; ③ Placement in a secured ward environment with strict hazardous item control and specialized 1:1 observation; ④ Conducting hourly rounds to effectively identify stressors and ensure patient safety.	/	①	①②	①②③	①②③④
Sensation of pain	① Application of distraction techniques; ② Utilization of patient-controlled analgesia pumps; ③ Administration of moderate-efficacy analgesics as prescribed; ④ Administration of high-potency analgesics as prescribed; ⑤ Evidence-based reassessment of pain scores per protocol.	/ (0 points)	①⑤ (1–2 points)	①②⑤ (3–4 points)	①②③⑤ (5–6 points)	①②③④⑤ (7–10 points)
Exercise tolerance functions	① Exercise regimen: 15–20 minutes/session; ② Exercise regimen: 10–15 minutes/session; ③ Exercise regimen: 5–10 minutes/session; ④ Independent exercise: 1–5 minutes/session; ⑤ Assisted exercise: 5–10 minutes/session.	①	①②	①②③	①②③④	①②③④⑤
Sexual functions	① Distribution of educational materials; ② Physician-supervised exercise regimens; ③ Combined traditional Chinese and Western medicine therapy; ④ Adjunctive therapy with physiotherapy devices.	/	①	①②	①②③	①②③
Mobility of joint functions	① Hip-knee flexion with straight leg raise (SLR) at 60°–90°; ② Hip-knee flexion with SLR at 30°–59°; ③ SLR at 10°–29°; ④ Ankle pump exercises; ⑤ Passive range-of-motion exercises.	①	①②	①②③	①②③④	①②③④⑤
Muscle power functions	① Active lower limb exercises: 15–20 min/session, 3 times daily; ② Contralateral limb-assisted exercises: 15–20 min/session, 3 times daily; ③ Resistance-band-facilitated exercises: 15–20 min/session, 3 times daily; ④ Caregiver-dependent passive range of motion.	①	①②	①②③	①②③④	①②③④⑤
Urination functions	① Structured bladder retraining protocol instruction; ② Hydration/activity counseling with abdominal wall massage; ③ Caregiver education on fecal management and pelvic floor muscle training; ④ Low-frequency electromagnetic stimulation for bowel motility enhancement; ⑤ Device-dependent voiding (e.g., cystostomy-assisted drainage).	①	①②	①②③	①②③④	①②③④⑤

Note: Principles of grading and quantification: ① The evaluation is conducted by directly applying the ICF threshold values, based on comprehensive analysis of the patient's medical history, clinical examination findings, and diagnostic test results. ② According to the ICF linkage guidelines, the currently widely used reliable measurement tool standards (such as the pain visual analogue scale VAS) are converted into ICF threshold values for clinical application. ③ According to the ICF linkage protocols, the results of existing clinical assessment tools (such as the modified Barthel index and muscle strength grading) are converted into ICF threshold values for clinical application (Yan, 2022).

Table 3. Comparison of clinical efficacy between control and experimental groups

Groups	Excellent	Good	Fair	Poor	Excellent/Good rate [*n* (%)]
Control group (*n* = 61)	20	18	5	18	38 (62.30)
Experimental group (*n* = 61)	34	16	4	7	50 (81.97)*

Note: * represents $P < 0.05$

Effect of ICF-RS bundled care on postoperative pain in patients

The VAS was employed to assess pain levels in both patient groups pre- and post-operatively. As presented in Table 4, no significant intergroup difference was observed in preoperative pain scores. However, at 3 days post-surgery, the observation group demonstrated significantly lower pain scores (2.57 ± 1.43) compared to the control group (4.49 ± 1.75), with a statistically significant difference ($P < 0.01$). This significant pain reduction in the observation group persisted at 5 days post-surgery ($P < 0.05$).

Table 4. Comparison of VAS scores

Groups	Preoperative	1 day post-surgery	3 days post-surgery	5 days post-surgery	7 days post-surgery
Control group (*n* = 61)	3.02 ± 1.58	3.10 + 1.99	4.49 + 1.75	3.52 + 1.54	1.45 + 1.76
Experimental group (*n* = 61)	3.05 ± 1.13	3.05 + 1.58	2.57 + 1.43**	2.96 + 1.34*	1.34 + 1.26

Note: * represents $P < 0.05$; ** represents $P < 0.01$

Comparison of patients' postoperative living conditions

Health-related quality of life was assessed using the SF-36 questionnaire at 1, 3, and 6 months postoperatively. As shown in Table 5, while the observation group showed marginally higher scores than the control group at 1-month follow-up, this difference did not reach statistical significance. However, significant intergroup differences ($P < 0.05$) emerged at subsequent assessments, with the observation group demonstrating substantially higher scores at both 3-month and 6-month follow-ups compared to the control group.

Table 5. Quality of life comparison at 1, 3, and 6 months post-surgery

Groups	1 month post-surgery	3 months post-surgery	6 months post-surgery
Control group (*n* = 61)	40.62 + 1.21	74.31 + 1.21	86.13 + 1.11
Experimental group (*n* = 61)	45.53 + 1.16	84.32 + 2.38*	95.23 + 1.14*

Note: * represents $P < 0.05$

Discussion

Given the variability in both location and severity of spinal cord injuries, postoperative rehabilitation strategies should be tailored accordingly. The development of individualized exercise regimens, based on comprehensive clinical assessment of each patient's specific condition, plays a crucial role in optimizing postoperative rehabilitation outcomes. The application of the ICF classification system in assessing SCI severity serves as an important reference for developing comprehensive rehabilitation strategies, facilitating the restoration of motor function and improvement of independent living skills in SCI patients (Pongpipatpaiboon et al., 2020). This study enrolled 122 SCI patients and conducted functional assessments using the ICF-RS classification system. The results demonstrated significantly superior recovery outcomes in the observation group compared to the control group. These findings suggest that the ICF-RS system not only exhibits excellent clinical applicability and operational feasibility but also enables accurate functional evaluation, thereby facilitating the development of personalized rehabilitation strategies for postoperative care.

The implementation of SCI rehabilitation nursing primarily depends on nursing staff, where procedural errors may lead to secondary spinal injuries and compromise rehabilitation outcomes. Therefore, implementing effective management strategies is essential to enhance nursing staff performance, standardize procedures, and improve overall care quality (Du et al., 2024; Wu et al., 2023). The ICF serves as a globally recognized framework for evaluating health status and related conditions. Through its multidimensional components, the ICF effectively characterizes functional impairments and provides valuable insights into disability assessment (Kew and Osborne, 2024). Research demonstrates that disease-specific core classifications developed within the ICF framework effectively identify functional outcomes in clinical conditions (Hernández-Lázaro et al., 2024). This framework also facilitates the identification of nursing challenges in patients with physical disabilities and chronic diseases, enabling targeted intervention strategies. In SCI patients, common clinical manifestations encompass motor dysfunction, nutritional deficiencies, incontinence, sleep disturbances, and anxiety disorders. The application of the ICF framework for identifying and evaluating these nursing issues significantly contributes to enhanced recovery outcomes and improved quality of life. This study implemented patient evaluation and classification using the ICF-RS body function combination project, encompassing emotional status, sleep quality, pain perception,

exercise tolerance, joint mobility, muscle strength, sexual function, and urinary function. Personalized nursing interventions were subsequently administered. The results demonstrated significant improvements in both clinical outcomes and long-term quality of life (3- and 6-month follow-ups) in the observation group. These findings indicate that the ICF-RS-based comprehensive nursing protocol enables targeted functional enhancement and demonstrates superior efficacy compared to conventional nursing approaches.

Pain significantly impacts postoperative rehabilitation in SCI patients, hindering early rehabilitation training initiation and delaying the resumption of oral intake along with nutritional recovery during the critical postoperative period (Westphal et al., 2024). This nursing model adopts a patient-centered approach that comprehensively addresses both disease-specific characteristics and patients' physiological-physiological status. By implementing tailored nursing interventions based on individual disease profiles and functional capacities, it enables real-time adjustment of care strategies to mitigate pain and discomfort. The model establishes therapeutic environments conducive to health and safety, fosters positive health-related behavioral modifications, enhances rehabilitation adherence, and ultimately facilitates the restoration of limb functionality and improvement in activities of daily living independence.

The ICF-RS framework-guided hierarchical nursing management system demonstrates clinical efficacy in SCI rehabilitation, effectively enhancing therapeutic outcomes while reducing postoperative pain levels. This model significantly promotes motor function recovery and optimizes long-term quality of life outcomes through structured rehabilitation protocols. Our research establishes a standardized assessment protocol for SCI rehabilitation stratification, demonstrating significant potential for improving both clinical effectiveness and patient-reported satisfaction metrics. However, as a preliminary single-center investigation with limited sample size, these findings require validation through multicenter trials with expanded cohorts to ensure generalizability.

Conclusion

This study employs the ICF-RS to enable precise assessment of patients' functional status. Based on the evaluation results, clinical nurses implement corresponding rehabilitation nursing interventions. This approach can improve patient function, enhance quality of life, promote recovery, and thereby facilitate better social reintegration. Furthermore, the application of the ICF-RS-based tiered nursing improves the efficiency of rehabilitation nursing, allows for more targeted interventions, and enhances the overall quality of nursing care.

Currently, research on the ICF within China is increasing, encompassing theoretical knowledge, core sets, the development and application of the ICF assessment tools, and spanning various fields including clinical practice, community settings, and management. However, studies in nursing remain limited and at a nascent stage. To facilitate the broader clinical adoption of the ICF, beyond further refining functional grading to better guide the formulation of clinical rehabilitation plans and the evaluation of rehabilitation outcomes, it is recommended to establish an ICF-RS data-sharing platform in the future. This platform would provide convenience for clinical assessors conducting quantitative ICF-RS evaluations, and enable assessing rehabilitation patients' function, analyzing rehabilitation needs, and guiding clinical practice through data sharing.

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Ethical aspects and conflict of interest
The authors have no conflict of interest to declare.

References

1. Cieza A, Kostansjek N (2021). The international classification of functioning, disability and health: the first 20 years. Dev Med Child Neurol 63(4): 363. DOI: 10.1111/dmcn.14799.
2. Du J, Chen R, Xie H (2024). Application of nursing intervention based on snyder's hope theory in individuals with spinal cord injury. Am J Transl Res 16(4): 1246–1255. DOI: 10.62347/JFAI7888.
3. Duan R, Qu M, Yuan Y, Lin M, Liu T, Huang W, et al. (2021). Clinical benefit of rehabilitation training in spinal cord injury: a systematic review and meta-analysis. Spine 46(6): E398–E410. DOI: 10.1097/BRS.0000000000003789.
4. Gao Y, Yan T, You L, Li K (2017). Developing operational items for the international classification of functioning, disability and health rehabilitation set: the experience from China. Int J Rehabil Res 41(1): 20–27. DOI: 10.1097/MRR.0000000000000254.
5. Hao DJ, Yang JS, He BR (2021). Highlights and progress of clinical diagnosis and treatment of spine and spinal cord injuries in China during the "13th Five-Year Plan" period. Chin J Traumatol 12: 289–294.
6. Hernández-Lázaro H, Mingo-Gómez MT, Jiménez-Del-Barrio S, Rodríguez-Fernández AI, Areso-Bóveda PB, Ceballos-Laita L (2024). Validation of the International Classification of Functioning, Disability, and Health (ICF) core set for post-acute musculoskeletal conditions in a primary care physiotherapy setting from the perspective of patients using focus groups. Disabil Rehabil 46(16): 3594–3601. DOI: 10.1080/09638288.2023.2251392.
7. Jacob M, Cox SR (2017). Examining transgender health through the International Classification of Functioning, Disability, and Health's (ICF) Contextual Factors. Qual Life Res 26(12): 3177–3185. DOI: 10.1007/s11136-017-1656-8.
8. Kew CL, Osborne CL (2024). An analysis of caregiver burden assessments using the International Classification of Functioning, Disability, and health (ICF): what aspects of burden are measured, and what is missing. Disabil Rehabil 46(16): 3724–3732. DOI: 10.1080/09638288.2023.2254227.
9. Matlasová H (2011). Practical use of the International Classification of Functional Capacities. Disability and Health. Kontakt 13(1): 54–64. DOI: 10.32725/kont.2011.008.
10. Pongpipatpaiboon K, Selb M, Kovindha A, Prodinger B (2020). Toward a framework for developing an ICF-based documentation system in spinal cord injury-specific rehabilitation based on routine clinical practice: a case study approach. Spinal Cord Ser Cases 6(1): 33. DOI: 10.1038/s41394-020-0283-8.
11. Wang J (2024). Clinical efficacy of triple pelvic osteotomy and Salter osteotomy in the treatment of hip dislocation in children. China. Guangdong Medical University, pp. 1–55.
12. Wang WX, Xu GR, He XH, Li K, Wang YM (2022). Rasch analysis of the Body Function component of the ICF Rehabilitation Set in functional assessment of orthopedic patients. Rehabilitation Medicine 32(5): 394–400. DOI: 10.3724/SP.J.1329.2022.05003.
13. Westphal M, Carrard V, Braunwalder C, Debnar C, Post M, Fekete C, et al. (2024). Reciprocal association between pain and quality of life after newly acquired spinal cord injury. Qual Life Res 33(5): 1347–1357. DOI: 10.1007/s11136-024-03615-1.
14. Wu Q, Han L, Zhang Q, Wang R, Zhao A, Zhu K (2023). Construction of a quality evaluation index system for spinal

cord injury nursing. Chin Gen Pract Nurs 21(31): 4408–4412. DOI: 10.12104/j.issn.1674-4748.2023.31.021.

15. Yan T (2022). Research of promoting the clinical application of the International Classification of Functioning, Disability and Health-Rehabilitation Composite (ICF-RS) and its functional level conversion. Chin J Rehabil Med 37(10): 1297–1300. DOI: 10.3969/j.issn.1001-1242.2022.10.001.
16. Yang B, Zhang F, Cheng F, Ying L, Wang C, Shi K, et al. (2020). Strategies and prospects of effective neural circuits reconstruction after spinal cord injury. Cell Death Dis 11(6): 439. DOI: 10.1038/s41419-020-2620-z.
17. Zhang HY (2021). Functional training and reconstruction of 198 patients with spinal cord injury. Chin Gen Pract Nurs 05: 404. DOI: 10.3969/j.issn.1674-4748.2009.05.023.
18. Zhang M, Gao Y, Xue J, Li K, Zhang L, Yu J, et al. (2024). Development of the assessment standards of the international classification of functioning, disability, and health (ICF) geriatric core set through a modified delphi method. BMC Geriatrics 24: 239. DOI: 10.1186/s12877-024-04816-6.