

Analysis of the Effect of Intensive Nursing Care on Improving Sleep Quality During the Perioperative Period of Severed Finger Reimplantation

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Abstract: *Objective:* To investigate the clinical effect of perioperative intensive nursing on patients who underwent severed finger reimplantation and its influence on sleep quality. *Methods:* 62 patients who underwent severed finger reimplantation between January 2023 and December 2023 were included. They were divided into two groups: the observation group ($n = 31$) and the control group ($n = 31$). The control group received basic nursing interventions, while the observation group received intensive nursing care. The comparison parameters included visual analog pain score (VAS), incidence of vascular crises, length of hospitalization, Pittsburgh Sleep Quality Index (PSQI), Hamilton Depression Score (HAM-D), Hamilton Anxiety Score (HAM-A), and patient satisfaction. *Results:* Postoperative VAS score, incidence of vascular crisis, hospitalization time, PSQI score, and HAM-A and HAM-D scores of the observation group were lower than those of the control group ($P < 0.05$). Meanwhile, the patient satisfaction of the observation group was higher than that of the control group ($P < 0.05$). *Conclusion:* Perioperative intensive nursing care for patients undergoing severed finger reimplantation demonstrates significant benefits. It reduces postoperative pain, lowers the incidence of vascular crises, shortens hospitalization durations, enhances sleep quality, alleviates negative emotions, and improves nursing satisfaction. These findings underscore the importance and applicability of such care practices.

Keywords: Intensive nursing care; Replantation of severed fingers; Perioperative period; Sleep quality

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1. Introduction

Replantation of severed fingers is a surgical procedure aimed at restoring partially or completely severed fingers with the aid of a microscope. During this procedure, the severed blood vessels are carefully reconnected through the anastomosis, and debridement is performed to remove any damaged tissue. Additionally, the bones, nerves, tendons, and skin tissues are meticulously repositioned and repaired to reconstruct both the structure and function of the finger. Comprehensive postoperative treatment is then administered to facilitate recovery^[1]. Clinical studies have shown that the survival rate of finger reimplantation is related to surgical operation and perioperative care. Therefore, appropriate perioperative nursing intervention programs should be formulated

according to the characteristics of the patients. Intensive care is a widely used nursing service model, which is mainly characterized by the centralized implementation of evidence-based nursing programs to improve the physical and mental health of patients ^[2]. In this study, 62 patients who underwent finger reimplantation were taken as samples to explore the clinical effects of intensive nursing care and its impact on sleep quality.

2. Information and methods

2.1. General information

All procedures in this study were approved by the Medical Ethics Committee. A total of 62 patients who underwent finger reimplantation surgery were selected between January 2023 and December 2023. They were divided into two groups: the observation group ($n = 31$) and the control group ($n = 31$) using the numerical table grouping method. In the observation group, there were 18 males and 13 females, with an age range of 33–59 years and a mean age of 46.17 ± 3.85 years. This group included 22 cases of single-finger amputation and 9 cases of multiple-finger amputation. In the control group, there were 17 male and 14 female patients, with an age range of 36–58 years and a mean age of 46.24 ± 3.77 years. This group included 21 cases of single severed fingers and 10 cases of multiple severed fingers. There were no significant differences in the general characteristics between the two groups ($P > 0.05$).

Inclusion criteria: (1) Finger severed within 6 hours, meeting the indications for finger reimplantation, (2) normal cognitive and communication abilities, (3) signed consent form to participate in the study.

Exclusion criteria: (1) Severe infection or improper preservation of the severed finger, leading to a low chance of survival after evaluation, (2) major organ dysfunction, making surgery intolerable, (3) mental or psychological disorders.

2.2. Methods

In the control group, patients received basic nursing interventions. The nursing staff monitored the condition of the severed finger area, adhered to the doctor's instructions to complete preoperative preparations promptly, assisted the physician during the operation, and closely monitored the recovery of the reimplanted finger area postoperatively. In case of any signs of vascular crises, prompt intervention was carried out. Once the patient's condition stabilized, they were guided to complete rehabilitation training.

Patients in the observation received intensive nursing intervention. The nursing staff conducted a comprehensive analysis of each patient's condition and developed various nursing interventions based on evidence-based practices.

- (1) Preoperative nursing intervention: (i) Preoperative preparation: As severed finger reimplantation is emergency surgery, preoperative preparation was done quickly. The patient's severed finger was observed for bleeding and then properly bandaged. Additionally, intravenous access was established for all patients, while those with multiple severed fingers routinely underwent catheterization; (ii) Health education and psychological care: The nursing staff used simple language to explain the anesthesia plan and surgical process for finger reimplantation to both patients and their families. They introduced the intensive nursing measures, discussed perioperative precautions, and addressed any questions or concerns raised by the patients. For patients experiencing severe preoperative stress, anxiety, or depression, the nursing staff worked to calm their emotions by sharing successful cases of finger reimplantation. They also provided detailed information on postoperative finger function restoration and pain relief methods, aiming to instill confidence and support the patient throughout the process.
- (2) Postoperative care: (i) Postoperative basic care: After the operation, nursing staff regulated the ward

temperature to 23–25°C, ensured daily ventilation by opening windows, strictly prohibited smoking, maintained cleanliness and hygiene in the environment, limited visitor numbers, and kept the ward quiet. During morning and nighttime when temperatures were low, nursing staff turned on the heating lamps. They selected 60 W or 100 W heating lamps and positioned them 30–40 cm away from the finger reimplantation area. Continuous irradiation was carried out for 3–4 days to maintain stability and warmth in the finger reimplantation area; (ii) Condition monitoring: Following surgery, nursing staff instructed patients to elevate the affected limb above heart level and closely monitored the reimplanted finger region for adequate blood supply. Skin temperature was measured hourly; a difference of over 3°C between affected and healthy limbs indicated poor blood supply, necessitating immediate physician notification. Nursing staff vigilantly watched for signs of vascular crisis, such as greenish-purple, yellowish-white, or greyish-white discoloration, accompanied by coolness and fullness. Failure of color to return within 3 seconds after pressing indicated vascular crisis, prompting timely physician intervention; (iii) Pain care: Patients who just underwent finger reimplantation often experience pain. The nursing staff addressed this by providing electronic analgesia pumps for controlled pain relief and employing distraction techniques such as listening to music or watching videos to divert patients' attention from discomfort. Air fresheners were installed in the ward to create a soothing environment. In cases of severe pain, opioids or non-steroidal analgesic drugs were administered as per the physician's recommendations; (iv) Psychological care: The nursing staff initiated conversations with the patients, informing them about the successful outcome of the operation and encouraging their cooperation. They educated patients about postoperative precautions and guided them through supportive psychological interventions and positive suggestions to actively engage in rehabilitation training. Additionally, they proactively communicated with the patient's family, providing updates on the patient's condition, explaining postoperative recovery precautions, and assisting in calming emotions while facilitating the patient's rehabilitation training; (v) Rehabilitation training: Patients were instructed by nursing staff to perform simple active and passive hand movements under protection for 5–10 days. The range of motion of the joints was controlled to be less than 30° and physical therapy programs such as ultrashort wave and biofrequency spectrum were utilized. From day 11 to day 30 postoperatively, patients were guided to increase the range of joint movement to less than 90° and to engage in distal joint movements. They were encouraged to touch different objects and use the tip of a pencil to scratch the palm and finger area to enhance hand sensation. Beyond 30 days postoperatively, nursing staff instructed patients to undergo grip strength training using a grip strength device and to perform simple self-care activities and household chores.

- (3) Discharge guidance: Before the patients were discharged from the hospital, the nursing staff instructed them not to remove the external fixation device without authorization and emphasized the importance of strictly following the doctor's instructions to complete rehabilitation training. Patients were advised to avoid secondary injury in the area of the reimplantation of severed fingers. Additionally, nursing staff provided detailed explanations regarding postoperative diet, medication, and life precautions, and reminded patients to schedule regular follow-up appointments for rechecks.

2.3. Evaluation criteria

- (1) The visual analog pain score (VAS), incidence of vascular crisis, and hospitalization time were compared between the two groups. The VAS score ranged from 0 to 10, with higher scores indicating more severe pain.

- (2) The Pittsburgh Sleep Quality Index (PSQI) of both groups was evaluated before and 7 days after surgery. The PSQI assesses sleep quality, time to fall asleep, and sleep efficiency, with scores ranging from 0 to 3 for each item, where higher scores indicate poorer sleep quality.
- (3) Hamilton depression score (HAM-D) and Hamilton anxiety score (HAM-A) were assessed in both groups before and 7 days after surgery. Scores ranged from 0 to 56 for each scale, with higher scores indicating more severe negative emotions.
- (4) The nursing satisfaction of the two groups was assessed using a custom questionnaire developed by our institution.

2.4. Statistical methods

Data were analyzed using SPSS 23.0 software. Measurement data (mean \pm standard deviation) were analyzed with the *t*-test, while count data (%) were analyzed using the chi-squared (χ^2) test. Significance was set at $P < 0.05$.

3. Results

3.1. VAS score, incidence of vascular crisis, and hospitalization time

In **Table 1**, the postoperative VAS score, incidence of vascular crisis, and hospitalization time of patients in the observation group were lower than those in the control group ($P < 0.05$).

Table 1. Comparison of VAS score, incidence of vascular crisis, and hospitalization time between the two groups (mean \pm SD)

Group	VAS score	Incidence of vascular crisis	Hospitalization time (d)
Observation group ($n = 31$)	2.04 \pm 0.58	1 (3.2%)	8.15 \pm 0.64
Control group ($n = 31$)	3.92 \pm 0.97	6 (19.4%)	10.38 \pm 0.96
<i>t</i> / χ^2	9.262	4.026	10.761
<i>P</i>	0.000	0.044	0.000

3.2. PSQI score

In **Table 2**, the PSQI score of the observation group was lower than that of the control group in the postoperative period ($P < 0.05$).

Table 2. Comparison of PSQI scores before and after operation between the two groups (mean \pm SD)

Group	Sleep quality		Bedtime		Sleep efficiency	
	Before	After	Before	After	Before	After
Observation group ($n = 31$)	2.05 \pm 0.44	0.71 \pm 0.12	2.14 \pm 0.32	0.66 \pm 0.12	2.08 \pm 0.32	0.75 \pm 0.14
Control group ($n = 31$)	2.09 \pm 0.38	1.13 \pm 0.35	2.18 \pm 0.27	1.07 \pm 0.34	2.11 \pm 0.36	1.38 \pm 0.42
<i>t</i>	0.383	6.320	0.532	6.331	0.347	7.923
<i>P</i>	0.703	0.000	0.597	0.000	0.730	0.000

3.3. HAM-A and HAM-D scores

In **Table 3**, the postoperative observation group was lower than the control group ($P < 0.05$).

Table 3. Comparison of HAM-A scores and HAM-D scores before and after operation between the two groups (mean ± SD)

Group	HAM-A score		HAM-D score	
	Before	After	Before	After
Observation group (<i>n</i> = 31)	28.96 ± 3.75	11.24 ± 1.98	25.94 ± 3.86	12.75 ± 1.83
Control group (<i>n</i> = 31)	29.04 ± 3.82	17.06 ± 2.75	26.01 ± 3.94	18.14 ± 2.99
<i>t</i>	0.083	9.563	0.071	8.561
<i>P</i>	0.934	0.000	0.944	0.000

3.4. Patient satisfaction

The nursing satisfaction of the observation group (30/31) was 96.8%, which was higher than that of the control group (23/31; 74.2%) (*P* < 0.05).

4. Discussion

Finger reimplantation is a complex surgical procedure with a longer postoperative recovery period. To enhance its success rate, precise and standardized surgical techniques, along with appropriate perioperative nursing interventions, are essential [3].

The study data indicate that postoperative VAS score, incidence of vascular crisis, and hospitalization time were lower in the observation group compared to the control group. This suggests that perioperative intensive nursing can alleviate pain, reduce vascular crisis incidence, and shorten hospital stays. Under the basic nursing model, nursing operations align closely with medical prescriptions, potentially failing to address the actual needs of patients [4]. During intensive care, nursing staff analyzed patients' characteristics, clarified perioperative precautions, and provided comprehensive pain management. Postoperatively, they closely monitored skin color and temperature in the reimplanted finger area and promptly identified and treated vascular crises to reduce their incidence [5]. They also carried out rehabilitation nursing interventions, instructing patients to gradually increase the range of motion of the hand joints, which promoted the recovery of hand motor function and shortened the hospitalization time [6]. In this study, the PSQI score, HAMA score, and HAMD score of the observation group were lower than those of the control group in the postoperative period, suggesting that perioperative intensive nursing care for patients with reimplantation of the severed finger improved negative emotions and sleep quality. Analyzing the reasons, patients with severed finger reimplantation experienced severe pain, and concerns about postoperative recovery outcomes, leading to heightened negative emotions, and poor sleep quality [7]. During intensive care nursing staff implemented humanistic care, calming patients' emotions, reducing physiological and psychological stimuli, and encouraging cooperation with treatment. This approach reduced negative emotions, helped patients establish a sense of recovery, and ultimately improved sleep quality [8]. In this study, patients in the observation group expressed higher satisfaction with nursing care compared to those in the control group. Intensive nursing, tailored to patients undergoing finger reimplantation, optimized nursing interventions, calmed patient emotions, and standardized health management of the reimplantation area. These measures improved both physical and mental recovery outcomes, ultimately enhancing patient satisfaction with nursing services [9,10].

5. Conclusion

Perioperative intensive nursing care for patients undergoing severed finger reimplantation surgery yields sever-

al benefits, including pain reduction, decreased vascular crisis incidence, shorter hospital stays, improved sleep quality, alleviated negative emotions, and increased nursing care satisfaction. However, due to the limited sample size, further research is needed to explore the effectiveness of perioperative cluster nursing care for these patients.

Disclosure statement

The authors declare no conflict of interest.

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