

Reducing the Reapplication Rate of Unexpected Pediatric Peripheral Venous Catheters

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Research Purpose

Peripheral vessels in children are small and not easy to inject, and movement can cause pulling that disrupts the flow of the intravenous drip, requiring re-fixation or re-injection. This causes fear, crying, and pain in children. Nurses have inconsistent methods for fixing injection sites, leading to increased occurrences of removing and reapplying tape and fixation boards. The frequent need for reapplication and reinjection often delays regular treatment and affects nurses' confidence. Additionally, leakage from venous catheters can lead to phlebitis requiring surgical debridement, eliciting sympathy and complaints from families, and even leading to medical disputes. This highlights the importance of properly fixing peripheral venous catheters, thus motivating improvements to reduce the frequency of unexpected reapplications in children, decrease the psychological fear in children, alleviate the physical and mental exhaustion of caregivers, reduce the workload of nursing staff, and ultimately enhance clinical care quality and satisfaction of inpatient families.

Research Method

Based on literature review, current situation analysis, and the identification of key causes, improvement plans were proposed. The project team assessed the main reasons for the reapplication rates of unexpected venous catheters in the pediatric ward using feasibility, importance, and effectiveness as evaluation indicators. Scoring was done using a three-tier method; 5 points for strongly agree, 3 points for agree, and 1 point for slightly agree, with a total score of 45 ($45 \times 80\% = 36$ points). A score above 36 points was deemed sufficient to implement countermeasures. The decision matrix for reducing venous catheter reapplications was used to assess main causes, key factors, and strategic plans, and a PDCA cycle was utilized to continuously promote and improve the re-fixation rate of venous catheters to 3.8%. (Figure 1, Figure 2)

Research Results

Project effectiveness was evaluated before and after implementation using a current situation survey that included "unexpected venous catheter reapplication rate," "nursing staff's knowledge on venous catheter care," and "family's awareness of post-injection care of venous catheters."

- Unexpected venous catheter reapplication rate: Before implementing the project measures (N=623), the pediatric venous catheter reapplication rate was 9.6%, and after implementation (N=610), the rate was reduced to 2.5%, with the number of errors reduced from 60 to 15.
- The number of incorrect fixations reduced from 33 to 4, unsecured connections at the T-lock junction of the catheter reduced from 17 to 4, and the issues of insufficient drip height causing backflow and leakage reduced from 6 to 3.
- An audit of nursing staff's knowledge and correctness of peripheral venous catheter care before and after the project showed an increase from 63% to 100%.
- A survey on family's awareness of post-injection care showed that nurses used the "Pediatric Venous Injection Care Guidelines" pamphlet for family nursing instruction, increasing the overall score from 66% before the project to 98% after, showing significant improvement.
- Monitoring nursing staff's execution of peripheral venous catheter fixation techniques through regular on-the-job education and technical assessments, and incorporating these into the training and assessment of new nurses, consistency in venous catheter fixation techniques among nursing staff increased from 63% to 100%.

Research Discussion

By utilizing standard processes for pediatric peripheral venous catheter fixation, on-the-job training, routine technical assessments, standard fixation boards, and educational posters, the rate of reapplication for venous catheters was reduced from 9.63% to 2.5%. The assessment of nursing staff's standard techniques for pediatric peripheral venous catheter fixation increased from 63% to 100%. The overall score for the effectiveness of the pediatric peripheral venous catheter reapplication rate project is maintained at 98%. Upon admission, immediate provision of care guidance for pediatric venous catheters to the families of the patients increases care awareness, not only reducing the anxiety of caring for the hospitalized child but also raising family satisfaction during the hospital stay from 94% to 99.5%. This approach has also been expanded to outpatient injection rooms and emergency rooms, enhancing the overall quality of catheter care through joint care by nursing staff and families of the patients.

Research Contributions

- Establishment of Institutional Nursing Technique Standards and Audits** : The establishment of institutional standards for venous catheter care, including fixation techniques, nursing guidance, and patient management. All pediatric nursing staff are required to regularly receive professional training and assessments related to venous catheters to ensure consistency and high quality of nursing techniques.
- Enhancement of Educational Resources and Tools** : Support the development of various forms of educational materials, such as digital applications, animations, and video teachings, to make it easier for patients and families to understand and apply nursing knowledge. Promote the use of standardized educational tools and resources throughout the institution to ensure consistency across medical units.
- Implementation of Monitoring and Evaluation Mechanisms** : Establish institutional monitoring standards to track and report nursing indicators related to venous catheters, such as the rate of re-application and associated complications. Regularly evaluate the effectiveness of the educational training programs to facilitate necessary adjustments and improvements.

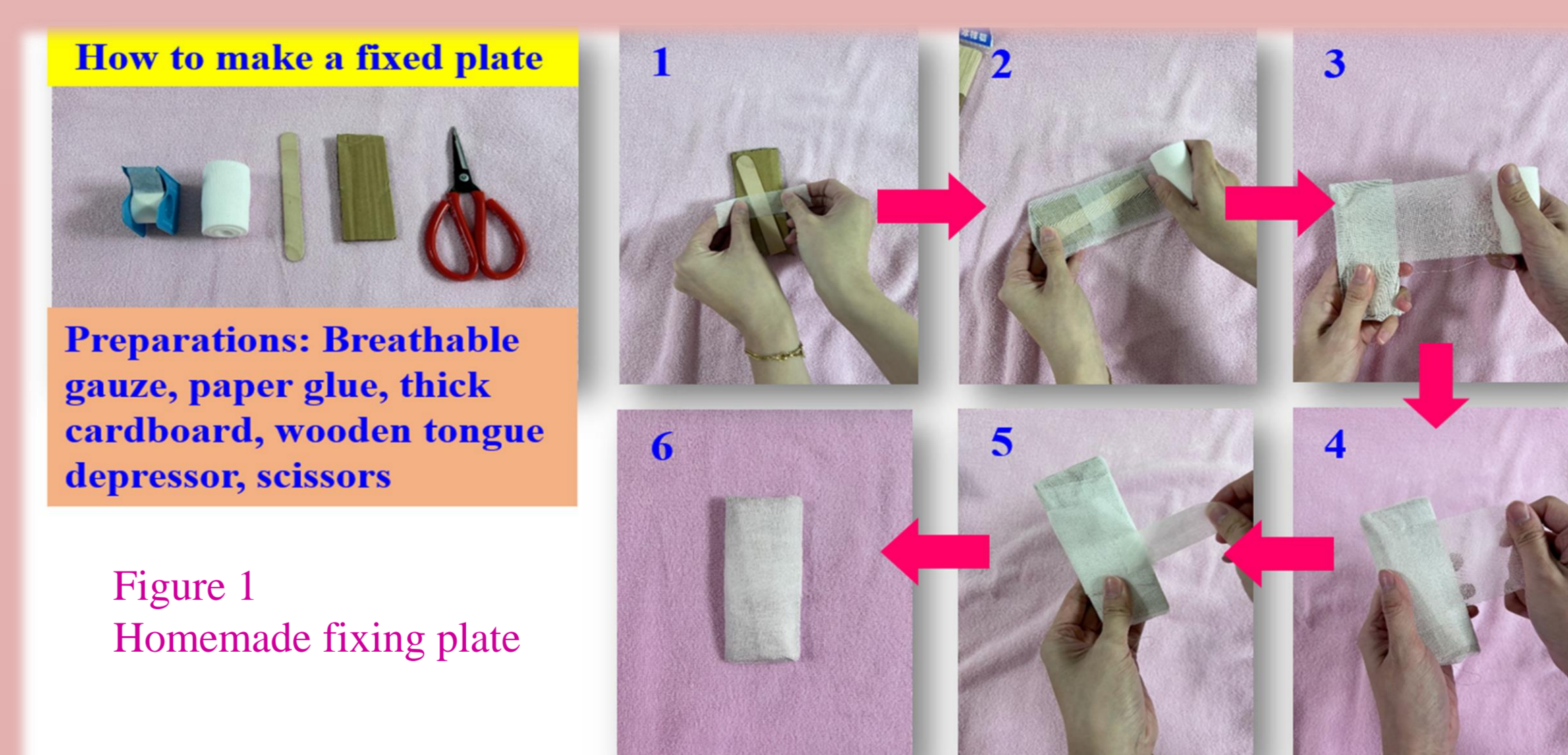


Figure 1
Homemade fixing plate

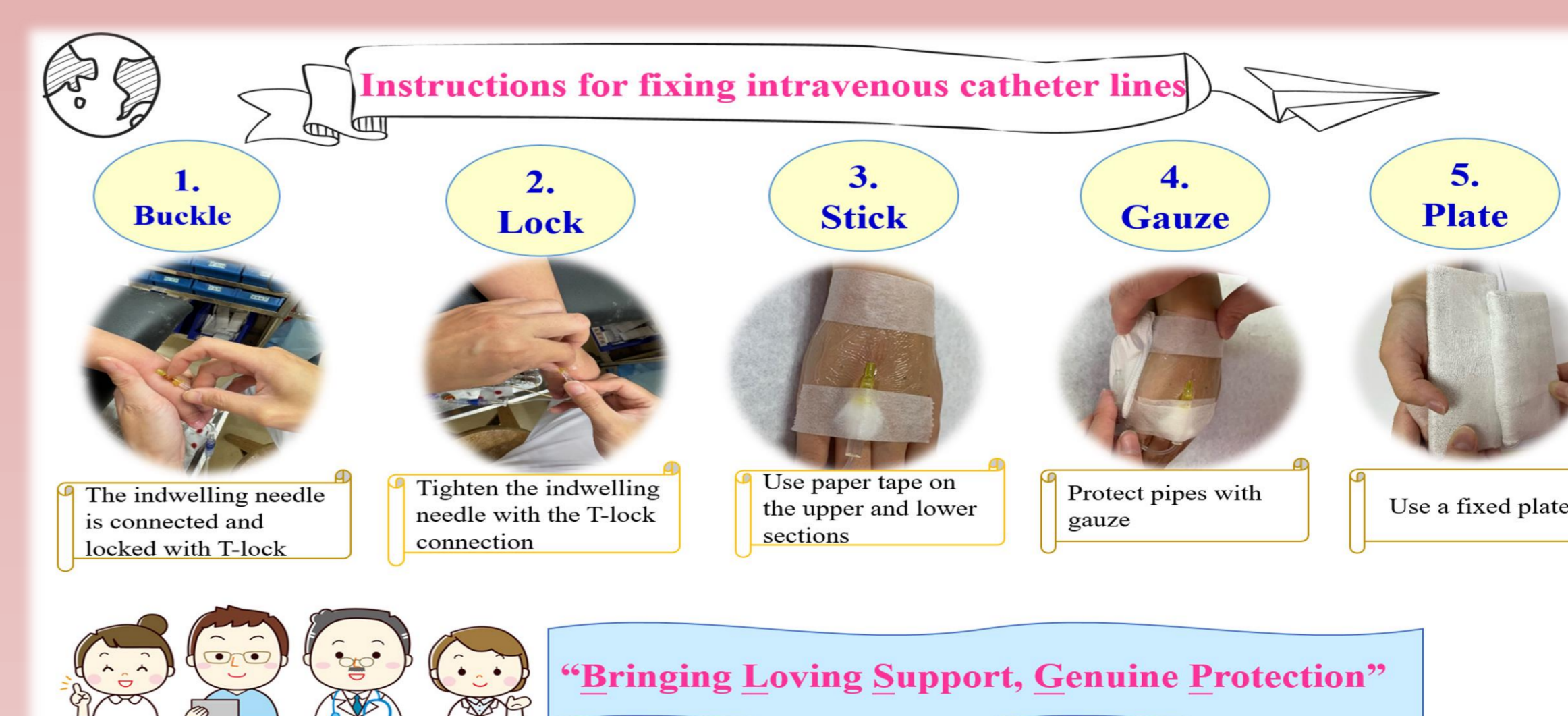


Figure 2
Steps and instructions for fixing intravenous indwelling needles