

Practical Considerations and Current Best Practice for Pediatric Clean Intermittent Catheterization

Nan E. Tobias

Clean intermittent catheterization (CIC) is a procedure that has been used successfully for over 45 years for a variety of urologic conditions (Lapides, Diokno, Silber, & Lowe 1972). Children with a variety of diagnoses benefit from the procedure. For example, children with congenital conditions, such as spina bifida, may have a bladder that works under high pressures and empties incompletely. A condition such as posterior urethral valves may cause obstruction to urinary flow and/or a flaccid bladder that does not function well. Other conditions, such as recurrent urinary tract infections, detrusor sphincter dyssynergia (a discoordination between the bladder and urinary sphincter), or other similar abnormality, may benefit from a CIC program. This process assists the bladder to empty to completion, reduces pressures in the bladder that are detrimental when transmitted to the kidneys, promotes bladder mucosal healing, and assists to prevent future urinary tract infections.

Pediatric conditions, such as those listed above, may lead to renal damage and even end stage renal disease if not properly treated. Children and their families may fail to realize the significance of their diagnosis. The urinary tract is not visible, and in many instances, children appear physically normal and may appear to void normally. The condition of the urinary tract on imaging may tell a totally different story. Without appropriate medical interventions, including CIC and anticholinergic medications, the bladder muscle develops high pressures that are transmitted to the kidneys and may lead to hydronephrosis. Over time, the function of the kidneys deteriorates

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Clean intermittent catheterization (CIC), a commonly accepted practice for several pediatric diagnoses, is used worldwide to promote urinary tract health and continence. CIC is a modification of aseptic technique that children and families perform at home and school. CIC instruction occurs in many different practice areas, including inpatient, outpatient, and home settings. Nurses who are not experienced urologic nurses are commonly expected to provide this instruction, making it paramount to have resources to provide such teaching. Pediatric nurses need to understand the reasons for the procedure, common diagnoses encountered, variations in technique encountered in its practice, long-term benefits, developmental and behavioral considerations, and recommendations in communications with families during the process. Nurses who care for these patients post-teaching need to understand the rationale for their patients' urologic care, and use their clinical judgment and critical thinking skills when issues such as insurance coverage, personal preference, or anatomic variations exist. Using this information, nurses can draw on their knowledge as well as communicate appropriate information to families and the referring service to provide safe, appropriate, and cost-effective care to the patient and family.

Key Words: Clean intermittent catheterization (CIC), pediatric urologic nurses.

until they finally fail. Serum creatinine levels do not rise until most kidney function has been destroyed. This process may take months to years, but once lost, kidney function cannot be restored. Renal replacement therapy, which includes dialysis and renal transplantation, is then the only option. Nurses who assist families to learn the technique of CIC can reinforce this vital information and encourage adjustment to the process. By doing so, nurses may promote the health of the child's urinary tract, assist the family to prevent renal failure, and improve the child's and family's quality of life.

Social and Psychological Impact of CIC

A descriptive study with families of children with spina bifida indicated that most children experienced difficulties when starting to use catheters (Edwards, Borzyskowski, Cox, & Badcock, 2004).

Many children verbalized feeling scared that they might damage their bodies or that it would hurt. Some children described the procedure as shocking or disgusting. However, most children who were successful in doing the catheterizations reported feeling very pleased with themselves. These findings are important for the nurse teaching CIC to realize. Nurses who may be hesitant to take on such teaching or who themselves feel inadequate in the role need to understand the rationale and benefits of CIC. Full understanding of the positive impact that CIC may have on families can be the impetus to encourage the nurse to fulfill this vital role.

Intuition tells us that family members who receive mixed messages from caregivers may experience added stress about learning CIC. For the nurse responsible for teaching CIC to the family, this knowledge is enlightening. It is paramount for the nurse to put aside

any misgivings about teaching the procedure. Tens of thousands of children across the country and around the world have successfully been placed on a CIC regimen. Borzyskowski, Cox, Edwards, and Owen (2004) found that CIC itself does not cause emotional or behavioral problems. Even though parents and children may dislike the procedure, CIC is successful in promoting a healthy urinary tract and healthy child development. The child's health issues may put a strain on family relationships, but CIC can be a mainstay of successful treatment. Successful treatment depends upon all caregivers giving the same messages to the family.

CIC can be a lifelong requirement or a temporary measure. For conditions such as spina bifida or spinal cord injury, or in instances where bladder augmentation procedures have been done, CIC is lifelong. In other situations, such as bladder instability or high grades of vesicoureteral reflux, or in instances where the bladder may reclaim its healthy function, CIC may be a temporary requirement. CIC may be needed for several weeks or months, or even for a few years. Many times, the duration that CIC will be needed or if it will be a permanent requirement is not known at the outset. This information (or lack thereof) may cause more anxiety for the family and child. Not knowing what the future holds may be more worrisome than being able to plan for a definite future. The nurse can help the family focus on the positive aspects in situations where there is hope that CIC will not be a lifelong requirement. Where CIC is a lifelong requirement, the nurse can emphasize that renal damage and failure can be prevented with meticulous care.

Teaching CIC

Nurses may have misgivings about their own ability to properly teach a family to perform CIC. They may feel as much distress over teaching the procedure as families do about learning CIC. These feelings of inadequacy may be due to inexperience in teaching CIC because the steps of CIC differ from those of aseptic technique. These concerns are real, and instruction on appropriate technique and information on different types of catheters, methods to reduce child and family anxiety, methods to assist a child to cooperate, and acquiring the assistance of other health-care workers as necessary can assist in alleviating these concerns. It is also

Table 1.
Methods to Teach Children about Clean Intermittent Catheterization (CIC)

Method	What to Say
Use diagrams and/or pictures of the genitourinary tract.	The kidneys clean the blood and make urine/pee; the ureters are tubes that allow the urine to drain into the bladder; the bladder is the storage tank for the pee; the urethra is the urine tube that lets the pee drain out of the bladder.
Describe how the catheter works.	The catheter (soft tube) slides through the urethra into the bladder and empties out all the pee.
Explain the reason for the catheter.	Helps all the pee get out. Helps the bladder to be more relaxed. Helps the kidneys work better.
Use anatomically correct dolls. Demonstrate the procedure with the doll and have the child practice on the doll, encourage, and assist the doll to cooperate.	Point out aspects of the procedure that are important. Encourage the child to explain to the doll what is happening. This will help the nurse to clarify what the child understands about the procedure and their feelings about it. Nurse can then clarify any misconceptions.
Provide written materials created by catheter companies, such as Hollister, Bard, 180 Degree Medical, and Coloplast, which can be obtained through company representatives or online.	Read books about catheterizations with the children. Books are bright, colorful, positive, and developmentally appropriate for school-aged children.

helpful for the nurse to obtain adequate information about the patient and family from the provider who ordered the CIC. If this information has not been adequately conveyed, it is appropriate for the nurse to request clarification. This will aid in the nurse's ability to reinforce teaching as well as aid the nurse's own comfort level with the family.

Developmental Aspects Of Teaching

In this author's experience, children as young as 7 or 8 years of age can be successful in performing their own catheterizations. This is not to say that children of this age can carry out the procedure from start to finish without assistance. Young children require supervision to assure their technique is appropriate. Most children (and adults) view the experience of learning the procedure of catheterization as frightening; thus, it is reasonable to teach the procedure to parents initially. In this author's pediatric urology experience spanning over 25 years, it is the rare child who is willing to learn the procedure before the parent. Children seem to need the reassurance that the catheterization will proceed successfully before doing it themselves. Additionally, CIC tends to be an awk-

ward procedure physically, particularly for girls. Adolescents, on the other hand, are more willing to catheterize themselves initially because they desire privacy and autonomy.

Prior to the actual catheterization teaching, it is helpful to ascertain what specific information has been offered to the child and family. Most often, the urologist has given the explanation of the need for catheterizations to the parents. The child may or may not have been present during the explanation. Regardless, the nurse should spend time with the child, giving the explanation in developmentally appropriate terms and encouraging the child to ask questions and have concerns addressed. Diagrams of genitourinary anatomy, including the kidneys, bladder, urethra, and perineum, are useful. Depending on the age and personality of the child, brief explanations of function of the urinary tract may be given (see Table 1). It is essential to explain the procedure is being done to help the child's bladder work better, not because the child has misbehaved or is being punished. The nurse should stress that the child is not at fault for the bladder issues, and that treatments being used will help the bladder and body be healthier. Using anatomically correct dolls to demonstrate the proce-

cedure can assist the child in understanding and processing the information. This encourages handling of the catheter, mastery of the procedure, and some level of control. Observing this demonstration is also helpful for parents. Many written materials are available to review with children and their families (see Table 1). The number of catheterizations to be done daily will be prescribed by the ordering service. Most often, there are four to five catheterizations per day and should be spaced equally throughout the day.

While the procedure is being taught to the parent, others assist in the process. Child life specialists or play therapists can help the child relax by providing distractions with toys and other activities as the nurse provides instruction to the parent. In some instances, even more in-depth assistance could be required. For example, if a child had a bad experience with past catheterizations or if a history of sexual abuse exists, requesting the input of a child psychologist would be appropriate. Desensitization techniques and taking extra time where possible to begin the catheterization program may be helpful.

Although it is tempting to suggest the use of a topical local anesthetic, lidocaine (i.e., EMLA or LMX), as the cream penetrates only through the epidermis and dermis, it is unlikely to provide any significant effect. Ironically, if the local anesthetic had an effect, it might hinder the child's body becoming accustomed to the procedure. If the family is insistent on using a local anesthetic, it should be reserved for use during the first few catheterizations only. After several days, children do not find the catheterizations uncomfortable as the body adjusts to the catheter.

Everyone Needs to Give The Same Message

Not only is it imperative that healthcare providers be united in their messages to the family regarding the necessity of catheterizations, it is just as important that the parents impart this same information to their children. Borzyskowski and colleagues (2004) reported that parents who were influenced by their children's objections to the catheterizations or parents who experienced distaste of the procedure had the effect of preventing the catheterizations from being accomplished. This study further found there were difficulties with catheterizations proceeding as expected when parents felt they were not listened to, thought

Table 2.
Explanations of Each Step of the Procedure for the Child

I will tell you what I am doing for each step.
I am cleaning your bottom/penis with cold soap.
I am looking at your bottom so that we can see the pee opening well.
It helps if you open your mouth to breathe. It will relax your muscles.
You will feel my hands touch on your skin.
I am picking up the catheter.
It is important for you to breathe.
I will go slowly.
You tell me if something bothers you.
I am putting in the catheter. Keep your bottom on the table/bed.
The catheter is almost in.
The catheter is draining the pee.
You did a nice job. Keep holding still.
I am pushing on your belly to help the pee get out.
We are done. I am taking out the catheter.

they did not have enough information about the bladder problem, and thought teaching about catheterizations was inadequate. Nurses may intervene in such circumstances by recognizing the existence of such scenarios, allowing parents to express their feelings, and providing time for acceptance, as well as continued support and education about the benefits of intermittent catheterization. If after the teaching sessions have been completed, the nurse believes the family has not reached acceptance, it is recommended that nursing staff contact the ordering service to provide this information. The service responsible for the catheterizations can then undertake further assessment and any needed intervention.

Behavioral Management

When undertaking CIC teaching with families, the nurse may feel overwhelmed, particularly if he or she has had very little, if any, experience in the provision of this teaching. Not only is the nurse required to think through the rationale of each step of the procedure, but the nurse must also develop a plan for obtaining the child's and family's cooperation. Family members may be experiencing grief over the medical diagnosis, concern over the future health of their child, and worries about causing emotional and physical trauma to their child. In addition, parents may be experiencing guilt regarding the diagnosis and treatment required. To help ease the tension, developing a relationship with

the child and family is important. The nurse may begin by asking about the child's activities, likes, and dislikes. Providing and/or reinforcing the rationale for the procedure to family members can be helpful. Time should be given to allow family members to express concerns, feelings, and questions. Suggestions as to what to say to children are listed in Table 1.

When it is time to begin the actual instruction, little interaction with the child is needed (Dore-Stites, personal communication, November 14, 2015). Most of the interaction needs to occur with the parent. Interactions with the child may be limited to words of support and encouragement, and brief instructions of ways to cooperate. The nurse should include brief words of explanation to the child as to what is occurring. Words to use are suggested in Table 2. It is helpful for caregivers to keep their voices soothing and positive. Suggestions from behavioral management recommend not over-talking the procedure or about feelings to children during the teaching session (Dore-Stites, personal communication, November 14, 2015).

It is wise to include three healthcare workers in the room in addition to the parent(s). One nurse will provide verbal and hands on instruction to the parent. One nurse or child life specialist can be assigned to the child to provide distractions and verbal instruction on ways to cooperate. The third can assist the child physically to cooperate. Only essential personnel should be in the

Table 3.
Suggestions for Parental Interaction During Catheterizations

Examples of Words for Parents to Use	<ul style="list-style-type: none"> • It is time to catheterize. • Let's gather the supplies. • After we are done, you can add a sticker to your sticker chart. • Jump up on the bed and show me how you will hold your legs. • Let's turn on a video while we catheterize.
Examples of Rewards	<ul style="list-style-type: none"> • Special sticker chart for cooperation (preschool or young school aged child). As the child progresses through steps, it okay to use the same rewards for more advanced behaviors. • 15 extra minutes of computer time that day. • The child chooses video to watch with parent. • Verbal praise: "You are holding your body very still. That helps a lot;" or "I know you are working very hard to help." • Put a dime or a quarter in a special bank each time the child meets that session's goal for cooperation; when money reaches a certain goal, can buy a small treat at the store (school-aged child).

room because this will be less threatening for the child. Children have a way of postponing the inevitable; it is common for children to ask to wait just "one more minute" or to say, "I have one more question." This is fine for one or two delays. After that, the anticipation of the procedure becomes much more frightening than the actual procedure. It is appropriate for the nurse to say, "Okay, it is now time to begin," and follow through.

Healthcare personnel need to identify and build on family strengths and to assist in creating strengths where there are few or none (Dore-Stites, personal communication, November 14, 2015). So that families can benefit from additional help at home, nurses may ask who could be available to assist with at least the initial catheterizations. Maybe an aunt or grandparent could be available in the beginning. Perhaps even a neighbor who is especially close to the family could assist. It is important to "be an obstacle remover for families" (Dore-Stites, personal communication, November 14, 2015). There may be a family member or friend who is a nurse or a school nurse who can help. The most difficult time of CIC is the outset. It is important to create an environment for success for families. Most families are catheterizing successfully after the first week if given appropriate support, education, and encouragement.

Other suggestions for CIC success are as follows. Parents should refrain from threatening the child to avoid turning the procedure into a negative experience. Instead, parents can offer rewards for the child's cooperation. A successful catheterization is not necessary for a reward to be given. Behavioral or even small tangible rewards are rec-

Table 4.
Steps to Perform Clean Intermittent Catheterization (CIC) for Girls

1. Wash hands.
2. Gather supplies – Cleaning agent (see Table 9); water-soluble lubricant; non-sterile gloves, if desired; container to collect urine; catheter.
3. Create a clean field to open the supplies, such as a clean cloth towel or fresh paper towel.
4. Open the catheter package if new catheter or zip bag for re-used catheters.
5. Open the lubricant and squirt contents on the sterile catheter pack or on paper towel.
6. Position the child on the bed or table. For girls, the frog leg position is easiest. Position the supplies very close to the child.
7. Put on non-sterile gloves, if desired.
8. Position the "distractor" and "holder" in their respective positions.
9. Allow short time for the child to get comfortable and for the "distractor" to begin a game/start reading a book.
10. Identify the urinary meatus by separating the labia well. One of the biggest mistakes made in urinary catheterizations is not being able to visualize the anatomy appropriately. Attempting to insert a catheter blindly into the vicinity of the meatus is not only uncomfortable for the child, but it will probably result in a failed catheterization. Separate the labia gently, but widely, with the non-dominant hand. A very successful maneuver is to pull slightly downward on the labia to allow adequate visualization.
11. Clean the urinary meatus from top to bottom with each of three swabs or wipes. This practice is not evidence-based; thus, it may be appropriate to clean with one baby wipe. If a baby wipe is used, it is probably best to choose one that does not contain alcohol or many chemicals.
12. Pick up the catheter with the dominant hand (while continuing to separate the labia) and apply the lubricant liberally to about an inch of the catheter. It is okay to apply the lubricant over the eyelets of the catheter. Place the funnel end of the catheter into the urine collection container. Visualize the anatomy. Identify the urethra and vagina. The urethra may appear as a dark slit or may gape open a bit. It is helpful to tug gently downward on the labia for better visualization.
13. Angle the catheter downward, slightly toward the bed, and insert into the urethra gently. Allow the catheter to "guide itself." Do not force. Continue to insert the catheter until urine flows, then about a quarter of an inch further. Allow the urine to drain. You may press over the suprapubic area with the flat part of your fingers to assure that all urine is expelled.
14. When the urine ceases to flow, pull back slightly on the catheter and allow time for more urine to drain.
15. Remove the catheter in a gentle continuous motion.
16. Measure the volume of urine and record.

ommended. Some examples are listed in Table 3. No matter how small the child's positive behavior, it is good to offer praise. For example, "You held your legs very still while Mom was cleaning your bottom – nice job;" or "Your body was quiet and you were reading a book with (the distractor) while your Mom and I put in the catheter." This author has often found that after the catheter has passed into the bladder and urine is draining, the child is totally unaware that the catheter is in place. It is common to hear the child ask, "Is the catheter out?" during this process. The nurse can comment, "Wow, that is amazing – you don't even feel the catheter right now. It is doing its job without bothering you."

Home vs. Clinic or Inpatient Teaching

There are advantages and disadvantages to each location of teaching. The child may feel more comfortable and in control in his or her own home. Thus, the child may feel more relaxed and be more cooperative. On the other hand, there may be fewer resources for the family in the home, for example, just one nurse to provide the teaching, support, distraction, and holding techniques. To counterbalance this, the family may ask other friends and family members to act as these support persons. When teaching occurs in the clinic area, many nurses and other healthcare workers are available. When the teaching occurs during an inpatient stay, this is true as well as having constant support for the family member/s learning the technique over several teaching sessions. There is likely no best way to accomplish the task, so individual circumstances should be considered when making this decision.

CIC Procedure

Although over time children or adolescents may be able to catheterize themselves while sitting on a toilet or commode, initially, it is better to allow the child to lie on a bed or table during the procedure. It is extremely difficult for a frightened child to hold a posture that allows catheterization while sitting on the toilet. Before placing the child on the table or bed, the nurse should review the instructions for catheterization with the parent. Having the steps written down ahead of time is also helpful (see Tables 4 and 5). If the parent has not observed the catheterization being done previously, the nurse may demon-

Table 5.
Steps to Perform Clean Intermittent Catheterization (CIC) for Boys

1. Wash hands.
2. Gather supplies – Cleaning agent (see Table 9); water-soluble lubricant; non-sterile gloves, if desired; container to collect urine; catheter.
3. Create a clean field to open the supplies, such as a clean cloth towel or fresh paper towel.
4. Open the catheter package if new catheter or zip bag for re-used catheters.
5. Open the lubricant and squirt contents on the sterile catheter pack or on paper towel.
6. Position the child on the bed or table. For boys, holding the legs straight and slightly separated but relaxed works well. Position the supplies very close to the child.
7. Put on non-sterile gloves, if desired.
8. Position the "distractor" and "holder" in their respective positions.
9. Allow short time for the child to get comfortable and for the "distractor" to begin a game/start reading a book.
10. If uncircumcised, slightly retract the foreskin gently with non-dominant hand (do not force). Retract just enough to visualize the meatus. For circumcised boys, the meatus will already be visible.
11. Clean the urinary meatus in a circular fashion starting from the meatus and moving outward with three separate swabs or wipes. Cleansing beyond the glans is unnecessary.
12. Hold the penis perpendicular to the body with non-dominant hand. Pick up the catheter with dominant hand and apply lubricant liberally for about two inches of the catheter. It is okay to apply lubricant over the eyelets of the catheter. Place the funnel end of the catheter into the collection container.
13. Insert the catheter gently into the urethra while holding the penis with the non-dominant hand. Continue to insert until urine flows or until the catheter meets resistance. It is common for the external urinary sphincter to create a sensation of a blockage to the urinary bladder. In some boys, the sphincter may be tight, and a special maneuver to insert the catheter fully into the bladder may be needed. When resistance is felt, continue to place firm, steady pressure on the catheter, but do not force the catheter. Do **not** let up on the gentle pressure. Keeping pressure on the sphincter muscle will allow the muscle to become fatigued, and a sudden "release" will be felt as the catheter enters the bladder. This maneuver is important because urine may flow into the catheter without the catheter tip being inside the bladder. Irritation of the sphincter by the catheter may allow some urine to drain, but likely, most of the urine remains inside the bladder. Thinking the catheter is within the bladder lumen when it is distal to the sphincter is the most common error when catheterizing boys. If the catheter is hitting a "wall," it is not inside the bladder. When the catheter enters the bladder, it will have open space to curl around inside. It may take up to a minute or more of firm but steady pressure to allow the catheter to enter the bladder. There may also be a bit of bloody mucous at the tip of the catheter due to mucous membrane irritation by the catheter; this is not concerning.
14. When the urine ceases to flow, pull back slightly on the catheter and allow time for more urine to drain.
15. Remove the catheter in a gentle continuous motion. If the foreskin was retracted, replace it forward over the glans.
16. Measure the volume of urine and record.

Table 6.
Choosing a Catheter Size

Premature Infant/Newborn	5 to 6 French, 8 French if large newborn
6 months to 3 years	8 French
4 to 10 years	10 to 12 French
11 to 14 years	12 to 14 French
15 to 18 years	14 to 16 French

strate the procedure in its entirety the first time. If the parent has previously witnessed the procedure, the nurse can talk the parent through the catheterization.

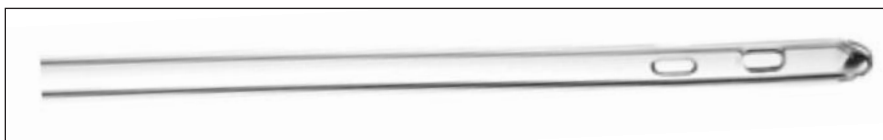
Instructions for the Child

During the process of catheterization, a brief explanation of each step is adequate. For example, "It is important for you to lie still to help Mom." "The soap will feel cold now, but it is important to hold very still." "We are just looking right now because we want to make sure that Mom can see where the opening is located." "Keep your bottom down on the bed." "The catheter may feel funny going in. Some kids tell me it feels like pushing and others say it feels uncomfortable. If you relax your muscles, it will go in easier." It is wise to emphasize positive wording, while not denying that the procedure might cause some discomfort. This is particularly true if there is some irritation or erythema on the female perineum or male meatus or glans. Attaining and maintaining the child's trust is important, so honesty is essential. Some children will ask to see the perineum. Holding a mirror to allow visualization for the child can be helpful, particularly for the school-aged population. This author has found, however, that teaching CIC with the use of a mirror is confusing because all movements are backwards when reflected.

Distraction and Holding Techniques

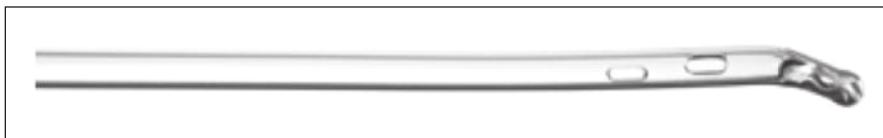
Although distraction can assist the process of CIC tremendously, it is likely that other techniques will be necessary to assist the child's ability to hold still to allow successful catheterization. The "holder" may assist by supporting the legs in a spread position with girls or by gently holding the legs down on the bed with boys. Sometimes children will bring their upper body to a sitting position on the bed due to apprehension. The child may be instructed to lie down with a gentle push on the shoulder. The "distractor" can also assist this process. Instructions should be spoken with a calm and gentle voice, and with minimal words. For the toddler or infant, a blanket may be wrapped around the child's upper body and underneath each arm in mummy fashion, holding the arms down to their sides. This will prevent grabbing the catheter and will promote the supine position. It is emphasized that these techniques are used to protect the child, promote time-

Figure 1.
Straight-Tipped Catheter



Source: C.R. Bard. Used with permission.

Figure 2.
Coudé-Tipped Catheter



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ly catheterization without prolonging the procedure for the child unnecessarily, and assist in the developmental needs of each child. It is helpful to reinforce these reasons for holding still to the child verbally as well.

Choice of Catheter

The ordering service will likely provide a list of supplies to be used. If not, the nurse should request clarification. It is best to use a catheter that has a large enough internal diameter to allow quick passage of urine. Quickly emptying the bladder will promote compliance with the procedure. Additionally, if the chosen catheter is too small, the eyelets on the catheter will not allow mucous and urinary sediment that is normally present in the urine to pass. This may cause the bladder to empty incompletely, thus compromising the success of the procedure. In boys, too small of a catheter may bend and curl in the posterior urethra and not enter the bladder. Too large of a catheter may cause the child discomfort and irritate tissues unnecessarily. In general, nurses tend to err on the side of choosing too small a catheter. See Table 6 for a general guideline for catheter size choice.

Intermittent catheters are made of a variety of substances, including polyvinyl chloride, polyurethane, and silicone. It is recommended that latex catheters not be used in children due to the likelihood of developing an allergy over time. Intermittent catheters have either a straight or a curved (Coudé) tip (see Figures 1 and 2). In general, straight-tipped catheters are used for girls and boys. If there is difficulty with passing the catheter in boys through the external

sphincter, the olive-tip Coudé catheter is a good choice. It allows easier insertion through the curved male posterior urethra and allows a larger surface area of the catheter to push through the sphincter muscle. There may be less common instances when a Coudé-tipped catheter is a good choice for a girl. See pictures of each type of catheter in Figures 1 and 2.

Other types of catheters may be used long-term. These are best suited for families who have more experience with catheterizations and not during initial teaching. These include the compact catheter, the closed system, and the hydrophilic catheter (see Figures 3, 4, and 5).

Clean vs. Aseptic Technique

Most families that perform CIC do so using clean technique. Even though catheter manufacturers do not recommend re-use of catheters, they may be used once or cleaned between multiple uses. In 2008, the Centers for Medicare and Medicaid Services (CMS) increased catheter coverage up to 200 per month. Some private insurers, however, will cover only four catheters per month. Many families do not have the resources to purchase a new catheter for each use. In the past, catheters were sterilized in a microwave oven between uses (Silbar, Cicmanec, Burke, & Bracken, 1989). Due to the development of latex allergies, these catheters are no longer recommended in the pediatric age group. When the newer polyvinyl chloride and silicone catheters were microwaved, they melted (Mervine & Temple, 1997) or did not become sterile (Bogaert et al., 2004). Most children currently use non-latex catheters; therefore, it is prudent to rec-

Figure 3.
Touchless System



Source: © C.R. Bard. Used with permission.

Figure 4.
Hydrophilic Catheter



Source: C.R. Bard. Used with permission.

ommend other cleaning techniques as listed in Table 7. Although more research could be beneficial about cleaning catheters between uses, this is the best evidence to date. There is no convincing evidence that the incidence of urinary tract infections has been affected by using aseptic or clean technique, single (sterile) or multiple use (clean) catheters, or by any other strategy (Prieto, Murphy, Moore, & Fader 2014). See Table 8 for types of catheterization techniques.

When catheterizations are performed by healthcare personnel in the hospital or office setting, sterile (aseptic) technique is used because of the high risk of nosocomial infections. The information in this article pertains to family members performing CIC, either in their homes, community, or hospital setting.

Outcomes of Successful Catheterizations

Nurses providing CIC training may only see the child's and family's initial reactions to the task. Parents' initial reactions of shock and grief will transform into a sense of the accomplishment of helping their child retain renal function and to carry out their lives. Children's initial reactions of fear and anger will transform into a sense of acceptance and mastery over a task that will maintain their health for years to come. Thousands of children and families worldwide have accomplished CIC to prevent renal damage and failure, and to promote continence as well as healthy social interaction. Nurses who provide this teaching and support are assisting families to adapt to care that is integral to their management and health. ■

Table 7.
Methods to Clean Non-Latex Catheters Between Use

Cleaning Solution	Instructions
70% isopropyl alcohol (rubbing ETOH)	<ul style="list-style-type: none"> Rinse with tap water for 30 seconds. Soak in container of alcohol for 5 minutes. Store in freezer bag. Do not rinse catheter. Just prior to using catheter, rinse with tap water.
Household bleach in 1:4 solution with tap water (1 part bleach, 4 parts tap water)	<ul style="list-style-type: none"> Rinse with tap water for 30 seconds. Soak in container of solution for 30 minutes. Store in freezer bag. Do not rinse catheter. Just prior to using catheter, rinse with tap water.
Betadine solution in 1:2 solution with tap water (1 part betadine, 2 parts tap water)	<ul style="list-style-type: none"> Rinse with tap water for 30 seconds. Soak in solution for 30 minutes. Store in freezer bag. Do not rinse catheter. Just prior to using, rinse with tap water.

Sources: Adapted from Bogaert et al., 2004; Kurtz, Van Zandt, & Burns, 1995.

Table 8.
Types of Catheterization Techniques

Method	Technique
Clean, re-use (number of times to re-use not agreed upon – one week, one month, or when catheter shows signs of deterioration)	Sterile disposable catheter use with handwashing with or without non-sterile gloves. After use, catheter is cleaned by one of the methods in Table 7.
Clean, single use	Sterile disposable catheter use with or without non-sterile gloves. Catheter disposed after single use.
Aseptic/sterile	Sterile disposable catheter, sterile gloves, disinfectant swabsticks or wipes.

Table 9.
Suggested Skin Cleansing Agents

<ol style="list-style-type: none"> Betadine swabsticks Benzalkonium chloride swabsticks Castile soap swabs or towelettes Antiseptic soap in pump dispenser Baby wipes without a lot of chemicals or alcohol
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Note: These are commonly recommended perineal cleansing agents. To date, there have been no randomized controlled trials comparing these agents.

Instructions for Continuing Nursing Education Contact Hours

Practical Considerations and Current Best Practice for Pediatric Clean Intermittent Catheterization

Deadline for Submission: December 31, 2019

PED 1706

To Obtain CNE Contact Hours

1. To obtain CNE contact hours, you must read the article and complete the evaluation through the **Pediatric Nursing website** at www.pediatricnursing.net/ce
2. Evaluations must be completed **online** by December 31, 2019. Upon completion of the evaluation, your CNE certificate for 1.1 contact hour(s) will be mailed to you.

Learning Outcome

After completing this activity, the learner will be able to provide teaching and support to families regarding CIC and assist them to adapt to care that is integral to the health of the patient.

Learning Engagement Activity

Download and review:

Review Table 1 and ask yourself the following question: "Do you use the strategies identified in this table when teaching CIC?"

Review Table 2 and ask yourself the following question: "Is there any phrase in the suggested script that you can add to your own approach when explaining the CIC procedure to the patient?"

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This article was reviewed and formatted for contact hour credit by Rosemarie Marmion, MSN, RN-BC, NE-BC, Anthony J. Jannetti, Inc. Education Director.

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