Background
Peripherally inserted central catheters (PICC) are essential for care in pediatric patients. The potential for dislodgement is a significant issue which can require replacement of the PICC thereby increasing costs and complication risks.

Critically Analyze the Evidence
The GRADE criteria were used to evaluate the quality of evidence presented in research articles reviewed during the development of this guideline. The table below defines how the quality of evidence is rated and how a strong versus a weak recommendation is established.

<table>
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<tr>
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</tr>
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<tbody>
<tr>
<td>STRONG</td>
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PICO Question 1: In children, does suturing newly placed peripherally inserted central catheters (PICC) impact dislodgement, central-line associated bloodstream infection rates, or insertion site infection rates compared to other securement methods?

Recommendation(s): There is insufficient evidence to recommend the use of sutures versus a specific device for the securement of PICC lines. Tape or the SecurAcath device should not be used as a securement method. (1-5)

A review of the literature revealed 3 randomized trials and 2 observational studies addressing this PICO question. In the first randomized trial, 66 patients aged 9 months to 19 years were enrolled to compare the efficacy and rate of complications between sutures and tape when securing PICC lines. The patients were separated into two groups, 34 were in enrolled in the suture group and 32 were enrolled in the tape group. The study noted the total complication rate for the suture group was significantly less than the tape group with occlusion, migration, and leak being the three most common complications. (2)

Another randomized trial compared the use of sutures or tape to StatLock (a type of PICC securement device) to study the impact on catheter complications. In this study, StatLock significantly reduced unplanned removals, maintenance interventions, and catheter-related complications in patients where the comparison was Pediatric PICCs secured by threaded tape versus StatLock. Also, when StatLock was compared to pediatric CVC lines and adult PICCs that were sutured, StatLock performed similarly to sutures for the rate of dislodgement and had significantly fewer catheter-related infections. (4)

The final randomized prospective study looked at catheter complications of a sutureless securement device for PICCs compared with sutures in an adult population. Unplanned removal occurred in 36% in the suture group and 24% of the patients in the StatLock group. Complications included catheter dislodgement, migration, systemic infection, cellulitis, leakage, occlusion and central venous thrombosis. This study also found the StatLock group had a significant difference in the number of systemic and catheter-related infections than in the suture group. (5)

The two observational studies that were found during the review of literature looked at the safety and performance of a catheter securement device (SecurAcath) and defined the current rate of infectious and noninfectious complications of PICCs, the causative agents and defined the possible risk factors associated with the complications. In the first observational study, 68 patients aged 16 years or older were evaluated. Unscheduled removal of SecurAcath occurred in 20.6% of patients and 22.1% of patients experienced adverse events. (1)

The final observational study looked at 279 PICCs in 221 patients. The PICC lines were secured to the skin by tape. Sixty-three percent of the patients were free of complications. Accidental dislodgement of catheters was noted in 9.3% of patients. PICC lines were removed from 13.6% of the patients due to mechanical problems and infectious complications. (3)
Critical Points of Evidence*

Evidence Supports
- None

Evidence Against
- Tape or the SecurAcath device should not be used as a securement method. \(^{1-5}\)

Evidence Lacking/Inconclusive
- None

*NOTE: The references cited represent the entire body of evidence reviewed to make each recommendation.

Figure. StatLock securement device for PICCs and central venous catheters holding a double-lumen Cook PICC.
References


Clinical Standards Preparation
This clinical standard was prepared by the Evidence-Based Outcomes Center (EBOC) team in collaboration with content experts at Texas Children’s Hospital. Development of this clinical standard supports the TCH Quality and Patient Safety Program initiative to promote clinical standards and outcomes that build a culture of quality and safety within the organization.

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Kathy Carberry, MPH, RN, Director

No relevant financial or intellectual conflicts to report.

Development Process
This clinical standard was developed using the process outlined in the EBOC Manual. The literature appraisal documents the following steps:

1. Review Preparation
   - PICO questions established
   - Evidence search confirmed with content experts

2. Review of Existing External Guidelines
   - N/A

3. Literature Review of Relevant Evidence
   - Searched: PubMed, CINAHL, Cochrane, Medline

4. Critically Analyze the Evidence
   - Three randomized trials and two observational studies.

5. Summarize the Evidence
   - Materials used in the development of the clinical standard, literature appraisal, and any order sets are maintained in a PICC Securement evidence-based review manual within EBOC.

Evaluating the Quality of the Evidence
Published clinical guidelines were evaluated for this review using the AGREE II criteria. The summary of these guidelines are included in the literature appraisal. AGREE II criteria evaluate Guideline Scope and Purpose, Stakeholder Involvement, Rigor of Development, Clarity and Presentation, Applicability, and Editorial Independence using a 4-point Likert scale. The higher the score, the more comprehensive the guideline.

This clinical standard specifically summarizes the evidence in support of or against specific interventions and identifies where evidence is lacking/inconclusive. The following categories describe how research findings provide support for treatment interventions.

- **Evidence Supports**: provides evidence to support an intervention
- **Evidence Against**: provides evidence against an intervention
- **Evidence Lacking/Inconclusive**: indicates there is insufficient evidence to support or refute an intervention and no conclusion can be drawn from the evidence.

The GRADE criteria were utilized to evaluate the body of evidence used to make practice recommendations. The table below defines how the quality of the evidence is rated and how a strong versus weak recommendation is established. The literature appraisal reflects the critical points of evidence.

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Recommendations
Practice recommendations were directed by the existing evidence and consensus amongst the content experts. Patient and family preferences were included when possible. The Content Expert Team and EBOC team remain aware of the controversies in the management of PICC Securement in children. When evidence is lacking, options in care are provided in the clinical standard and the accompanying order sets (if applicable).

Approval Process
Clinical standards are reviewed and approved by hospital committees as deemed appropriate for its intended use. Clinical standards are reviewed as necessary within EBOC at Texas Children’s Hospital. Content Expert Teams are involved with every review and update.

Disclaimer
Practice recommendations are based upon the evidence available at the time the clinical standard was developed. Clinical standards (guidelines, summaries, or pathways) do not set out the standard of care and are not intended to be used to dictate a course of care. Each physician/practitioner must use his or her independent judgment in the management of any specific patient and is responsible, in consultation with the patient and/or the patient’s family, to make the ultimate judgment regarding care.

Version History

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