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Application of Systematic Dietary Management in Postoperative Swallowing Care of Patients Undergoing Anterior Cervical Surgery

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ABSTRACT

Objective: To investigate the impact of dietary management on postoperative swallowing care of patients undergoing anterior cervical surgery.

Methods: This prospective randomized controlled trial involved 120 patients who underwent anterior cervical surgery in the orthopedic department of a tertiary hospital from March 2022 to March 2023. Patients were randomly divided into observation and control groups (n = 60 each). The control group received routine postoperative care, whereas the observation group received additional systematic dietary management intervention. The outcome measures comprised recovery time of swallowing function, Repetitive Saliva Swallowing Test (RSST) scores, Swallowing Quality of Life (SWAL-QOL) scores, nutritional status, and patient satisfaction.

Results: The observation group showed a shorter recovery time of swallowing function than the control group (8.6 ± 2.3 vs 13.5 ± 3.7 days; t = 8.475, P < 0.01). At 3, 7, and 14 days after surgery, both the RSST and the SWAL-QOL scores were higher in the observation group than in the control group (P < 0.01). At 14 days after surgery, the Nutrition Risk Screening 2002 score was lower in the observation group (1.8 ± 0.6 vs 2.5 ± 0.8, t = 5.387, P < 0.05). By contrast, serum albumin levels were higher in the observation group (38.6 ± 3.1 g/L vs 35.7 ± 3.4 g/L, t = 4.962, P < 0.05). Patient satisfaction scores were higher in the observation group than in the control group (87.6 ± 6.8 vs 72.3 ± 8.5; t = 11.026, P < 0.001).

Conclusion: Systematic dietary management effectively promotes the recovery of swallowing function, improves nutritional status, and increases patient satisfaction after anterior cervical surgery, supporting its clinical application.

Clinical Relevance: Systematic dietary management provides a practical, evidence-based intervention to address postoperative dysphagia in anterior cervical surgery patients. This approach can be readily implemented in clinical settings to accelerate functional recovery, reduce nutritional complications, and improve patient outcomes. The graded dietary protocol and assessment tools (RSST and SWAL-QOL) offer health care teams standardized methods for managing swallowing dysfunction, ultimately enhancing perioperative care quality.

Level of Evidence: Level 2 - Therapeutic study (prospective randomized controlled trial).

Cervical Spine

Keywords: anterior cervical surgery, swallowing dysfunction, dietary management, nursing intervention, randomized controlled trial

INTRODUCTION

Anterior cervical surgery is frequently conducted for treating cervical degenerative diseases, cervical disc herniation, and cervical trauma.[1] Common procedures include anterior cervical discectomy and fusion and anterior cervical corpectomy and fusion, among others.[2,3] These procedures require dissection through anterior cervical muscles, trachea, esophagus, and other tissues; therefore, they necessitate traction and separation of anterior cervical tissues. Combined with postoperative factors, such as incision swelling, local hematoma, and nerve damage, approximately 40% to 71% of patients experience varying degrees of swallowing dysfunction in the early postoperative period.[4,5] The incidence of dysphagia after anterior cervical surgery is 67.9% at 1 week, 44.4% at 1 month, and 34.6% at 3 months.[6] The persistence of these swallowing issues can severely affect postoperative recovery, nutritional intake, and quality of life.

Postoperative swallowing dysfunction primarily presents as swallowing pain, dysphagia, a foreign body sensation in the pharynx, and hoarseness. The severity of these symptoms has been related to the surgical approach, the number of surgical segments, surgical duration, and the degree of

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intraoperative traction.[7] These symptoms can reduce food intake and malnutrition, subsequently affecting wound healing and postoperative rehabilitation.[8] Individualized, systematic dietary management has yielded good results in patients with postoperative swallowing dysfunction.[9–11] Dai et al[12] demonstrated that a graded dietary management protocol significantly shortened the recovery time of swallowing function and enhanced nutritional status among patients with dysphagia after esophageal cancer surgery. However, limited research has elucidated dietary management for dysphagia in patients who underwent anterior cervical surgery. Additionally, systematized and standardized intervention measures are lacking.

To this end, this study aimed to develop a postoperative dysphagia dietary management program for patients undergoing anterior cervical surgery to evaluate its clinical efficacy. The findings will provide a scientific basis and practical guidance for optimizing postoperative care in these patients.

MATERIALS AND METHODS

General Information

This quasiexperimental design involved patients who underwent elective anterior cervical surgery in the orthopedic department of a tertiary hospital in Changzhou from January 2024 to December 2024. They were randomly divided into experimental and control groups using a random number table method. The same medical team diagnosed and treated all patients, who were unaware of their group allocation. This study was approved by the Ethics Committee of the Changzhou Second People's Hospital and registered with the Chinese Clinical Trial Registry (approval number [2025]KY010-01 and registration number MR-32-24-025399).

The inclusion criteria were as follows: (1) age 18 to 70 years; (2) cervical degenerative disease, cervical disc herniation, or cervical trauma diagnosis confirmed by imaging; (3) scheduled for anterior cervical surgery; and (4) provided informed consent. The exclusion criteria were as follows: (1) pre-existing swallowing dysfunction; (2) severe internal medical conditions; (3) cognitive dysfunction; (4) serious complications during or after surgery; (5) inability to complete follow-up per the protocol.

Research Methods

Establishing Research Team

A multidisciplinary research team was established, consisting of 3 orthopedic physicians, 8 nursing staff (including 4 orthopedic specialist nurses and 4 nursing leaders), 2 nutritionists, and 2 rehabilitation therapists. All team members underwent training before the research, encompassing the mechanism and clinical presentation of swallowing dysfunction after anterior cervical surgery, swallowing function assessment, dietary management theory and techniques, implementation of the research protocol, and evaluation of outcome indicators. Additionally, the training involved theoretical learning, case discussions, practical demonstrations, and hands-on practice. This helped the team members master relevant knowledge and skills, comply with unified assessment standards, and adhere to intervention measures to ensure standardization and consistency in research implementation.

Developing a Dietary Management Plan

The dietary management plan for postoperative dysphagia in patients undergoing anterior cervical surgery was developed through literature retrieval, expert interviews, clinical observations, and multidisciplinary discussions. Furthermore, this process incorporated the hospital's clinical setting. The plan adhered to these principles: (1) Individualization: implementing graded management based on each patient's swallowing function status; (2) Safety and effectiveness: promoting swallowing function recovery while ensuring safe intake; (3) Nutritional balance: meeting the nutritional requirements for postoperative rehabilitation; (4) Clinical feasibility: considering the hospital setting and patient compliance; and (5) Evidence-based medicine: developing intervention measures based on the latest research evidence.

The plan primarily included the following components: swallowing function assessment and classification standards, graded dietary management measures (including food selection, texture adjustment, and eating methods), nutritional intervention strategies, implementation process, and monitoring and evaluation methods. The plan was finalized after expert review by the orthopedic, nursing, nutrition, and rehabilitation departments. Finally, it was compiled into a dietary management manual for use by both medical staff and patients (Table 1).

Intervention

The control group received routine postoperative care: (1) Basic care: vital signs monitoring, respiratory management, position management, and wound care; (2) Postoperative medication guidance: instructions on the use and precautions for analgesics, antibiotics, and so on; (3) Basic swallowing function

Table 1. Dietary management manual for patients with dysphagia after anterior cervical surgery.

Intervention Aspect	Severe Dysphagia	Moderate Dysphagia	Mild Dysphagia	Recovery
Assessment criteria	RSST score 0–1 times/30 s	RSST score 2 times/30 s	RSST score 3 times/30 s	RSST score ≥3 times/30 s
Diet type	Primarily nasogastric feeding Small amounts of oral ice cubes or water	Homogenized, fine, soft liquid foods Finely ground foods	Soft, easy-to-chew foods Moist foods	Regular diet Focus on variety
Recommended foods	Enteral nutrition formula Functional beverages Ice cubes, ice cream	Thin rice porridge Steamed egg custard Soy milk Fruit puree Vegetable puree	Soft rice Steamed fish Soft tofu Soft noodles Steamed cake	Regular rice Various meats Vegetables Fruits Nuts
Food texture adjustment	Liquids thickened to honey consistency Primarily cold temperature	Liquids thickened to yogurt consistency Foods ground to a homogeneous consistency Moderate temperature	Foods cut into small pieces Kept moist Avoid dry, hard, or crispy foods	Gradually return to a regular diet Avoid overly hard, dry foods
Eating posture and techniques	Lying position with head elevated 30° Sit upright for 30 min after eating	Sit upright, head slightly bent forward 30°–45° "Small mouthfuls, slow swallowing" 3–5 mL each time	Sit upright, head slightly bent forward “Small mouthfuls, slow swallowing” 5–10 mL each time Single food intake	Sit upright Pay attention to eating speed Avoid talking while eating
Meal arrangement	2–3 h intervals Small amounts, frequent feedings	3–4 h intervals 100–150 mL each time	3 regular meals 2 snacks	3 regular meals Snacks as needed
Nutritional intervention	Energy: 25–30 kcal/kg/d Protein: 1.2–1.5 g/kg/d Appropriate supplementation of vitamins and minerals	Energy: 25–30 kcal/kg/d Protein: 1.2–1.5 g/kg/d Ensure adequate fluid intake	Energy: 25–30 kcal/kg/d Protein: 1.0–1.2 g/kg/d Increase dietary fiber intake	Energy: 20–25 kcal/kg/d Protein: 0.8–1.0 g/kg/d Balanced diet
Monitoring frequency	Daily assessment Daily record of food intake	Assessment every 2 d Daily record of food intake	Assessment every 3 d Record abnormal situations	Assessment once per week Follow-up monitoring
Special considerations	Monitor for aspiration Observe gastrointestinal tolerance Maintain oral hygiene	Avoid mixed-texture foods Avoid highly adhesive foods Rinse your mouth before and after eating	Avoid dry, hard foods with many crumbs Quiet eating environment Rest for 30 min after meals	Gradually return to a regular diet Ensure thorough chewing Maintain good eating habits
Education points	Explain the purpose and method of tube feeding Oral care guidance Family involvement and support	Food texture adjustment methods Thickener usage method Safe eating posture	Food selection guidance Eating technique training Strengthen self-management ability	Balanced diet guidance Optimize the eating environment Establish long-term healthy eating habits

Abbreviation: RSST, Repetitive Saliva Swallowing Test.

training: guidance on conducting swallowing muscle exercises and ice stimulation training, among others; (4) General dietary guidance: a gradual transition from a liquid to a regular diet based on the patient's situation, without a specific dietary plan; and (5) Discharge guidance: instructions on basic rehabilitation exercises, daily life precautions, and so on.

The observation group received a systematic dietary management intervention, apart from routine care. This intervention comprised comprehensive management from the pre- to postoperative stages. One day before surgery, patients were examined for their swallowing function and nutritional status. A dietary management manual was distributed and health education was provided. The Repetitive Saliva Swallowing Test (RSST) was conducted to assess the recovery of postoperative swallowing function. RSST scores classify patients into 4 categories: severe (0–1 times/30 s), moderate (2 times/30 s), mild (3 times/30 s), and recovery period (≥3 times/30 s).[13] Corresponding dietary management was based on the level of swallowing function: (1) Severe dysfunction: tube feeding supplemented with ice cube training; (2) Moderate dysfunction: a homogenized fine soft liquid diet; (3) Mild dysfunction: soft, easy-to-chew foods; and (4) Recovery: gradual transition to a regular diet. Strict control was maintained over food texture, with targeted adjustments to food viscosity, temperature, and moisture. Patients were instructed about adopting a 30° to 45° forward-bending head posture for eating and adhering to the “small mouthfuls, slow swallowing, and small frequent meals” technique. Additionally, nutritionists regularly assessed patients' nutritional status and adjusted energy and protein intake. Moreover, swallowing function was re-evaluated every 2 to 3 days, concomitant with dietary adjustments. A WeChat follow-up group was established to provide

continuous guidance and support, training, and individualized home dietary plans to ensure the continuity and effectiveness of the intervention.

Evaluation

Swallowing Function Recovery Time

The time (in days) from surgery to the recommencement of regular eating was recorded. Regular eating was defined as the ability to consume a regular diet with an RSST score of ≥3 times/30 s, no noticeable dysphagia symptoms, and sufficient nutritional intake. Two trained nursing staff conducted daily assessments and recordings.

Repetitive Saliva Swallowing Test

The RSST was used to assess swallowing function. Patients were seated upright, with an assessor placing a finger on the patient's laryngeal prominence area. They were instructed to swallow saliva repeatedly. The number of swallows within 30 seconds was recorded. A score of ≥3 times/30 seconds indicated normal swallowing, whereas that of <3 times/30 seconds indicated swallowing dysfunction. Assessments were conducted on postoperative days 1, 3, 7, and 14.[14]

Swallowing Quality of Life Scale

The Swallowing Quality of Life (SWAL-QOL) Scale—developed by McHorney et al in 2000—was used to assess the impact of dysphagia on quality of life. This 44-item scale includes 11 dimensions: food selection, eating burden, eating duration, eating desire, symptom frequency, communication, fear, mental health, social function, fatigue, and sleep. These items are scored on a 5-point Likert scale, with total scores ranging from 0 to 100. Higher scores indicate better swallowing-related quality of life. Assessments were conducted by professionally trained researchers to ensure scoring consistency.[15]

Nutritional Status Assessment

The following 2 indicators were used to comprehensively assess nutritional status:

1. Nutritional Risk Screening 2002 (NRS 2002): This tool was used preoperatively and at 14 days postoperatively; it comprises factors, including nutritional decline, body mass index, decreased food intake, and disease severity. The total score ranges from 0 to 7 points, with a score ≥3 indicating nutritional risk.[16]
2. Serum albumin (ALB) level: Fasting venous blood was collected preoperatively and at 14 days postoperatively. Serum ALB levels were determined using the bromocresol green method, with a normal reference range of 35 to 55 g/L. It served as an objective indicator of protein nutritional status.[17]

Patient Satisfaction

A self-designed "Satisfaction Questionnaire on Dietary Management for Patients Undergoing Anterior Cervical Surgery" was used to assess patient satisfaction with dietary management. The questionnaire included 4 dimensions: dietary guidance content, implementation methods, nursing staff attitude, and dietary management effectiveness. Each dimension consisted of 5 items, scored on a 5-point Likert scale (1–5 points). The total score was converted to a percentage, where higher scores indicated greater satisfaction. Patients completed the questionnaire on the day before discharge.

Statistical Analysis

SPSS 26.0 software was used for data analysis. Measurement data are expressed as mean ± SD, and t tests were used for between-group comparisons. Count data are expressed as the number of cases (%), whereas x^2 tests were used for group comparisons. A P value < 0.05 indicates statistical significance.

RESULTS

A total of 120 patients who underwent anterior cervical surgery at our hospital's orthopedic department were randomly divided into observation and control groups (n = 60 each). The mean age was 52.6 ± 8.7 years in the observation group, compared with 53.2 ± 9.1 years in the control group. The observation group consisted of 34 men (56.7%) and 26 women (43.3%), whereas the control group had 36 men (60.0%) and 24 women (40.0%). The mean body mass index was 23.8 ± 3.2 in the observation group, compared with 24.1 ± 3.5 in the control group. The average disease duration was 18.5 ± 7.6 months in the observation group, compared with 17.9 ± 8.2 months in the control group. Baseline characteristics did not differ between the groups (P > 0.05), indicating their comparability (Table 2).

Table 2. Comparison of baseline data.

Item	Observation Group (n = 60)	Control Group (n = 60)	t/x^2	P
Age, y, mean ± SD	52.6 ± 8.7	53.2 ± 9.1	0.374	0.709
Sex, n (%)			0.134	0.714
Men	34 (56.7)	36 (60.0)		
Women	26 (43.3)	24 (40.0)		
BMI, mean ± SD	23.8 ± 3.2	24.1 ± 3.5	0.497	0.620
Disease duration, mo, mean ± SD	18.5 ± 7.6	17.9 ± 8.2	0.421	0.675
Disease type, n (%)			0.348	0.840
Cervical disc herniation	32 (53.3)	30 (50.0)		
Cervical degenerative disease	21 (35.0)	23 (38.3)		
Cervical trauma	7 (11.7)	7 (11.7)		
Surgical method, n (%)			0.209	0.901
Single-segment ACDF	28 (46.7)	27 (45.0)		
Double-segment ACDF	24 (40.0)	24 (40.0)		
ACCF or hybrid surgery	8 (13.3)	9 (15.0)		
Operation time, min, mean ± SD	142.6 ± 35.8	145.3 ± 38.2	0.401	0.689
Intraoperative blood loss, mL, mean ± SD	86.5 ± 32.4	89.2 ± 34.7	0.452	0.652
Comorbidities, n (%)			0.279	0.964
Hypertension	15 (25.0)	16 (26.7)		
Diabetes	8 (13.3)	7 (11.7)		
Coronary heart disease	5 (8.3)	6 (10.0)		
Other	4 (6.7)	5 (8.3)		
Education level, n (%)			0.138	0.934
Junior high school or below	22 (36.7)	21 (35.0)		
High school/technical secondary school	25 (41.7)	26 (43.3)		
College or above	13 (21.6)	13 (21.7)		
Preoperative swallowing function, RSST score, mean ± SD	6.8 ± 0.5	6.7 ± 0.6	0.985	0.327

Abbreviations: ACCF, anterior cervical corpectomy and fusion; ACDF, anterior cervical discectomy and fusion; BMI, body mass index; RSST, Repetitive Saliva Swallowing Test.

Comparison of Swallowing Function Recovery Time

The mean swallowing function recovery time was 8.6 ± 2.3 days in the observation group, compared with 13.5 ± 3.7 days in the control group (t = 8.475, P < 0.01). Hence, the observation group regained swallowing function more rapidly than the control group.

Comparison of RSST Scores at Different Postoperative Time Points

RSST scores did not differ between the groups on postoperative day 1 (P > 0.05). Nevertheless, on postoperative days 3, 7, and 14, dysphagia scores were lower in the observation group than in the control group (P < 0.01; Table 3).

Comparison of SWAL-QOL Scores at Different Postoperative Time Points

SWAL-QOL total scores did not differ between the groups on postoperative day 1 (P > 0.05). However, on postoperative days 3, 7, and 14, SWAL-QOL total scores were higher in the observation group than in the control group (P < 0.01; Table 4).

Further analysis of SWAL-QOL score dimensions on postoperative day 14 suggested that the observation group had higher scores in 8 dimensions: "food selection," "eating burden," "eating duration," "symptom frequency," "communication," "fear," "mental health," and "social function" than the control group (P < 0.05). Hence, dietary management intervention comprehensively improved swallowing-related quality of life (Table 5).

Comparison of Nutritional Status at Baseline and on Postoperative Day 14

NRS 2002 scores and serum ALB levels did not differ between the groups at baseline (P > 0.05). Nevertheless, on postoperative day 14, the observation group demonstrated lower NRS 2002 scores and higher serum ALB levels than the control group (P < 0.05; Table 6).

Table 3. Comparison of dysphagia scores at different postoperative time points.

Group	n (cases)	Postoperative Day, mean ± SD			
		Day 1	Day 3	Day 7	Day 14
Observation group	60	1.8 ± 0.6	3.2 ± 0.7	4.9 ± 0.8	6.5 ± 0.7
Control group	60	1.7 ± 0.5	2.4 ± 0.6	3.6 ± 0.7	5.2 ± 0.8
t		0.964	6.732	9.426	9.583
P		0.337	<0.001	<0.001	<0.001

Table 4. Comparison of Swallowing Quality of Life total scores at different postoperative time points.

Group	*n* (cases)	Postoperative Day, mean ± SD			
		Day 1	Day 3	Day 7	Day 14
Observation group	60	32.6 ± 5.8	45.3 ± 6.2	68.4 ± 7.5	83.7 ± 6.2
Control group	60	31.8 ± 6.1	38.6 ± 5.8	54.2 ± 6.9	72.3 ± 7.1
t		0.743	6.238	10.724	9.328
P		0.459	<0.001	<0.001	<0.001

Comparison of Patient Satisfaction

The satisfaction score for dietary management was 87.6 ± 6.8 points in the observation group, compared with 72.3 ± 8.5 points in the control group ($t = 11.026$, $P < 0.001$). Hence, patients receiving systematic dietary management demonstrated higher satisfaction.

DISCUSSION

Effect on Swallowing Function Recovery

Patients in the observation group demonstrated a significantly shorter swallowing function recovery time than patients in the control group. Furthermore, their RSST and SWAL-QOL scores on postoperative days 3, 7, and 14 were higher. Therefore, dietary management positively facilitates the recovery of swallowing function, consistent with both domestic and international research results.[18] Labeit et al[19] demonstrated that strategic, systematic dietary adjustments, combined with swallowing training, can shorten the recovery time in patients with dysphagia. Systematic dietary management comprises graded interventions based on the patient's swallowing status, ensuring appropriate food texture and eating methods to reduce pain and discomfort during swallowing. Additionally, reasonable food choices and texture adjustments reduce the swallowing effort, enhancing confidence and appetite. Guidance on optimal eating posture and techniques reduces the risk of aspiration, thus improving swallowing safety. A progressive dietary transition plan provides functional training for the swallowing muscles, promoting faster recovery.[20]

This study used RSST to assess swallowing function; this tool is characterized by its simplicity, noninvasiveness, and good reproducibility. RSST primarily detects the number of continuous saliva swallows within 30 seconds, directly reflecting the functional status of the swallowing muscles. Additionally, it enables the early screening of dysphagia and assessment of functional recovery.[21] An RSST of <3 times/30 seconds has been strongly associated with swallowing dysfunction, with 75% sensitivity and 77% specificity.[22] Simultaneously, this study used the SWAL-QOL scale to comprehensively assess the impact of dysphagia on quality of life. The observation group demonstrated significantly higher scores than the control group in food selection, eating burden, symptom frequency, communication, and mental health. Thus, dietary management improved both physiological and psychosocial function. This finding is consistent with the findings by Côté et al,[23] who confirmed that the SWAL-QOL scale sensitively reflects multidimensional changes in dysphagia-related quality of life.

Compared with international studies, this study not only focused on food texture adjustments but also on eating posture, technique guidance, and psychological support, creating a more comprehensive intervention model. Wei et al[24] primarily focused on food texture adjustments, whereas this study designed dietary plans based on the habits and preferences of Chinese patients, thus enhancing both the applicability and compliance of the program. However, the follow-up time was relatively short, which prevented evaluating the long-term impact of dietary management on swallowing function recovery. Future research should extend the follow-up period to observe the sustained effects of dietary management.

Table 5. Comparison of Swallowing Quality of Life scores in various dimensions on postoperative day 14.

Dimension	Observation Group, mean ± SD (*n* = 60)	Control Group, mean ± SD (*n* = 60)	*t*	*P*
Food selection	85.3 ± 7.2	73.6 ± 8.4	8.347	<0.001
Eating burden	82.7 ± 6.9	70.2 ± 7.8	9.446	<0.001
Eating duration	79.6 ± 7.4	68.5 ± 8.1	7.953	<0.001
Eating desire	86.2 ± 6.8	79.4 ± 7.5	5.239	<0.05
Symptom frequency	84.5 ± 7.1	70.8 ± 8.3	9.827	<0.001
Communication	88.3 ± 6.5	75.4 ± 7.9	9.762	<0.001
Fear	83.1 ± 7.3	69.7 ± 8.6	9.238	<0.001
Mental health	85.6 ± 6.7	72.9 ± 7.8	9.475	<0.001
Social function	82.8 ± 7.6	70.5 ± 8.4	8.456	<0.001
Fatigue	78.9 ± 7.4	74.6 ± 7.9	3.045	<0.05
Sleep	84.5 ± 6.9	76.8 ± 7.5	5.858	<0.01

Table 6. Comparison of nutritional status at baseline and on postoperative day 14.

Group	*n* (cases)	NRS 2002 Score, mean ± SD		Serum Albumin, g/L, mean ± SD	
		Baseline	Postoperative Day 14	Before Surgery	Postoperative Day 14
Observation group	60	2.1 ± 0.8	1.8 ± 0.6	41.2 ± 3.5	38.6 ± 3.1
Control group	60	2.0 ± 0.7	2.5 ± 0.8	41.5 ± 3.3	35.7 ± 3.4
t		0.746	5.387	0.487	4.962
P		0.457	<0.05	0.627	<0.05

Abbreviation: NRS 2002, Nutritional Risk Screening 2002.

Effect on Nutritional Status

Regarding nutritional status, NRS 2002 scores in the observation group were lower than in the control group on postoperative day 14. Contrarily, serum ALB levels were higher in the observation group than in the control group. Thus, systematic dietary management effectively improved nutritional status, consistent with the results of Li et al.[25] Dietary management ensures sufficient energy and protein intake by adjusting food texture, increasing food diversity, and improving nutritional density. Simultaneously, graded dietary guidance promotes a smooth transition from liquid to a regular diet, reducing the risk of insufficient food intake caused by dysphagia. Additionally, nutritional assessment and regular monitoring facilitate the early identification and timely correction of malnutrition, ensuring adequate nutritional support.

Compared with international studies, this study emphasized nutritional density and the use of traditional Chinese foods. Khalooeifard et al[26] highlighted the advantages of protein supplementation, whereas this study relied more on nutrient-rich traditional foods, such as egg custard, soy milk, and fish while ensuring basic nutrition. This strategy not only helped meet patients' nutritional requirements but also aligned with their food preferences, improving the intervention's efficacy. Future research should include additional nutritional assessment indicators to comprehensively evaluate the impact of dietary management on nutritional status. Implementing interventions requires a professional nutritional support team; thus, the intervention should be simplified, and dietary management toolkits feasible for different hospital levels should be developed, improving the program's feasibility and promotional value.

Effect of Dietary Management on Patient Satisfaction

The satisfaction score for dietary management was significantly higher in the observation group than in the control group. This finding may be attributed to several reasons: (1) Systematic dietary management comprehensively considered individual patient needs, enhancing their comfort. (2) Dietary education improved patients' self-management ability, enhancing their sense of care participation. (3) Psychological support alleviated anxiety, improving patient compliance with the intervention. (4) Diverse dietary choices and texture adjustments increased food acceptance and appetite among patients. Likewise, Jukic et al[27] demonstrated that individualized dietary management improves not only swallowing function but also quality of life and overall satisfaction.

Analysis of the SWAL-QOL scale results suggested that the observation group scored significantly higher than the control group in the "social function" and "mental health" dimensions. Therefore, dietary management intervention improved not only their swallowing function but also their ability to participate in social activities and mental health. Bartlett et al[28] reported that patients with dysphagia demonstrate poor social participation because of eating difficulties, leading to social isolation and psychological distress. Conversely, effective dietary management can enhance confidence in social participation, finally improving their quality of life. Additionally, the observation group scored significantly higher than the control group in the "communication" dimension of the SWAL-QOL scale. Hence, dietary management improves patients' communication ability and willingness, substantially helping them return to social life.

Interestingly, in this study, the dietary management intervention emphasized patient participation and family support. Integrating dietary management manuals, demonstrations, guidance, and follow-ups via WeChat improved the knowledge level and participation among both patients and families. This collaborative management model involves medical staff, patients, and their families, which may serve as an important factor in improving patient satisfaction. Notably, the observation group scored significantly higher than the control group in the "food selection" and "eating burden" dimensions. Thus, systematic dietary management increased patients' autonomy over food choices while reducing the sense of burden. These enhancements positively improved self-efficacy and quality of life.

Future research should explore the application of information technology in dietary management, such as

developing mobile applications, remote guidance platforms, and so on, to expand the coverage and provide continuous support and guidance for discharged patients. Additionally, the impact of dietary management on long-term quality of life and the correlation between SWAL-QOL dimension scores and clinical indicators should be investigated to identify the key factors affecting swallowing-related quality of life.

CONCLUSION

Systematic dietary management not only effectively promotes the recovery of swallowing function in patients after anterior cervical surgery but also improves nutritional status, swallowing-related quality of life, and patient satisfaction. In this study, the RSST and the SWAL-QOL scale served as objective and reliable measures to comprehensively assess swallowing function and quality of life. Future research should further improve the dietary management protocol, explore individualized interventions, and provide more scientific and effective guidance for postoperative swallowing care of patients undergoing anterior cervical surgery.

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Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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