Am J Transl Res 2021;13(6):6864-6872
www.ajtr.org /ISSN:1943-8141/AJTR0130457

Original Article

Impact of enhanced recovery nursing combined with limb training on knee joint function and neurological function after total knee arthroplasty in patients with knee osteoarthritis

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Received January 22, 2021; Accepted February 19, 2021; Epub June 15, 2021; Published June 30, 2021

Abstract: Objective: To investigate the impact of enhanced recovery after surgery (ERAS) nursing combined with limb training on knee joint function and neurological function after total knee arthroplasty in patients with knee osteoarthritis (KOA). Methods: Eighty-six patients with KOA after TKA were randomly divided into two groups, group A and group B, with 43 patients in each group. Group A was given ERAS nursing, and group B was given limb rehabilitation training combined with ERAS nursing. The changes in knee joint function and neurological function were observed. Results: There was no significant difference in the time to get out of bed for the first time, first bowel movement time after the surgery, hospital stay and hospital costs between the two groups (P>0.05). There was no significant difference in VAS scores between the two groups before the operation and 1 d after the operation (P>0.05). Three days and seven days after the operation, the VAS scores in the two groups both decreased, and the VAS scores of group B were higher than those of group A (P<0.05). There was no significant difference in the excellent rate of Judet scores and Lysholm scores between the two groups (P>0.05), but the two indicators in the two groups all increased at three and six months after the operation, and the two indicators in group B were higher than those of group A (P<0.05). There was no significant difference in NIHSS scores between the two groups before the operation (P>0.05). Fifteen and thirty days after the operation, the NIHSS scores of the two groups both decreased, and the NIHSS scores of group B were lower than those of group A (P<0.05). After the nursing care, the scores of health knowledge level, self-care concept, self-care responsibility and self-care skills in group B were higher than those in group A (P<0.05). The incidence of complications in group B during nursing was lower than group A (P<0.05). Conclusion: The enhanced recovery after surgery nursing combined with limb training has a better effect on KOA patients after TKA. It can significantly improve knee joint function, limb motor ability and neurological function, increase patients' cognition of disease and reduce the incidence of complications, compared with simple enhanced recovery after surgery nursing.

Keywords: Knee osteoarthritis, enhanced recovery after surgery, limb training, knee joint function, neurological function

Introduction

Knee osteoarthritis (KOA) is an orthopedic disease with a high incidence. Articular cartilage located at the junction of the femur, tibia and fibula can reduce the friction between the bones. Improper exercise may damage the articular cartilage, leading to increased local inflammation and immune response, which results in knee osteoarthritis and impaired knee joint function [1, 2]. KOA treatment methods include drugs and surgical treatment. However, the therapeutic effect of drug treatment on knee osteoarthritis is far less than expected. Total knee arthroplasty (TKA) is a widely used method to treat KOA, which can improve joint deformities. However, a study confirmed that after TKA, patients experienced joint pain during rest and walking; their muscle function and peripheral nerve function gradually deteriorated; their knee joint function decreased, and common complications such as neurological dysfunction occurred [3].

Enhanced recovery after surgery (ERAS) is a program proposed by Danish scholars, aiming

to increase the body's physiological function, reduce stress and accelerate the postoperative recovery of patients [4]. ERAS has become an important way for hospitals to provide patients with high-quality health services. The limb training for KOA patients after operation has a beneficial effect on their physical function. It has been proved that proper and scientific limb training plays a positive role in promoting the healing of injury [5]. However, there is little research on the clinical efficacy of ERAS nursing combined with limb training for KOA patients. In this study, we observed and analyzed the effect of ERAS nursing combined with limb training on knee joint function and neurological function of postoperative KOA patients.

Materials and methods

General information

Eighty-six KOA patients after total knee arthroplasty from July 2017 to July 2019 were enrolled in this study. The inclusion criteria were: patients who were diagnosed with knee osteoarthritis by X-ray and met the diagnostic criteria for osteoarthritis [6]; patients who were older than 18 years old; patients who underwent TKA for the first time; patients with lesions in one knee; patients with complete clinical information. The exclusion criteria were: patients who experienced infection in the involved joint; patients who underwent TKA for more than one time; patients with poor language and cognitive ability; patients who withdrew from the study or did not cooperate.

Eighty-six patients were randomly divided into two groups, group A and group B, with 43 patients in each group. Group A was given ERAS nursing, and group B was given ERAS nursing combined with limb rehabilitation training. The patients and their family members in both groups understood the content of this study and signed the informed consent. This study was approved by the Ethics Committee of our hospital.

Methods

Patients in group A received ERAS nursing, starting from the time of hospitalization and ending at 30 d after the operation. A team was built, which composed of an orthopedic physician, a head nurse and several nurses. They collected information about the patients' condition and nursing progress, learned nursing knowledge about the disease, formulated an ERAS nursing plan and guided a responsible nurse to implement it.

The preoperative nursing procedures were as follows [7]. (1) Preoperative stress relief. Psychological counseling was conducted to build trust with patients, reduce their preoperative pressure and establish their confidence in the operation. Patients were informed of disease-related knowledge by both oral explanation and written material. (2) Two hours before the operation, 2 g of cefazolin (Sichuan Changzheng Pharmaceutical Co., Ltd., China) in 100 ml of normal saline (Beijing Tiantan Biological Products Co., Ltd., China) were given intravenously. If the patient is allergic to cefazolin, 0.6 g of clindamycin (Wuhan Pusheng Pharmaceutical Co., Ltd., China) in 100 ml of normal saline was used. If there was no obvious sign of infection after the operation, the above drugs were used until the second day after the operation. (3) Preparation for operation area. The operation area was cleaned with soapy water and then disinfected. (4) Bowel preparation. Patients were allowed to drink water and eat liquid food 8 hours before the operation, and patients without diabetes history were allowed to take 200 ml of 5% glucose solution (Shanghai Changzheng Fumin Jinshan Pharmaceutical Co., Ltd., China). (5) Respiratory tract preparation. It was necessary for patients to receive respiratory tract training before the operation. Breath training was carried out by deep breathing. Smoking and drinking were avoided. (6) Pain assessment. The degree of pain was assessed and recorded. (7) Complications. Related cases were referred to prevent possible complications such as constipation and bedsores.

The postoperative nursing procedures were as follows. The drainage tube was removed within 24 h after the operation, and the wound was given a local ice compress for 24 hours at 24 h after the operation. (1) Dietary intervention. When the anesthetic was no longer effective, nutrition intake was increased because a high proportion of protein and vitamins can help tissue healing. (2) Since the patients needed to rest in bed after the operation, with limited movement and inconvenience in activity, they tended to have negative emotions.

Language communication was helpful for this kind of patients to adjust their psychological state andaccelerate the body's recovery. (3) Analgesia. Two days after the operation, the analgesia pump was pulled out, and 100 mg of tramadol was given twice a day orally for 7 days. (4) Prevention of infection. After the operation, rivaroxaban (Bayer Healthcare Co., Ltd., Germany) was given orally for 14 days. Broad-spectrum antibiotics were used to prevent infection. The frequency of wound dressing was increased, and the wound was kept dry and clean. The operated leg was fixed and raised. Patients with vascular anastomosis were given warmth care, antispasmodic and anticoagulant treatment to prevent deep venous thrombosis. (5) Protection of the neurological function. The motor function of the lower limb and the bladder' function was closely monitored after the operation. Patients with normal functions were instructed to take rehabilitation training. (6) Preventive nursing. The patient's joint condition was checked to see if the joint was red or infected after the operation. Regularly turning over and massage for the patients was carried out to prevent the formation of bedsores. (7) Discharge guidance. Patients were instructed in the training methods, and they were guided to reduce movements such as running and jumping to avoid joint injury.

Patients in group B received limb training on the basis of group A. The nursing plan in this group ended at 90 d after the operation. After the operation, the patient returned to the ward and remained in a supine position. The involved joint was treated with compression stockings, and the leg was raised. The patient was encouraged to make active plantar flexions of the ankle joint and active movements of the toe joint. During this period, their motor nerves function and whether swelling occurred was closely monitored to avoid venous thrombosis. Two days after the operation, quadriceps femoris muscle contraction exercises were performed, contracting once for 10 seconds, 10 times in a group, resting for 10 minutes between groups, and 3 groups in total. Ankle pump training was performed: ankle dorsiflexion for 10 s, rest, ankle dorsiflexion for 5-10 s, rest, 30 times in a row as a group, 2 groups a day. Speed-up of the lower limb blood circulation exercises were performed: raising the leg up 30° to 45° with both knees straightened, once for 10 s, 10 times a group, 2 groups a day; and patients were encouraged to get out of the bed and do some standing and walking exercise. If there were no adverse symptoms when standing, patients could do some short distance walking, according to their tolerance. Three days to 14 days after the operation, knee joint activity training was carried out: making active and passive knee joint flexion, with a flexion angle gradually increasing from 0° to 90°, to increase the strength of the muscles around the joint, once for 10 s, 10 times a group, 3 groups a day. Fifteen to sixty days after the operation, patients were encouraged to carry out knee function training, resistance training and stairs climbing training, once for 20 min, 10 times a group, and 3 groups a day. Thirty to ninety days after the operation, when the knee joint function was stable, patients went swimming and jogging.

Outcome measures

Primary outcome measures included general indicators of the operation, pain scores, knee joint function and neurological function. Secondary outcome measures included self-efficacy and complications.

General indicators of surgery: The time to get out of bed for the first time, first bowel movement time after the surgery, hospital stay and hospital costs in both groups were observed.

Pain scores: Visual Analogue Scale (VAS) was used to evaluate the degree of pain in both groups before the operation, one day, three days and seven days after the operation. The scale included four grades, which were 0, 1-3, 4-6, 7-10, representing no pain, mild pain, median pain and severe pain, respectively.

Knee joint function: The knee joint function of both groups was observed before the operation, three months and six months after the operation. The knee flexion function was observed by the Judet' criteria, and the knee function was evaluated by the Lysholm Knee Scoring Scale. In the Judet' criteria, the knee flexion' degree was divided into four grades: >100°, 81-100°, 50-80° and <50°, respectively representing excellent, good, fair and poor [7]. The excellent rate (%) = excellent cases/total cases × 100. The evaluation content of the Lysholm scale included limp, using cane or

Table 1. Comparison of general information between the two groups (n, $\bar{x}$ ± sd)

Group		Group A	Group B	χ^2/t	P
n		43	43		
Male		28	25	0.179	0.915
Female		15	18		
Average age (years)		67.3±5.2	68.1±5.2	0.720	0.474
Mean disease course (years)		6.5±3.7	6.1±4.1	0.509	0.612
Surgical site (case)	Left knee	23	22	0.047	0.977
	Right knee	20	21		
Combined with hypertension (case)		11	15	0.535	0.765
Combined with diabetes (case)		16	11	0.801	0.670
Operation time (min)		125.5±20.5	130.2±18.7	1.111	0.269
Bleeding volume (mL)		415.50±58.60	398.30±69.50	1.241	0.218

crutches, locking sensation in the knee, giving way sensation from the knee, pain, swelling, climbing stairs, squatting, with a total score of 100 [8]. Lower scores indicated worse function.

Neurological function: The neurological function of patients in both groups was detected by the National Institute of Health Stroke Scale (NIHSS) before the operation, 15 days and 30 days after the operation. The NIHSS included 12 items, with a total score of 42. Higher scores indicated worse neurological function.

Self-efficacy: Before and after the nursing care, the Exercise of Self-Care Agency scale (ESCA) was used to evaluate patients' health knowledge level, self-care concept, self-care responsibility and self-care skills, with a total score of 172. Higher scores indicated stronger self-care ability.

Complications: The incidence of incision infection, joint stiffness and deep vein thrombosis in both groups were observed. The incidence rate (%) = complication cases/total cases × 100.

Statistical analysis

SPSS 23.0 software was used to analyze the data of the two groups. Measurement data were expressed as mean ± standard deviation ($\bar{x}$ ± sd) and were analyzed by t-test. Data at different timepoints were compared by the repeated measures ANOVA. The knee joint function and incidence of complications were expressed as (n, %) and analyzed by χ^2 test. P<0.05 was considered statistically significant.

Results

Comparison of general information between the two groups

There was no significant difference in gender, average age, mean disease course, surgical site (the left knee or the right knee), operation time, bleeding volume and complications between the two groups (P>0.05). See **Table 1**.

Comparison of general indicators of surgery between the two groups

There was no significant difference in the time to get out of bed for the first time, first bowel movement time after the surgery, hospital stay and hospital costs between the two groups (P>0.05). See **Table 2**.

Comparison of pain scores between the two groups at different timepoints

There was no significant difference in VAS scores between group A and group B before and one day after the operation (P>0.05). Three days and seven days after the operation, the VAS scores of the two groups both decreased (P<0.05), but the VAS scores of group B were higher than those of group A (P<0.001). See **Table 3**.

Comparison of the excellent rate of Judet scores between the two groups at different timepoints

There was no significant difference between the two groups in the excellent rate of Judet scores before the operation (P>0.05). Three

Table 2. Comparison of general indicators of surgery between the two groups (n, $\bar{x} \pm sd$)

Group	Group A	Group B	t	P
n	43	43		
Time to get out of bed for the first time (d)	3.05±1.02	2.59±1.58	1.604	0.113
First bowel movement time (d)	2.09±0.80	2.18±0.97	0.469	0.640
Hospital stay (d)	6.28±2.04	5.85±1.88	1.016	0.312
Hospital costs (yuan)	50320.00±730.00	49892.00±852.3050	1.520	0.145

Table 3. Comparison of pain scores between the two groups at different timepoints ($\bar{x} \pm sd$)

Time	Group A	Group B	t	P
Preoperative	6.97±1.20	7.05±1.01	0.335	0.739
1 d after operation	5.95±0.74	6.04±0.85	0.524	0.602
3 d after operation	2.58±0.35$^{\#,a}$	3.85±0.55$^{\#,a}$	12.770	<0.001
7 d after operation	1.43±0.31$^{\#,a,b}$	2.90±0.70$^{\#,a,b}$	12.590	<0.001
F	249.000	546.500		
P	<0.001	<0.001		
F for different timepoints	754.600			
P for different timepoints	<0.001			
Between-group F	76.800			
Between-group P	<0.001			
Within-group F	20.210			
Within-group P	<0.001			

Note: Compared with before the operation, $^{\#}P<0.05$; compared with 1 d after the operation, $^{a}P<0.05$; compared with 3 d after the operation, $^{b}P<0.05$.

Table 4. Comparison of the excellent rate of Judet scores between the two groups at different timepoints (n, %)

Group	n	Excellent rate of Judet scores (%)		
		Excellent cases before the operation (%)	Excellent cases three months after the operation (%)	Excellent cases six months after the operation (%)
Group A	43	4 (9.30)	24 (55.81)	36 (83.72)
Group B	43	3 (6.98)	36 (83.72)	41 (95.35)
χ^2		0.331	5.583	4.322
P		0.565	0.018	0.037

and six months after the operation, the excellent rate of the two groups both increased, and the excellent rate of group B was higher than that of group A (P<0.05). See **Table 4**.

Comparison of Lysholm scores between the two groups at different timepoints

There was no significant difference in Lysholm scores between the two groups before the operation (P>0.05). Three months and six months after the operation, the Lysholm scores of the two groups both increased, and the changes of group B were larger than those of group A (P<0.001). See **Table 5** and **Figure 1**.

Comparison of NIHSS scores between the two groups at different timepoints

There was no significant difference in NIHSS scores between the two groups before the operation (P>0.05). Fifteen days and thirty days after the operation, the NIHSS scores of the two groups both decreased, and the changes of group B were more extensive than those of group A (P<0.001). See **Table 6** and **Figure 2**.

Comparison of self-efficacy between the two groups

There was no significant difference in self-efficacy between the two groups before the nursing care (P>0.05). After the nursing care, the scores of health knowledge level, self-care concept, self-care responsibility and self-care skills in group B were higher than those of group A (P<0.05). See **Table 7**.

Comparison of complications between the two groups

In group B, only two patients experienced incision infection, and no deep venous thrombosis or joint stiffness occurred, with a complication rate of 4.65%. In group A, two patients experienced incision infection; two patients experi-

Table 5. Comparison of Lysholm scores between the two groups at different timepoints (n, $\bar{x} \pm sd$)

Group	n	Lysholm scores (score)		
		Preoperative	3 months after the operation	6 months after the operation
Group A	43	53.20±1.80	57.26±3.69#	74.05±1.25#,c
Group B	43	52.60±2.05	66.07±2.57#	85.30±2.01#,c
t		1.442	12.850	31.170
P		0.153	<0.001	<0.001
F for different timepoints		725.500		
P for different timepoints		<0.001		
Between-group F		4954.000		
Between-group P		<0.001		
Within-group F		221.800		
Within-group P		<0.001		

Note: Compared with before the operation, #P<0.05; compared with three months after the operation, cP<0.05.

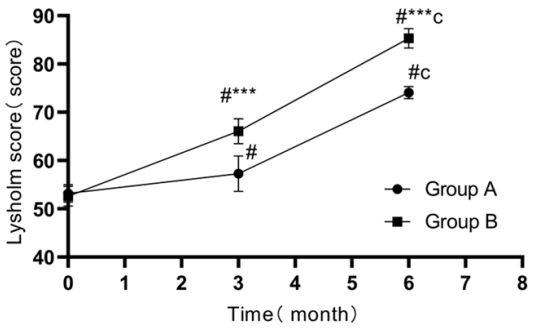

Figure 1. Comparison of Lysholm scores between the two groups at different timepoints. Compared with group A, ***P<0.001; compared with before the operation, #P<0.05; compared with three months after the operation, cP<0.05. 0: before the operation. 1-8: specific months after the operation.

enced deep venous thrombosis; five patients experienced joint stiffness, with a complication rate of 20.93%. There was a significant difference in the total incidence of complications between the two groups (χ^2=10.361, P<0.01). See **Table 8**.

Discussion

Knee arthroplasty can improve the prognosis of KOA patients with a 10-year survival rate of more than 90%, but postoperative complications such as incision infection can lead to knee dysfunction and affect rehabilitation [7]. Therefore, postoperative nursing plays a vital role in improving the clinical efficacy of patients. ERAS nursing is a new nursing concept, also known as fast track surgery (FTS). It is a perioperative multimodal clinical nursing method that can minimize surgical stress injury, maintain organs' function and accelerate the recovery of patients [8]. ERAS applies the existing nursing methods to all perioperative stages and reasonably optimizes the conventional nursing methods to achieve the target effect [9]. After the surgery, KOA patients need to rest in bed; their postoperative joint pain can reduce their enthusiasm for joint function training; slow gastrointestinal peristalsis occurs, which increases therapy time and patients' economic pressure [10]. ERAS realizes the continuity of postoperative rehabilitation by establishing a nursing team where the nurses were systematically trained with KOA disease knowledge and postoperative nursing methods and instructed to provide programmed and standardized nursing care for patients during the preoperative and postoperative period. Pdziwiatr M et al. confirmed that ERAS nursing could reduce the time resting in bed, the first defecation time, hospital stay and hospital costs of KOA patients after knee arthroplasty [11]. Early postoperative limb training can increase the blood circulation of the knee joint, accelerate the absorption of hematocele in the operated knee joint, improve the patients' enthusiasm to get out of bed and increase the treatment efficiency and patients' self-reliance ability [12]. In this study, there was no significant difference in the time to get out of bed for the first time, first bowel movement time after the surgery, hospital stay and hospital costs between the two groups.

The knee joint is an important weight-bearing joint of the body, surrounded by rich sensory nerves. The pain receptors on the injured joint of KOA patients receive noxious stimulation signals, which are then transmitted to the central nervous system, and the patients exhibit pain responses. The synovium of the knee joint is extremely sensitive to pain mediators. When KOA occurs, substance P (SP), a kind of

Table 6. Comparison of NIHSS scores between the two groups at different timepoints (n, $\bar{x} \pm sd$)

Group	n	NIHSS scores (score)		
		Preoperative	15 d after the operation	30 d after the operation
Group A	43	12.06±5.11	9.85±3.14[#]	7.14±1.95[#,d]
Group B	43	11.69±5.68	6.69±2.14[#]	4.14±1.25[#,d]
t		0.318	5.453	8.493
P		0.752	<0.001	<0.001
F for different timepoints		21.970		
P for different timepoints		<0.001		
Between-group F		66.970		
Between-group P		<0.001		
Within-group F		4700.00		
Within-group P		<0.001		

Note: Compared with before the operation, [#]P<0.05; compared with 15 d after the operation, [d]P<0.05.

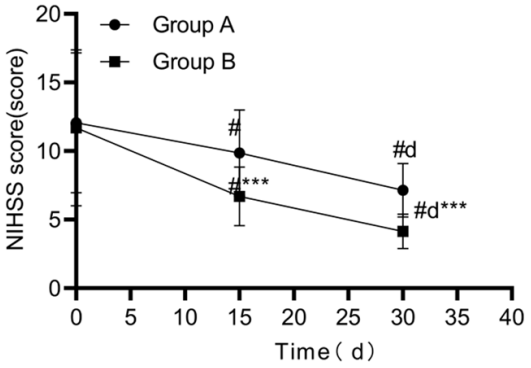

Figure 2. Comparison of NIHSS scores between the two groups at different timepoints. Compared with group A, ***P<0.001; compared with before the operation, [#]P<0.05; compared with 15 d after the operation, [d]P<0.05. 0: before the operation. 1-40: specific days after the operation.

pain mediator, is produced and activates pain receptors, promoting neutrophil phagocytosis and accelerating vascular exudation. The joint pain threshold of patients is then reduced, and the pain is aggravated [13]. Patients with KOA have knee joint disorders because inflammatory mediators can lead to edema and pain of the involved joint, reducing knee flexion ability and social function [14]. TKA is a standard surgical method to treat KOA. However, patients can still have joint pain after TKA, which is a complex physiological change caused by joint repair and injury. The pain peak is on the 3rd day after the operation, which can last up to one week after the operation [15]. ERAS nursing establishes patients' self-confidence in the treatment through preoperative psychological intervention and reduces the knee joint pain through postoperative analgesia, which can decrease the sensitivity of patients' nervous system. Andrea V et al. confirmed that KOA patients usually had knee flexion disorders after an operation because flexion can aggravate pain [16]. In ERAS nursing, tramadol is used for analgesia, which can reduce swelling, joint effusion and VAS scores. Early limb training for KOA patients can reduce the incidence of venous thrombosis, accelerate the repair of surrounding tissue and improve the pain induced by joint injury. The reason may be that limb training after the surgery can improve the motion range of the knee joint, strengthen muscle ability and increase joint endurance and coordination, thus relieving postoperative pain. Limb training can also enhance the joint flexion and extension, improve muscle strength and increase the stability of the knee joint, which helps inhibit intra-articular inflammation and reduce pain.

Patients with KOA need scientific rehabilitation training. Two days after the operation, they can do exercises such as perform active movement of the toe joints, the ankle joint and the knee joint and walking, which can increase the knee joint's flexion ability, promote the patients to get out of bed and accelerate the recovery. The Judet scores and Lysholm scores are the main indexes to evaluate knee joint function in patients with KOA after the operation. Higher excellent rate of Judet scores and higher Lysholm scores indicate better knee joint function. ERAS nursing combined with limb training in KOA patients after operation can avoid local tissue spasms, reduce muscle atrophy and adhesiveness and increase quadriceps muscle strength, knee metabolic cycle and joint function [17]. Gu et al. adopted ERAS, where postoperative KOA patients were given predictive nursing and joint massage and were guided to do nursing care at home after discharge [18]. We confirmed that ERAS combined with limb

Table 7. Comparison of self-efficacy between the two groups (n, $\bar{x} \pm sd$)

Group		Group A	Group B	t	P
n		43	43		
Health knowledge level (score)	Before care	44.20±4.12	43.85±3.69	0.415	0.679
	After care	54.05±5.14	59.11±5.69	4.327	0.001
Self-care concept (score)	Before care	20.14±2.11	20.03±1.98	0.249	0.804
	After care	23.66±3.25	25.69±4.05	2.563	0.012
Self-care responsibility (score)	Before care	18.60±2.14	19.03±2.20	0.918	0.361
	After care	20.33±2.69	23.04±3.00	5.114	0.001
Self-care skills (score)	Before care	30.24±3.69	29.68±3.11	0.761	0.449
	After care	35.14±4.05	41.27±4.67	6.503	<0.001

Table 8. Comparison of complications between the two groups (n, %)

Group	Group A	Group B	χ^2	P
n	43	43		
Incision infection (%)	2 (4.65)	2 (4.65)	0.000	1.000
Deep vein thrombosis (%)	2 (4.65)	0 (0.00)	3.488	0.062
Joint stiffness (%)	5 (11.63)	0 (0.00)	7.476	0.006
Total incidence (%)	9 (20.93)	2 (4.65)	10.361	0.002

training can reduce knee joint injury, improve walking ability and self-management ability. In this study, compared with group A, postoperative pain in group B decreased, knee function increased, indicating that ERAS nursing combined with limb training can increase knee function and improve prognosis.

NIHSS is an indicator with good reliability and validity to evaluate patients' neurological deficits. Higher scores indicate more serious neurological injury [19]. Through nerve protection nursing on postoperative KOA patients and massaging the lower limb of patients, ERAS nursing can stimulate the activation of the femoral nerve. When ERAS is combined with limb training, including muscle exercise training, it helps improve nerve injury. Liu et al. confirmed that nursing could improve the neurological function of postoperative KOA patients and reduce the NIHSS score, which is similar to the results in this paper [20]. Self-efficacy is a core concept, which refers to patients' belief in coping with certain difficulties and the development of self-potential [21]. After TKA, immune function in the elderly and adaptive ability are weak, so they are prone to pessimistic emotions such as anxiety, and their self-efficacy is reduced. ERAS nursing promotes KOA patients to understand the disease knowledge, improve their enthusiasm for the treatment, increase proprioception and social confidence through early knee function training, which helps improve self-efficacy. KOA patients often experience complications such as incision infection and joint stiffness in patients after the surgery. ERAS nursing can reduce the risk of incision infection and reduce joint stiffness and other complications when combined with early limb training [22]. In this study, the self-efficacy of group B increased, and the incidence of complications of group B decreased, showing a significant difference when compared with those of group A. It indicates that ERAS nursing combined with limb training can strengthen self-efficacy through proprioception and reduce complications through active training.

The shortcomings of this paper are that the research content is single and the timepoints are few, which may impact on the results. Therefore, more timepoints should be set, and more experimental data and samples should be included in future research to provide a strong clinical basis for clinical nursing.

In conclusion, the enhanced recovery after surgery nursing combined with limb training can significantly improve the knee joint function, limb motor function, neurological function and self-efficacy and reduce complications in patients with knee osteoarthritis after total knee arthroplasty.

Disclosure of conflict of interest

None.

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