

Review Article

Effect of comfort nursing combined with health education in the recovery of children with polydactyly and the influence on the treatment compliance and nursing satisfaction of children

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Abstract: To study the effect of health education combined with comfort care on treatment compliance, nursing satisfaction, and postoperative recovery of children with polydactyly, 80 children with polydactyly were selected as the study subjects and divided into a control group (CG) and an observation group (OG). Children in the CG received routine health education nursing, and children in the OG received psychological comfort nursing combined with music intervention on this basis. The changes of anxiety before and after surgery in the two groups were studied with the distribution scale, and the treatment compliance, nursing satisfaction, and postoperative recovery of the children under different modes of nursing intervention were compared. The results showed that the preoperative and postoperative anxiety scores of children in the OG were significantly lower than those in the CG ($P < 0.05$). The treatment compliance score of children in the OG was significantly higher than that in the CG ($P < 0.05$), and the nursing satisfaction score of children in the OG was significantly higher than that in the CG ($P < 0.01$). The postoperative range of motion and angular deformity in the OG were significantly different from those in the CG ($P < 0.01$), and the aesthetic score and excellent recovery rate of the children in the OG were significantly higher than those in the CG ($P < 0.05$). Therefore, comfort nursing combined with health education can effectively improve the treatment compliance of children with polydactyly deformity, increase the satisfaction of nursing work, and improve the degree of recovery after surgery.

Keywords: Polydactyly, health education, comfortable care, music intervention, treatment compliance, excellent recovery rate

Introduction

Polydactyly is a very common congenital malformation disease. It is common in the thumb and little finger, and in some patients it is genetic. At present, the cause and mechanism of polydactyly are not clear, but it is often considered as a non-hereditary isolated malformation disease, which is mostly manifested as sporadic, and is not accompanied by malformation syndrome in other parts [1]. Clinically, the types and severity of polydactyly are diverse, and some patients have only a narrow vascular nerve pitti connected to a normal finger. Patients with more serious deformities are mostly manifested as poor finger development,

fine or deviated finger, which seriously affects the appearance and function of the hand [2, 3]. Children with polydactyly are often accompanied by psychological problems. Parents fear that it will affect their psychological development and their future life, study, and employment [4].

Surgical excision of polydactyly is the only treatment method at present. Generally, surgical treatment for children with polydactyly over 3 years old and preschool children with polydactyly is selected. Early implementation of surgery may lead to children not cooperating with rehabilitation training after the surgery, thus delaying the best opportunity for rehabilitation

exercise. Health education nursing model is a comprehensive subject combining nursing science and health education. This model can improve patients' self-care and nursing ability by carrying out targeted, planned, and evaluated education activities for patients and their families, and ultimately achieve the purpose of preventing disease, promoting rehabilitation, and improving patients' quality of life [5, 6]. At present, various forms of health education nursing model have been applied in clinical practice, and studies have shown that these nursing models can effectively improve the quality of life of patients [7]. Comfort nursing is a new nursing mode integrating the integration and individuality. Studies have shown that comfort nursing mode can effectively improve patients' satisfaction with nursing work [8]. However, there are few studies on the application of comfort care combined with health education in surgical nursing of children with polydactyly deformity.

Therefore, children with polydactyly that need surgical treatment were selected as the research objects in this study. After dividing them into CG and OG, nursing intervention modes of health education combined with comfort nursing were implemented respectively. By investigating children's anxiety and treatment compliance before and after surgery, satisfaction with nursing work and recovery after surgery, the influence of different nursing modes on children with polydactyly were evaluated. The study aimed to lay a foundation for the application of comfort nursing in clinical nursing of children with polydactyly.

Materials and methods

Subjects and groups

Children with hand and foot polydactyly admitted to our hospital from March 2017 to June 2018 were selected as the study objects. The inclusion criteria were as follows: patients older than 3 years of old and younger than 5 years of old; patients diagnosed as complex polydactyly that met the severe malformations or tissue defects in the hands and feet. The exclusion criteria were as follows: patients with other organ diseases; patients not undergoing surgery for the first time; patients with mental disorders. All the children and their families had agreed to participate in this study and signed the informed consents.

According to the following equation, the sample content required by this study was calculated.

$$n_1 = n_2 = 2 \cdot \left(\frac{u_\alpha + u_\beta}{\delta/\sigma} \right)^2 + \frac{u_\alpha^2}{4} \quad (1)$$

According to the principle of bilateral inspection level, $\alpha=0.05$, $\beta=0.1$, then $1-\beta=0.90$.

Assuming $\frac{\delta}{\sigma}=0.80$, it can be estimated that the sample content should be 34 cases per group. However, considering the possibility of streaming samples, the samples were expanded to 40 cases in each group, so there were a total of 80 cases.

Based on the above calculation, 80 children with polydactyly were divided into two groups in a ratio of 1:1, which were CG and OG. The children in the CG received only routine health education nursing, while the children in the OG received comfort nursing on this basis.

Nursing intervention

Children in both CG and the OG received routine health knowledge education. The children and their families attended 5 health knowledge lectures on polydactyly during and after admission, 1.5 hours each time. Health education manuals were issued at the time of admission. After the surgery, the patient's family members were required to pay attention to the protection of the dressing and ensure the cleanliness of the surrounding skin. The children and their families were told to carry out early functional exercise. Daily nursing knowledge guidance was given at discharge, and follow-up consultation was carried out after 14 days after the surgery. The main content of health education included the definition of polydactyly, the surgical methods suitable for polydactyly patients, surgical nursing methods, daily precautions and so on.

The children in OG received comfort nursing intervention on the basis of health education. Before the surgery: the nursing staff was required to check the physical and mental states of the children, confirm the operation time with the families again, and instruct the children to have a good rest. During the surgery, the nursing staff dressed neatly and took the initiative to welcome the children, communicated with the children to understand their psychological conditions, and informed the

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Table 1. Beck anxiety scale

Item	No feeling 1	Normal 2	Tolerable 3	Very strong 4
1. I feel numbness or tingling				
2. I feel hot				
3. I feel my legs shake involuntarily				
4. I can't relax				
5. I am afraid that something bad will happen				
6. I feel dizzy				
7. I have palpitations and a rapid heartbeat				
8. I feel uneasy				
9. I get scared easily				
10. I feel very nervous				
11. I often feel suffocated				
12. My hand can't help but shiver				
13. I shake when I stand or walk				
14. I am afraid of losing control				
15. I am afraid that I am going to die				
16. I feel very scared				
17. I have a little indigestion and a pain in my stomach				
18. I faint sometimes				
19. I often have difficulty in breathing				
20. My face is red and hot				
21. I am sweating				

family members that the children had been accompanied by an itinerant nurse during the surgery. The medical staff told the children some relaxation techniques to relieve the discomfort during the surgery, and helped children adjust their mental states, so as to relieve pre-operative anxiety, fear, and tension. The communication process did not exceed 15 minutes. The medical staff brought the children into the operating room in advance, and played the quiet and soothing music based on their preferences. During the surgery, the temperature of operating room was kept at $25.0 \pm 1.0^{\circ}\text{C}$, and the relative humidity was $55.0 \pm 5\%$. The itinerant nurse closely observed the reaction, vital signs, and body language of the children, held the hands of the children when necessary, took deep breaths together with them, and encouraged them to relieve the bad mood during the surgery. After the surgery, the medical staff informed the children and their families of the effect of the surgery, wound care, and postoperative precautions, etc. In addition, the medical staff carefully answered the questions of the children and their families, and asked the children and their families to cooperate with the treatment, nursing, and re-visit.

After surgery, all the children received routine surgical care, oxygen inhalation by mask, and electrocardiogram monitoring, and were required to observe whether the dressing at the incision was exuded, whether there was blood supply obstacle at the dressing, skin color, and skin temperature, etc.

Research tools and assessment indicators

Beck anxiety inventory (BAI) was used to score the anxiety of children before and after surgery, and the problems were reorganized and described as items that children could understand, as shown in **Table 1**. BAI scale was a self-assessment scale for anxiety feelings, which included 21 items. A 4-level scoring method was used to set the problem options, which were divided into "no feeling", "normal", "tolerable", and "very strong", and were assigned to "1, 2, 3, and 4 scores" respectively. The higher the score, the stronger the anxiety of the children was. The Cronbach's α factor for the scale was 0.95.

In order to evaluate the treatment compliance of children, the treatment compliance of children was evaluated through a self-designed

Table 2. Therapeutic compliance scale of children

Item	Not at all 1	Occasionally 2	Basically 3	Completely 4
1. Can you keep your mouth clean every day?				
2. Can you go to bed every day as required?				
3. Can you take the medicine on time according to the doctor's request?				
4. Can you take the medicine as prescribed by the doctor?				
5. Can you take the medicine according to the required course of treatment?				
6. Can you carry out the auxiliary examination as required?				
7. Can you perform rehabilitation training as required?				
8. Can you review regularly as required?				

questionnaire, as shown in **Table 2**. The choices of these questions were divided into “not at all”, “occasionally”, “basically”, and “completely” with a score of “1, 2, 3, 4 scores”, respectively. The higher the score, the better the treatment compliance was. The scale was filled out by the duty nurse.

In order to evaluate the satisfaction degree of children with nursing care, the satisfaction degree was investigated through a self-designed questionnaire, as shown in **Table 3**. This part was composed of 7 dimensions, including service attitude, professional skills, ward environment, conscientiousness at work, health guidance, basic life care, and humanistic care, as well as 23 projects under these 7 dimensions. Likert 5 rating was used to set the options of these questions, which were divided into “very dissatisfied”, “dissatisfied”, “average”, “satisfied”, and “very satisfied”, and the scores were respectively “1, 2, 3, 4, and 5”. The higher the score, the higher the satisfaction with the care was. At the time of discharge, the nursing staff of the hospital guided the children and their families to complete the scale. The Cronbach's α coefficient of the scale was 0.95 according to the preliminary test results, which suggested that the survey results were reliable.

All children had their stitches removed 14 days after surgery and were externally fixed with plaster for about 5 weeks. After confirming the healing of the osteotomy by X-ray film after surgery, the plaster was removed and functional exercise was performed after removing the Kirschner wire. At the follow-up consultation 14 days after discharge, the range of motion, joint stability, angular deformity, and appearance of each group were recorded. In addition, the degree of recovery was assessed according to the Kawabata scoring criteria.

In addition, a translated version of the quality of life scale for children compiled by Varni et al. in 1987 was distributed to assess the quality of life of children. The scale contained 23 entries for 4 modules, which were physical, emotional, social, and school performance. All 23 items were evaluated with a 5-point scoring method, and the final score was converted into a percentage system for the statistics of the occurrence frequency of events in the last month. The higher the score, the better the child's quality of life was. The scale was filled out independently by the children based on their true feelings and psychological state under the guidance of professionals. The Cronbach's α coefficient of the scale was 0.83, which indicated that the survey results were reliable.

Statistics and analysis

SPSS19.0 software was used for statistical analysis. All enumeration data were expressed by mean \pm standard deviation, and t-test or χ^2 test was used for inter-group comparison. All measurement data were expressed by percentage, and the inter-group comparison of measurement data was analyzed by variance test process. When $P < 0.05$, the difference between groups was considered statistically significant.

Results

Analysis of basic data of children

A total of 80 children were included in this study, including 45 males and 35 females. The children ranged in age from 3 to 12 years old, with an average age of 3.42 ± 2.10 years old. After dividing them into the CG and the OG, nursing intervention was carried out in different ways, and basic data of children in the two groups were compared. As can be observed

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Table 3. Nursing satisfaction scale

Item	Very dissatisfied 1	Unsatisfactory 2	General 3	Satisfactory 4	Very satisfactory 5
1. The ward is quiet and well equipped					
2. The nurse would give advance notice before discharge					
3. Nurses can show up in time to help					
4. The nurse is very helpful to me					
5. The nurse is able to dispense medication on time and clearly communicate precautions					
6. Before the operation, the nurse can inform the precautions in advance					
7. The nurse is skilled in injection and dressing change					
8. The nurse would inform the matters needing attention before discharge					
9. The nurse can feel my needs					
10. My privacy is respected during my stay in hospital					
11. The nurse can listen to my troubles about health issues					
12. The nurse can help solve the problem in time					
13. The nurse can find my reaction in time					
14. The nurse can help explain the treatment plan					
15. The nurse asks about the condition every day.					
16. The nurse asks about health issues outside the condition					
17. Communication between the nurse and the parent is good					
18. The nurse can ask me how I feel during my care.					
19. The nurse greets me every morning					
20. The nurse can answer questions patiently					
21. The nurse is a neat and tidy person					
22. The nurse is a gentle person					
23. The nurse can take the initiative to introduce the ward environment and the attending doctor					

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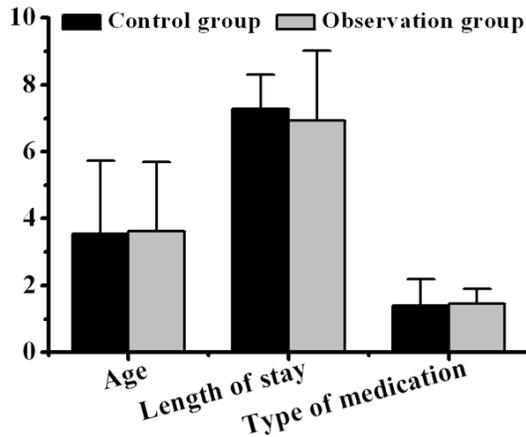


Figure 1. Comparison of basic data of children.

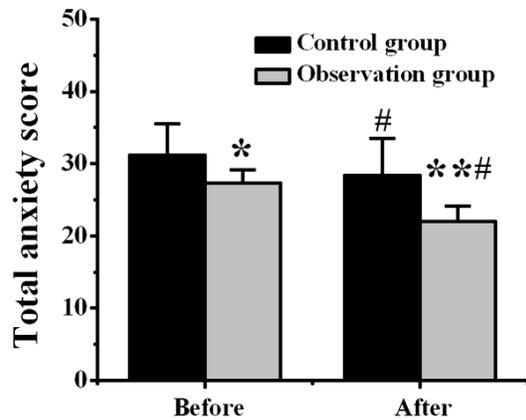


Figure 2. Comparison of anxiety scores between the two groups before and after surgery. Note: * means there is a significant difference compared with the CG, $P < 0.05$; ** indicates that there is an extremely significant difference compared with the CG, $P < 0.01$; and # indicates that there is a significant difference compared with that before surgery, $P < 0.05$.

from **Figure 1**, the average age of children in the CG and the OG was 3.55 ± 2.19 years old and 3.62 ± 2.07 years old, respectively. The average length of hospital stay was 7.28 ± 1.02 days and 6.92 ± 2.10 days, respectively; the types of medication were 1.39 ± 0.81 and 1.46 ± 0.45 . The proportion of boys in the CG and OG was 55.0% and 57.5%, respectively. After comparison, no significant difference was found among the basic data ($P > 0.05$).

Comparison of anxiety of children before and after operation under different nursing modes

The differences in anxiety of children under different nursing modes before and after surgery

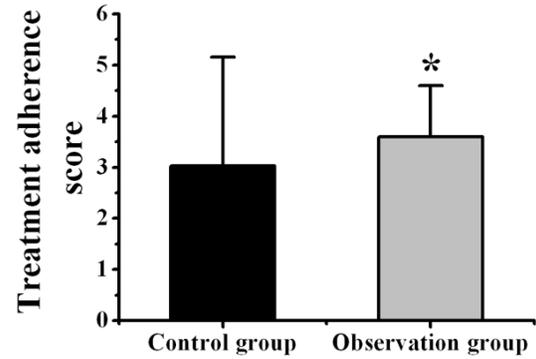


Figure 3. Comparison of mean scores of treatment compliance scale between the two groups. Note: * means there is a significant difference compared with the CG, $P < 0.05$. The children with scores of “3” and “4” were classified as having good treatment compliance, and the children with scores of “1” and “2” were classified as having poor treatment compliance.

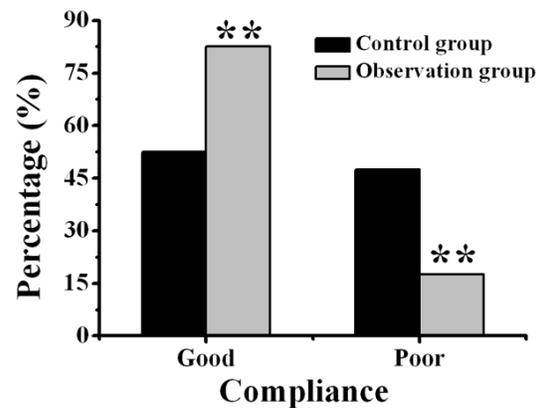


Figure 4. Comparison of the ratio of good and poor treatment compliance between the two groups. Note: ** indicated an extremely significant difference compared with the CG ($P < 0.01$). 52.5% of the children in the CG had good treatment compliance, while 47.5% had poor treatment compliance. In the OG, 82.5% of the children had good treatment compliance, and 17.5% had poor treatment compliance. Moreover, the probability of good treatment compliance in the OG was significantly higher than that in the CG ($P < 0.01$), and the probability of poor treatment compliance was significantly lower than that in the CG ($P < 0.01$).

were compared, and the results were shown in **Figure 2**. It can be observed that, the average score of anxiety of children was 31.18 ± 4.36 in the CG and 27.26 ± 1.89 in the OG before surgery, and the score of anxiety in the OG was significantly lower than that in the CG ($P < 0.05$). After surgery, the average score of anxiety was 28.33 ± 5.17 in the CG and 22.02 ± 2.13 in the

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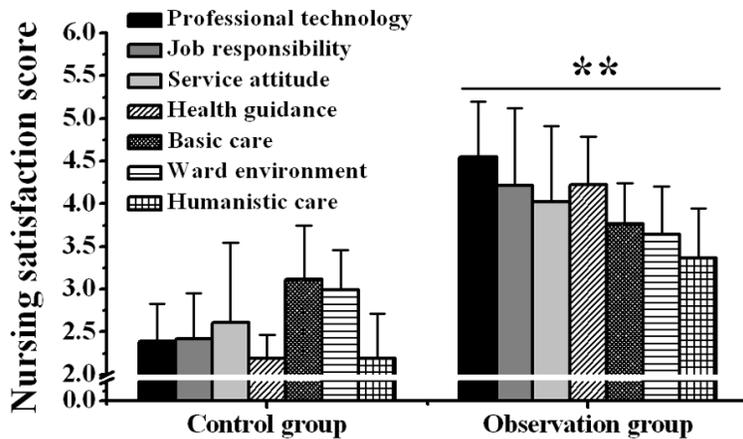


Figure 5. Comparison of the mean score of satisfaction in 7 dimensions between the two groups. Note: ** indicates that there is an extremely significant difference compared with the CG, $P < 0.01$.

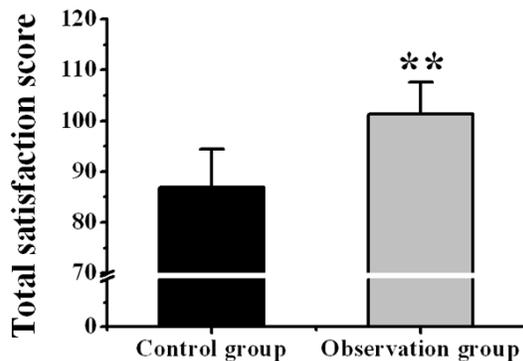


Figure 6. Total score of nursing satisfaction of children in the two groups. Note: ** indicated an extremely significant difference compared with the CG ($P < 0.01$).

OG, and the score of anxiety in the OG was significantly lower than that in the CG ($P < 0.01$). Moreover, the anxiety score of the CG and the OG after the surgery was significantly lower than that before the surgery ($P < 0.05$).

Comparison of treatment compliance of children with different nursing modes

Differences in treatment compliance of children with different nursing modes were compared, and the results were shown in **Figure 3**. As can be observed from **Figure 3**, after comparing the average score of the treatment compliance scale of the two groups of children, the score in the OG was 3.59 ± 1.01 , while the score in the CG was 3.03 ± 2.12 , and the score in the OG was significantly higher than that in the CG ($P < 0.05$).

The children with scores of “3” and “4” were classified as having good treatment compliance, and the children with scores of “1” and “2” were classified as having poor treatment compliance. After comparing the probabilities, it can be observed from **Figure 4** that 52.5% of the children in the CG had good treatment compliance, while 47.5% had poor treatment compliance. In the OG, 82.5% of the children had good treatment compliance, and 17.5% had poor treatment compliance. Moreover, the probability of good treatment compliance in the OG was significantly higher than that in the CG ($P < 0.01$), and the probability of poor treatment compliance was significantly lower than that in the CG ($P < 0.01$).

compliance in the OG was significantly higher than that in the CG ($P < 0.01$), and the probability of poor treatment compliance was significantly lower than that in the CG ($P < 0.01$).

Comparison of survey results of satisfaction among different nursing modes

The differences in nursing satisfaction of children with different nursing modes were compared, and the results were shown in **Figure 5**. The nursing satisfaction scores of the children were analyzed from seven dimensions, including service attitude, professional skills, ward environment, conscientiousness, health guidance, basic life care, and humanistic care. The average satisfaction scores in the OG in seven dimensions were significantly higher than those in the CG ($P < 0.01$).

After that, the differences between the total satisfaction scores were compared. As can be observed from **Figure 6**, the total satisfaction evaluation score in the CG was 86.93 ± 7.45 , while that in the OG was 101.31 ± 6.25 . The total score of satisfaction evaluation in the OG was significantly higher than that in the CG ($P < 0.01$).

Comparison of recovery of children under different nursing modes

First of all, taking one child as an example, the results of surgical treatment of polydactyly were compared. From **Figure 7A** and **7B**, it can be observed that before the surgery, the child

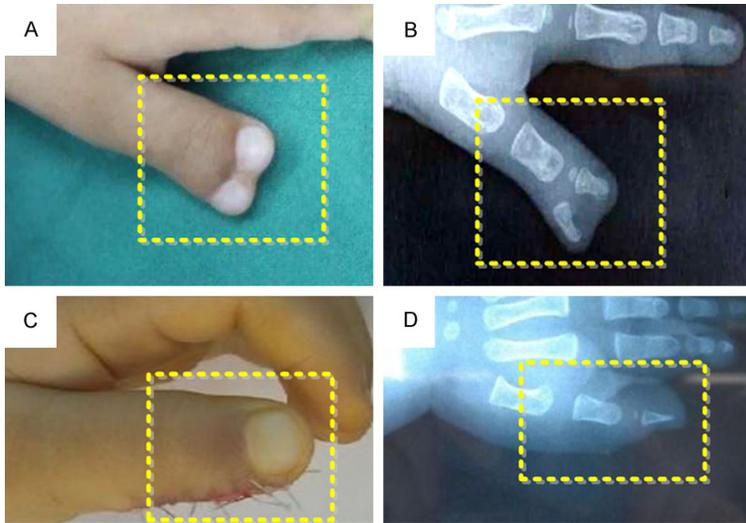


Figure 7. Visual and X-ray images of the affected area of a child before and after surgical treatment. Note: A: Visual image before surgery; B: X-ray image before surgery; C: Visual image after surgery; D: X-ray image after surgery; the affected area was shown in the dotted box.

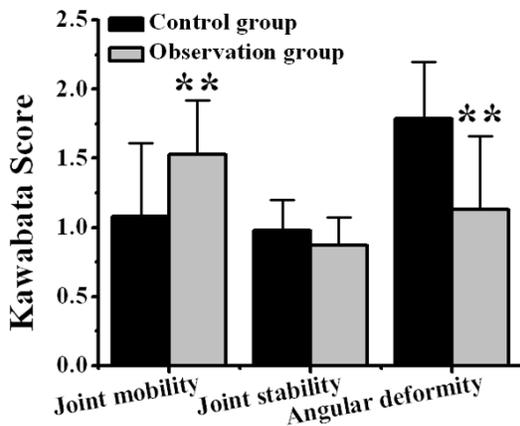


Figure 8. Comparison of postoperative recovery between the two groups. Note: ** means there is an extremely significant difference compared with the CG, $P < 0.01$.

showed the multi-finger deformity of the compound phalangeal type of the distal phalangeal bone of the left thumb on the visual and X-ray images. After surgical treatment, it can be observed from **Figure 7C** and **7D** that the deformed finger of the child was obviously repaired from the visual and X-ray images. Therefore, the effect of surgical repair and treatment was obvious.

Subsequently, the postoperative recovery effect of the two groups was compared. In **Figure 8**, it can be observed that the score of

range of motion of the children in the CG was 1.08 ± 0.53 , while the score of range of motion of the children in the OG was 1.53 ± 0.39 , and the range of motion of the children in the OG was significantly higher than that in the CG ($P < 0.01$). The joint stability score of the children in the CG was 0.98 ± 0.22 , and that of the children in the OG was 0.87 ± 0.2 . The joint stability score of the children in the OG was smaller than that of the CG, but there was no significant difference between the two groups ($P > 0.05$). The score of angular deformity in the CG was 1.79 ± 0.41 , while that in the OG was 1.13 ± 0.53 , and the score of angular deformity in the OG

was significantly lower than that in the CG ($P < 0.01$).

The aesthetic degree of surgical site was compared between the two groups, and the results were shown in **Figure 9**. The score of children in the CG was 6.25 ± 3.26 points, and that of children in the OG was 8.17 ± 2.58 points. The aesthetic score in the OG was significantly higher than that in the CG ($P < 0.05$). Besides, the excellent rate of postoperative recovery in the CG was $76.2 \pm 5.3\%$, and that in the OG was $83.3 \pm 4.6\%$. The excellent and good rate of postoperative recovery in the OG was significantly higher than that in the CG ($P < 0.05$).

Discussion

Children with polydactyly are younger and tend to have stress anxiety before surgery. In this case, relaxing music therapy and comfort nursing can significantly reduce the surgical stress response of children, thereby reducing their anxiety and bad emotions. Studies have shown that after music intervention, the patient's pre-operative tension and anxiety can be significantly reduced. Moreover, mild music emotions may stimulate the parasympathetic nervous system of patients to maintain excitement, thus promoting the anti-stress ability of the body [9, 10], which is consistent with the results in this study that music and psychological nursing before surgery can reduce the anxiety of chil-

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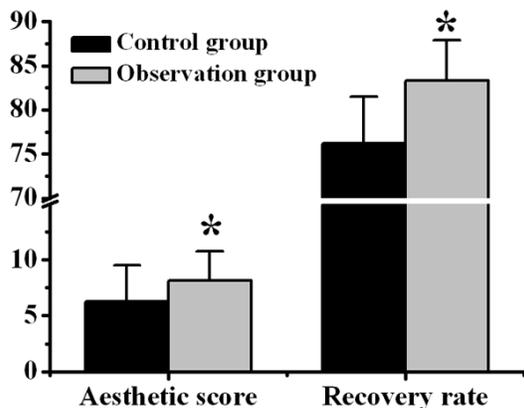


Figure 9. Comparison of the aesthetic score and excellent recovery rate of the affected area between the two groups of children. Note: * indicated an extremely significant difference compared with the CG ($P < 0.05$).

dren. Treatment compliance means that patients can consciously follow the doctor's instructions for treatment and keep consistent with the doctor's orders. Some researches show that the factors that affect patient's compliance are mainly caused by patient's physical and psychological discomfort during the treatment [11, 12]. The comfort nursing mode can help the patients reach the most pleasant state both physically and psychologically. In this study, the pleasure brought by the environment temperature and humidity and sound during the treatment was analyzed, and the psychological comfort nursing was carried out. The results showed that it could effectively improve the treatment compliance of children, which was consistent with the research results of Xiong et al. [13] and Yeh et al. [14].

The comfort nursing model can promote the communication ability and cooperation ability between patients and nursing staff, effectively improve the relationship between nursing staff and patients, and optimize the learning ability and communication ability of nursing staff, so as to better guide and meet the psychological needs of patients [15, 16]. The results of this study indicated that the implementation of comfort nursing can significantly improve the satisfaction of children and their families on the nursing work, which was of great significance to improve the satisfaction of patients and their families on the surgical effect and establish a good relationship between doctor, nurse, and patient. Based on X-ray examination

results, the growth trend of affected area and normal finger can be judged by the upper palm, finger epiphysis plate, etc. [17], and the surgical treatment can obviously repair the affected area of the finger of the child. Angular deformity refers to the angle formed by the vertical axis of the upper, lower, far, and near fracture segments after fracture healing, which will affect its function [18, 19]. The results of this study revealed that comfort care combined with health education could effectively reduce the postoperative angular deformity score of children with polydactyly, and improve the joint range of motion score of children, indicating that this nursing mode could improve the postoperative recovery of children, which was consistent with the research results of Leonard et al. [20]. Aesthetic appearance and excellent recovery rate are also key indicators to evaluate the surgical treatment of multiple finger deformity [21]. The results of this study suggested that the comfort care mode could significantly improve the aesthetic score of the affected areas of children after surgical treatment and the excellent recovery rate.

In this study, the results indicated that comfort nursing combined with health education could effectively improve the anxiety of children with polydactyly before and after surgery, increase their treatment compliance and satisfaction with the nursing work, and optimize the postoperative recovery effect. However, the sample size included in this study was limited, and the average age of selected children was 3.42 ± 2.10 years. In fact, the optimal treatment time for children with congenital polydactyly is about 3 weeks. At that time, the hand tissues of the children are easy to be dissected, and the organs of the children have better tolerance to anesthesia and other surgical risk factors. Follow-up research can further explore the influence of comfort care on the therapeutic effect of children aged around 3 weeks. In conclusion, the results of this study can lay a foundation for the application of comfort nursing in recovery of children with polydactyly.

Disclosure of conflict of interest

None.

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