



UCSF Benioff Children's Hospitals
Oakland | San Francisco



A GUIDE TO TREATING YOUR CHILD'S
Constipation, Wetting, and Urinary Tract Infection

UCSF BENIOFF CHILDREN'S HOSPITALS UROLOGY DEPARTMENT

This booklet contains information that will help you understand more about your child's bladder problem(s), and provide tips you can use at home before your first visit to the urology clinic.

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Dear Parent(s),

Your child has been referred to the Pediatric Urology Parent Program at UCSF Benioff Children's Hospitals. We specialize in the treatment of children with bowel and bladder dysfunction. This booklet contains information that will help you understand more about your child's bladder problem(s), and tips you can use at home before your first visit to the urology clinic.

Almost all kids with bladder problems will benefit from treatment of stool retention (aka constipation) even if they are already stooling every day. Your pediatrician will get your child started on a bowel program before coming to urology clinic.

Based upon your child's symptoms please review the following numbered sections in addition to reading "Bedwetting and Accidents Aren't Your Fault."

- 1. Stool Retention and Urologic Problems**
(Bowel Dysfunction)
- 2. Bladder Dysfunction**
Includes daytime incontinence (wetting), urinary frequency and infrequency, dysuria (painful urination), and overactive bladder
- 3. Urinary Tract Infection and Vesicoureteral Reflux**
- 4. Nocturnal Enuresis**
(Nighttime Bedwetting)
- 5. Urologic Tests**

THIS BOOKLET ALSO CONTAINS:

- » Resources for parents (page 16)
- » References (page 17)
- » Instruction check off for pediatrician (page 18)
 - Suggested tips to practice before your urology clinic visit (given to you by your pediatric primary care provider)



Introduction

It is distressing to a family when a child is continuously wet. However, the problem is common and children generally outgrow it.

In most cases childhood incontinence is associated with other conditions which may include one or more of the following: wetting during the day; urinary frequency/urgency; wetting during sleep (nocturnal enuresis); constipation and/or encopresis (stool incontinence); and urinary tract infections. All of these conditions have different patterns and causes and may require different treatment plans.

While there are some children who are wet due to the structure of their urinary tract, most of those afflicted are wet because they have acquired an abnormal pattern of urination. The purpose of this booklet is to give children and their families a better understanding of normal and abnormal urination, how to determine the cause of abnormal urination, and to show how normal urination can be resumed.

1. Stool Retention and Urologic Problems

Normal Bowel Function

Stool is formed as a result of digestion of food eaten. The digestive process begins when anything is taken into the mouth. Saliva starts to breakdown the food in the mouth. As it passes down the esophagus and into the stomach, further breakdown occurs. It then passes into the small intestines in a semi-liquid form. The body begins to absorb nutrients through the small intestine wall, leaving behind waste products. This liquid is moved through the small intestine by peristalsis.

Peristalsis is a reflex caused by a distention of the intestine from the liquid food, followed by a constriction in the same area of distention. This propels the food forward. As peristalsis moves the liquid toward the large intestine all of the nutrients are absorbed. The liquid entering the large intestine is liquid waste.

The large intestine or colon is in the shape of an upside down "U." The motility slows down allowing for water to be reabsorbed and soft stool to be formed. The colon deposits the stool into the rectum. The rectum can be considered a "holding area" very similar to the bladder's role for urine. It is empty and fills with stool prior to having a bowel movement.

The internal anal sphincter is at the end of the rectum. It is an involuntarily controlled muscle that automatically opens when the rectum is full of stool. This allows the stool to move into the anal canal. This passage also activates a signal that goes to the spinal cord and up to the brain alerting the individual that a bowel movement is imminent.

The external anal sphincter is a voluntarily controlled muscle at the other end of the anal canal. When the brain receives the impending bowel movement signal, a message is sent to the external anal sphincter to contract. It remains closed until the individual signals it is safe to relax. The stool passes out of the body to the toilet.

Most people find they have a routine time for a bowel movement. Regularity can be affected by: foods, medication, activity, a change in routine (vacations) or location of the bathroom. Knowing the pattern can prevent any changes in regularity.

What is Constipation?

Constipation can present in many different ways including:

- » Infrequent bowel movements.
- » Hard and/or small stool.
- » Abnormally large stool.
- » Difficult or painful defecation.
- » Stool accidents, skid marks or smearing of stool in the underwear (encopresis).
- » Taking a long time to pass a bowel movement.



- » Clogs toilet.
- » Stools more than 2x/day

What causes constipation in children?

The most common cause of constipation is "withholding." Children will withhold stool for many reasons including, but not limited to:

- » A response to social issues such as toilet training.
- » Dirty or "public" bathrooms.
- » Restrooms that are not private.
- » Unavailability of a restroom.
- » Because they are too busy playing.
- » Due to a past painful defecation.
- » Changes in routine or diet.

When the child withholds his stool, the rectum expands to accommodate the increasing amount of stool. As the stool remains in the rectum/bowel, the stool bolus will not only increase in size, but it will also become hard. Stool becomes hard because the body reabsorbs water from the stool as long as stool remains in the bowel. The longer the stool remains in the bowel, the more water will be absorbed by the body and the harder the stool will get. As the rectum continues to expand, the child's normal urge to defecate gradually vanishes. As the cycle is repeated, greater amounts of stool are built up in the rectum and bowel. As a result of this chronic retention, the ability of the bowel to move stool contents is diminished (decreased motility). Subsequently, rectal elasticity and sensation further decrease. In other words, children who have chronic constipation lose the ability to sense when the

1. Stool Retention and Urologic Problems

rectum is full and over time lose the ability to evacuate the bowel completely. When the child finally does pass stool, the defecation may be painful due to the large/hard stool. The painful defecation may subsequently cause the child to further withhold stool due to fear of another painful defecation.

As the cycle progresses, some children will begin to have stool accidents (otherwise known as soiling or encopresis). Stool incontinence occurs:

- » As result of looser stool leaking or overflowing from a rectum that has been distended by retained stool.
- » When soft or liquid stool leaks around a rectal impaction.
- » When the child tries to expel gas. When liquid stool “leaks” around a stool impaction, the child will “think” he/she is about to pass gas, when, in fact, they pass liquid stool. This will sometimes present as “smearing” of stool in the underpants.
- » The muscles used to withhold become fatigued.

Interestingly, boys will suffer from stool soiling 3 to 6 times more often than girls. This may be because of the standing versus sitting voiding position used by boys during urination. When urinating, the pelvic floor muscles relax, which may cause stool in the rectum to be expelled. Since boys stand to urinate, when the pelvic muscles relax with voiding, they may soil their underwear unknowingly. Girls sit with voiding, so if stool is expelled when they urinate, girls will not soil.

Constipation Differences Between Children and Adults

	CHILDREN	ADULTS
TRANSIT TIME Time between eating food and producing a stool	16 hours	30-48 hours after puberty
BEHAVIOR	Withholding	Straining
INCONTINENCE	Common	Rare
SEDENTARY LIFE	Rare	Common
FIBER DIET	Rarely helpful	Helpful

It is important to note that no organic etiology is found in 90 to 95 percent of children with constipation/stool retention.

In addition, what causes constipation in adults does not necessarily cause constipation in children. The table above describes some of the differences between constipation in children and constipation in adults.

Why is my urology specialist concerned about stool retention?

Stool retention can be the primary cause of urinary tract infections and childhood urinary incontinence. In addition, some medications used in urology for the treatment of incontinence can also cause constipation/stool retention.

Studies have shown the following relationships between constipation and urologic conditions:

- » Children with recurrent urinary tract infections often have associated constipation. When these children have their constipation treated they get less urinary tract infections.
- » Children with diagnosed “hyper bladders” can actually have resolution of the uninhibited bladder contractions after treatment of constipation.
- » Vesicoureteral reflux (page 11) is more likely to resolve if constipation is treated.
- » Constipated children have a significant increase in post void residual (urine left in the bladder after urinating) and upper renal tract dilation (dilation of the kidneys) than children who are not constipated. Both findings, post void residual and kidney dilation can influence urinary tract infections.
- » Some types of childhood urinary incontinence (both day and night) can be cured by treating the constipation.

How do I know if my child has stool retention?

It is very difficult to assess stool retention in children. Most parents do not know their children’s bowel habits, and the children themselves are rarely able to give a good bowel history. Parents are usually do not know if their children are constipated.

Based on the history and physical exam, your urology practitioner may simply just assume your child has stool retention (based on symptoms and physical exam) and treat your child for constipation. The urology practitioner may want to obtain an x-ray to assess exactly how much stool retention is present and then tailor treatment. Since an x-ray exposes the child to radiation it is recommended to try to treat the child without the x-ray.

How do I treat my child’s constipation and/or stool accidents?

Normal bowel movements:

- » Occur 1 to 2 times every day.
- » Are soft.
- » Are passed without pain or straining.
- » Occur at socially appropriate times to prevent soiling or accidents.

1. Stool Retention and Urologic Problems

Our recommended treatment will be in two phases:

1. Clean Out Phase

The goal of the "Clean Out" is to literally clean out the entire bowel of stool. How long this takes will depend on the amount of retained stool. This phase always requires medication.

2. Maintenance Phase

The goal of the "Maintenance Phase" is to maintain the empty bowel by having 1 to 2 continent, soft stools per day. This phase will most often involve medication initially.

Note: Treatment may take several months. Successful treatment is dependent upon having patience and not stopping the therapy too early.

What types of medications are used?

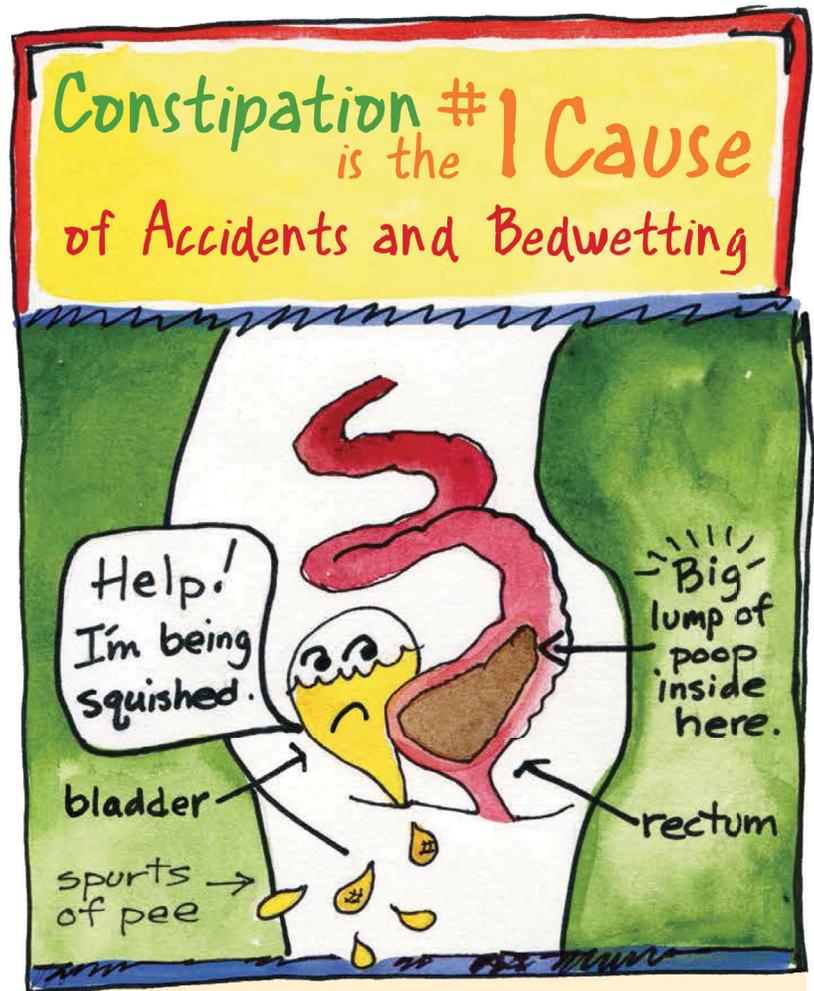
There are many different types of medicines used in the treatment of constipation. All have their own risks and benefits.

- » Stool softeners—Docusate (Colace®)
- » Stimulants (senna, ex-lax®)
- » Osmotic Laxatives (Miralax®), magnesium supplements (magnesium citrate, milk of magnesia), Lactulose (Enulose)
- » Enemas (Fleet®, Pedia-Lax®) which go directly into the rectum

To treat stool retention, we primarily use osmotic laxatives and enemas. Osmotic laxatives and enemas are safe and effective and are the least likely to be absorbed into the body (with the exception of the magnesium supplements which we only use for the clean out phase). Stool softeners, such as Colace, are best used to treat constipation in patients who need to avoid straining (for example after surgery). The primary side effects of all stool medications include: soiling; gas; nausea; vomiting; abdominal pain; and diarrhea. Most children tolerate these medications quite well with few side effects.

What Else Can I Do to Help My Child?

- » Avoid blame, criticism, or punishment for bowel accidents.
- » Always reward your child for following the recommendations (not for success).
- » Encourage your child's teacher to participate in this process, allowing them to have ready access to the bathroom at school.



How Accidents Happen

Child holds poop.
 ↓
 Poop piles up and stretches the rectum.
 ↓
 Stretched rectum squishes and irritates bladder.
 ↓
 Bladder leaks pee.

How to Stop Accidents

Clean out rectum with enemas or laxatives.
 ↓
 Rectum shrinks back to size.
 ↓
 Bladder returns to normal.
 ↓
 Child continues with laxatives and high-fiber diet to keep poop soft.

1. Stool Retention and Urologic Problems

Initial Clean Out Phase

The clean out process is typically performed over several weekends when your child is not in school. The success of this treatment is dependent on a successful initial clean out. The clean out phase can only be done successfully with medication. The following medications may be used:

- » **Miralax (Polyethylene glycol 3350)**
Miralax is an osmotic laxative. It moves the stool through the bowel using an electrolyte solution to cause osmotic pressure. Miralax is our first choice for the clean out phase. Children like the taste, it is very effective, and has the least amount of side effects of all the “clean out” medications (side effects may include nausea, cramping, soiling, and bloating). Miralax can be expensive and it may be difficult to predict when the medicine will become effective.
- » **Magnesium supplements (Magnesium Citrate, Milk of Magnesia)**
Magnesium supplement is another osmotic laxative. While it is effective, easy to obtain (over the counter), and inexpensive, it may cause cramping.

Maintenance Phase

After the bowel has been cleaned out it is important to keep the bowel cleaned out. We do this in the maintenance phase. This phase may last as long as 6 months because it may take this long for the intestine and rectum to shrink back down to its normal size so that stool does not accumulate once again. This process allows for maintenance of regular bowel movements and keeping the bowel empty. There are 3 parts to the maintenance phase: medication; diet/fiber; and the daily sit.

1. MEDICATIONS

- » **Miralax (Polyethylene glycol 3350)**
Miralax can be used as a maintenance medication (in smaller doses) in addition to being used as a clean out medication. It helps to ensure that a child is having 1 to 2 soft stools per day. As the bowel regains its elasticity and form, the dose should be gradually decreased. Most children will require the Miralax for the first one to 3 months of the maintenance program.
- » **Enemas**
An enema is medicine that goes directly into your child's rectum where the stool comes out. While this does not sound easy or fun, many parents and kids actually prefer this method because it works faster and provides for a more predictable bowel movement.
- » **Lactulose**
Lactulose is a maintenance medication used for chronic constipation. The dose needs to be slowly titrated up; however, until the desired effect is reached (one to 2 soft stools per day). Starting on “too high” of a dose increases cramping and gas. This medication is prescription only.

2. DIET

- » **Water:** An important step in treating constipation is increasing the daily intake of water. Water softens the stool because water makes up the majority of stool. Not drinking enough water can harden the stool.
- » **Fiber:** Fiber gives stool a soft consistency. Although increasing fiber intake is generally recommended there is no direct evidence that increased “dietary” fiber intake is effective in childhood constipation.
Fiber by supplement:
There are many over the counter supplemental fiber products. For young children, the powder form might be the best choice as it can easily be mixed in liquid. For older children who can swallow pills the tablet or capsule form is probably the easiest. For children somewhere inbetween wafers would be the best choice. The fluid/fiber ratio is important! Not enough fluid with the fiber can make constipation worse. If using the wafers or tablets, have the child drink the liquid first and then the fiber (if they don't drink all the liquid give them less fiber). Of the powders, Benefiber dissolves best in water or juice, making it more palatable for small children.

3. DAILY SIT

If your child has encopresis (stool accidents) then the daily sit is a crucial element of the bowel maintenance program. The goal is to have the child have a bowel movement at a socially acceptable time, in a socially acceptable place. This is done by sitting on the toilet for 15 to 20 minutes after a meal. It is important to have the child sit after a meal because we all have a normal reflex (gastro-colic reflex) that stimulates the bowel to move. Sitting on the toilet after a meal takes advantage of this reflex. Depending on your child's individual situation and severity, have your child sit on the toilet after breakfast or dinner or both. Sometimes, due to the social structure of an individual family we will have the child eat an afternoon snack and sit on the toilet after the snack.

If your child does not stool within 20 minutes he/she may get up. If your child stools before the time limit is up, he/she may get up early.

2. Bladder Dysfunction

The Physiology of Normal Urination

Urination may seem like a straightforward event, but it is actually a complex phenomenon which, even today, is poorly understood. Urination involves the coordination of two completely separate systems: 1) the bladder composed of smooth muscle like the intestine, over which we have no direct control, and 2) the sphincter, composed of a type of muscle like the muscles in our arms and legs, over which we have control (Figure 1).

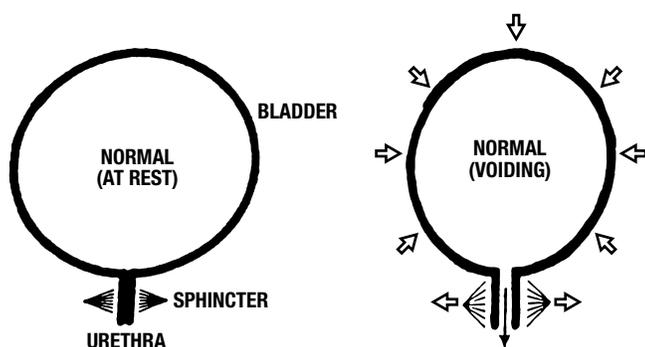
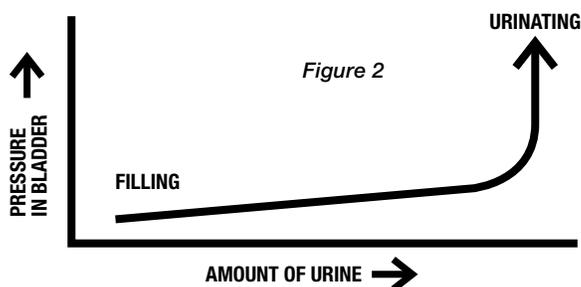


Figure 1

(Figure 1) The normal anatomy of the urinary tract showing the bladder connected to the urethra through which the urine passes to the outside. The sphincter surrounds the urethra and, by its contraction, can shut off the flow completely.

The bladder is remarkable in that it holds large amounts of urine (up to 15-20 ounces, 500-600 mls or about a pint in the normal adult) with very little rise in pressure. Ideally, the bladder muscle relaxes to increase in size while filling up with urine. Ultimately, a state of filling is reached, at which point the bladder muscle begins to contract and signal its desire to empty itself (Figure 2). It does not do so immediately, however, in part because the sphincter muscle is in a constant state of contraction that holds the urine in. The sphincter muscle is in this constant state of contraction except when the individual is ready to start urinating.



(Figure 2) The pressure-volume relationship seen in the normal bladder. As the bladder fills, the pressure rises very little until the stretch limit had been reached, at which time contraction of the bladder stimulates urination.

Normal Urination in Infants

The bladder of an infant empties by reflex. Once the bladder reaches a certain level of fullness, a contraction begins. While the brain is aware of this contraction, it does not interfere with this sustained contraction of the bladder. This results in good bladder emptying, which means the bladder empties until there is no more urine. This is called reflex voiding.

Normal Adult Urination

An infant's voiding pattern is very different from an adult. When an adult feels the beginning of a bladder contraction at an inconvenient time or place, a message is sent from their brain to the bladder that tells it to stop contracting. Once this message is received and the bladder stops contracting, this results in a loss of the urge to urinate.

Secondly, when at a socially convenient time is reached for emptying a full bladder, one sits at the toilet and makes a conscious effort to initiate voiding. The brain then sends a message to the bladder to begin contracting. An adult will also relax the muscles of the pelvic floor and smoothly empty the bladder to completion.

Abnormal Urination

The infrequent voider

Children may be distracted by events while they are playing and ignore the early signs of a full bladder, or they simply have not developed the ability to interpret the signs of a full bladder. Once the child's bladder has exceeded its capacity, a powerful bladder contraction will occur which may be especially hard to inhibit. In order to try to avoid this problem, children should be encouraged to completely empty their bladder 5 to 6 times a day, before they feel the urge to urinate.

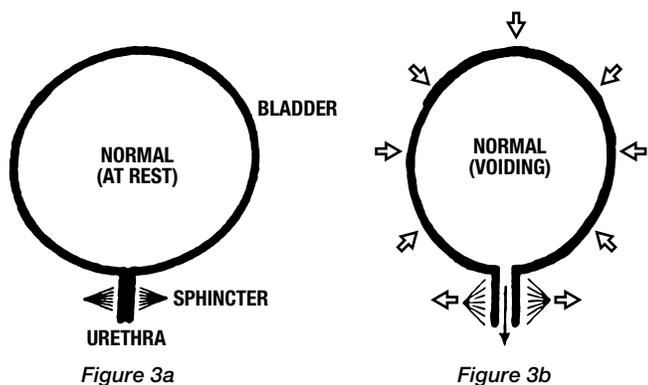
Difficulty in inhibiting a bladder contraction

When a child is unable to send a message to his brain to stop the bladder contraction, he relies on just the sphincter; this can result in damp pants. Signs of this include the child who fidgets, the girl who squats and sits on her heel, or the little boy who grabs his genitalia.

When this happens and the child is asked if he needs to go to the bathroom and says 'no' it is because he doesn't understand what is happening in his body at that time. Children attempt to use various means to overcome a bladder contraction. This is called voiding dysfunction. This tendency accounts for the difficulty many children experience relaxing their pelvic muscles to facilitate complete bladder emptying. In other words, they are contracting their pelvic floor muscles so often that when they finally do attempt to urinate they can not relax their pelvic floor muscles. When listening to these children urinate, you will notice that the flow is interrupted, rather than smooth and flowing. Because these children have problems relaxing the appropriate muscles during urination,

2. Bladder Dysfunction

they often fail to empty their bladder completely and are prone to infections. Also, the frequent contraction of the pelvic floor muscles can lead to constipation.



(Figure 3a) During normal urination, the bladder contracts and the sphincter relaxes to allow the free escape of urine from the bladder. (Figure 3b) Children suffering from voiding dysfunction tend to contract their sphincters as their bladders contract and urinary flow is interrupted.

Failure to empty the bladder

Failing to urinate to completion can be confirmed by listening to the child void. If the urinary stream does not have a gradual diminution in force at the end of urination but rather stops abruptly, then the child has unintentionally tightened up the sphincter and has not voided completely. To solve this, have the child remain on the toilet and encourage relaxation. Children who do not empty their bladder consistently are at risk for urinary tract infection and a constant need to urinate.

The hyperactive or uninhibited bladder

Some children who experience problems with continence and urinary frequency/urgency have what is considered a hyper or uninhibited bladder. The hyper bladder contracts after holding less urine than a normal bladder without sending a message to the brain, which can lead to urinating accidents. Some children will simply void much more frequently (every 30 to 60 minutes), but remain dry. Causes for this may be related to infection, emotional stress, or other conditions. More often, there is no specific cause. Your child may be prescribed medicine to help the bladder to relax. Most kids who suffer from urinary frequency/urgency/incontinence do not have a hyper bladder.

Vaginal voiding—females only

If you have a daughter who complains of painful urination (without infection), is constantly leaking, gets redness/itchiness/irritation in her private area (sometimes called “vaginitsis”) or leaks urine right after she urinates, she may be vaginal voiding. Vaginal voiding occurs when a female urinates with her legs too close together, causing urine to backwash up into her vagina; the urine leaks out later. The easiest solution is to teach your daughter to urinate with her legs apart.



2. Bladder Dysfunction

Treatment of Bladder Dysfunction

TIMED URINATION

The purpose of timed urination is to have the child empty his bladder before it fills to the point where a “hard-to-stop” bladder contraction is triggered. Therefore, the child should urinate prior to any “urge” to urinate and this will vary per child. The frequency of urination is influenced by the amount of fluid being taken in, as well as whether or not the bladder is completely emptied with each urination. As a general rule, a child should empty their bladder completely 5 to 6 times a day, or roughly every two to three hours.

INCREASE WATER INTAKE DURING THE DAY

Many children do not drink liquids at breakfast or at school which can make them very thirsty in the afternoon and evening. The body, specifically the kidneys and bladder, need water regularly throughout the day. Recommended fluid intake for children is measured by weight:

Age/Weight	Recommended fluid intake
» <2 years old/<10 kg	30 to 35 ounces/day
» 2 to 5 years old/<20 kg	40 to 50 ounces/day
» 6 to 12 years old/<50 kg	50 to 60 ounces/day
» Teens	60 to 70 ounces/day

URINATION WITH RELAXATION

Without good relaxation of the perineum, children are unable to empty their bladder completely. When teaching a child to relax while urinating, it may help to have them “sigh” during urination. Sighing is a normal relaxation trigger and makes it impossible for the child to strain at the same time. You can also have your child count or sing.

LEARNING TO EMPTY THE BLADDER COMPLETELY

If you notice an abrupt interruption of the urinary stream, then the child must be persuaded to re-initiate a second effort to urinate with relaxation (double voiding). By listening to the stream, you can determine whether the bladder is being completely emptied. Make sure the child understands that he or she controls the bladder.

WORK ON STOOL RETENTION/CONSTIPATION

This will require medication for many months (see stool retention/constipation page 5).

MEDICATIONS

Bladder Medications:

The most commonly prescribed pediatric bladder medications are anticholinergics (examples: Ditropan (Oxybutinin) and Detrol (Tolterodine)). The main side effects of these include dry mouth, constipation, and facial flushing. These side effects often resolve over time, and occur significantly less with the controlled-release form. It is important that good oral hygiene be maintained while on any of these medications. The decrease in saliva that may occur can increase cavities.

- » **Ditropan (Oxybutinin) and Ditropan XL**—Ditropan comes in regular or controlled-release form (Ditropan XL). It has an antispasmodic effect on the smooth muscle of the bladder. It increases the amount of urine that the bladder can hold, and helps lessen urinary urgency and frequency. Ditropan comes in pill and liquid form; Ditropan XL only comes in pill form. Ditropan XL must be swallowed whole—never chewed or crushed.
- » **Detrol (Tolterodine)**—Detrol also acts on the smooth muscle of the bladder, allowing it to relax and fill with more urine before the need to urinate approaches. It comes in regular form or controlled-release (Detrol LA). Detrol is available in pill form.

Note: There is another category of medications called “alpha-blockers” (example: Doxazosin) that have been used to treat voiding dysfunction. Ask your urology provider if this option is appropriate for your child.

POSITIVE REINFORCEMENT

Use positive reinforcement to motivate your child to work on his bladder training program. Many parents and pediatricians have tried a reward system with the goal of the child “being dry” as opposed to the goal of “following the bladder program.” Unfortunately, the child has not yet learned how to be dry, but the child does have control over following the bladder program. When the child independently follows his prescribed bladder program he could be rewarded with a sticker or a gold star on a calendar or any other reward system.

TIMED URINATION ALARMS

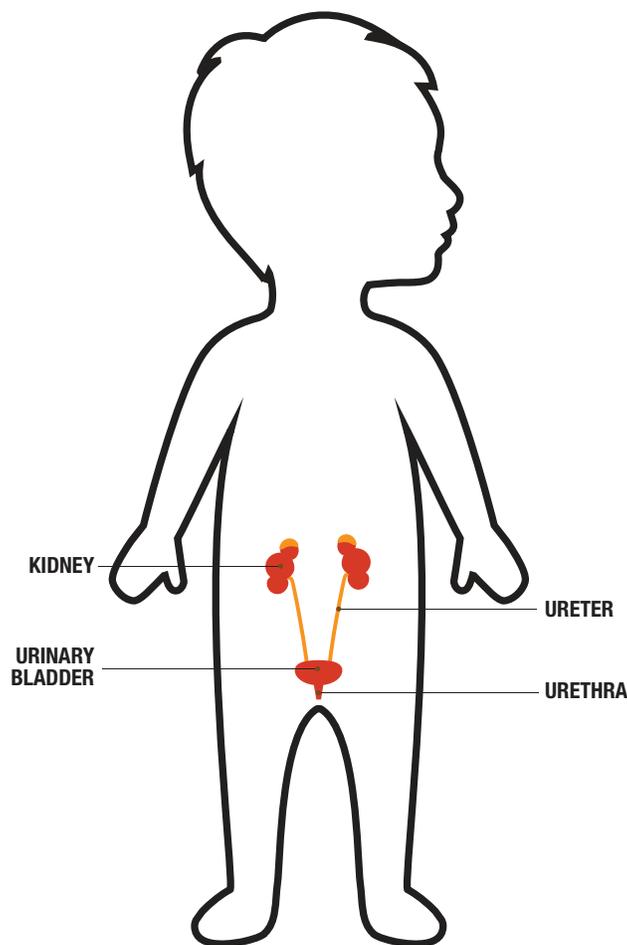
For children who will benefit from a timed urination schedule (e.g., they should attempt urination every two to three hours) we recommend purchasing a watch that will alarm as a reminder. For younger children, get a watch that will alarm without having to be reset.

It is important that you explain to any adult who may be supervising your child—teachers, coaches, or counselors—that your child must be excused from regular activities and possibly even reminded to use the toilet at the prescribed intervals.

3. Urinary Tract Infection & Vesicoureteral Reflux

What Is the Urinary Tract?

The kidneys filter blood to produce urine. Urine travels from the kidneys down the ureters and into the urinary bladder. The urine is stored in the bladder until urination occurs. The tube through which urine then passes out of the bladder during urination is called the urethra.



What Is a Urinary Tract Infection?

A urinary tract infection is an inflammation of the bladder or the bladder and the kidneys. It is usually caused by bacteria from the skin outside the urethra moving up the urethra and into the bladder. If the bacteria stay in the bladder the infection is called cystitis or “bladder infection.” If the bacteria find their way up to the kidneys, it is called pyelonephritis or “kidney infection.”

What are the signs and symptoms of urinary tract infection? The signs and symptoms of urinary tract infections in children depend on age.

For infants:

- » Fever
- » Irritability
- » Inconsolable
- » Vomiting and diarrhea
- » Poor feeding
- » Failure to gain weight

For older children:

- » Burning or pain with urination
- » Frequent or urgent urination
- » Fever
- » Lower abdominal pain
- » New wetting episodes or more frequent occurrences
- » Side or back pain
- » Blood in urine (visible or seen on urine test)

As the child reaches toddler age more classic symptoms appear, such as pain during urination, urinary frequency and urgency. It becomes easier to recognize urinary tract infections as the child becomes verbal and is toilet trained.

Regardless of age, bladder infection (cystitis) is not usually associated with fever and generally does not produce any long-term damage to the bladder or kidneys.

However, a kidney infection (pyelonephritis) is usually associated with a high fever and may produce permanent damage or scarring of the kidney even after only one infection, especially in a very young child.

3. Urinary Tract Infection & Vesicoureteral Reflux

How can you tell if your child has a urinary tract infection?

After collecting a urine specimen your provider or lab will look at your child's urine with a microscope (urinalysis). To be certain that there is an infection a urine culture will also be done. Results can take up to 48 hours and antibiotics will be prescribed.

The method of urine collection will affect the accuracy of the urine culture. It is important to:

- » Wash the skin around the urethra with the cleansing pad to get rid of the bacteria on the skin's surface. Then the child should void into the cup. It is best to let a few drops of urine go into the toilet and then let the middle of the urine stream go into the specimen cup.
- » If the urine is collected at home, please keep the urine sample cold by placing it in the refrigerator and packing it in ice while traveling to the doctor's office.

Because bacteria from the skin may contaminate these samples, it may sometimes be necessary to pass a small plastic tube through the urethra into the bladder (bladder catheterization) to obtain a clean specimen.

Why do children get urinary tract infections?

The most common cause of a urinary tract infection is constipation/stool retention (page 5). The next most common cause is abnormal urination/bladder dysfunction (page 7). Sometimes an individual carries a "host resistance" to infection, meaning some children are genetically more prone to infection than others.

When should my child be evaluated for urinary tract infections?

Children who have a culture-proven urinary tract infection may need radiologic studies such as an ultrasound of the kidneys and bladder (page 10). Depending on the symptoms and frequency of infections, a voiding cystourethrogram test (VCUG) (page 15) might be recommended to rule out vesicoureteral reflux. Waiting until a child has had multiple urinary tract infections before having him or her evaluated increases the risk that kidney damage or scarring may occur.

What if my child is diagnosed with vesicoureteral reflux?

Vesicoureteral reflux can run in families or it can be caused by abnormal urination and constipation. Many children will outgrow it. Less often, a child may require a surgical procedure to correct the reflux. Surgery will not prevent a bladder infection but it will prevent the bladder infection from spreading to the kidney. Children with bowel and bladder dysfunction are less likely to outgrow reflux and more likely to continue to get infections even while on a daily preventative antibiotic. Children who are treated for constipation are more likely to outgrow their reflux, and less likely to require surgery for reflux.

How can I help prevent urinary tract infections in my child?

Treating constipation/stool retention and bladder dysfunction is a highly effective way of preventing urinary tract infections (pages 4 and 9).

Treating of Urinary Tract Infection

- » All children with a urinary tract infection are treated with a safe and well-tolerated antibiotic. A child who is very ill with a kidney infection may require hospitalization for intravenous antibiotics until the fever goes down and the urine culture results are known. Another urine culture may be done while your child is taking the antibiotic or when the medication is finished to make sure the infection is gone.
- » Some children who have repeat urinary tract infections may require a daily low-dose medication for a period of time.
- » Stretching the urethra (urethral dilation) is not a technique used by our urology care team. It was once assumed that many girls who got urinary tract infections had narrow or tight urethras. We now know that the size of the urethra is no different between those girls who have infections and those who do not.
- » Treatment for children with vesicoureteral reflux will vary according to the child's age, number of urinary tract infections, and the findings on the above described tests.

4. Nocturnal Enuresis (Nighttime Bedwetting)



What Is Nocturnal Enuresis?

Persistent nocturnal enuresis (nighttime bedwetting) is the most common issue of bladder control in childhood. Nighttime enuresis is the involuntary loss of urine during sleep for a child that is 5 years old or older. It does tend to run in families, but this is not always the case. If one or both parents have had trouble with bedwetting, their children have an increased chance of having similar problems.

Fifteen percent of 5 year olds and 10 percent of 6 year olds experience bedwetting. As children get older there is a reduction in the number of children who are wet at a rate of about 15 percent per year.

Cause

The most common causes include constipation (page 3), bladder dysfunction (page 7), or a genetic predisposition. Psychological problems were once thought to be the cause of enuresis, but this is no longer believed to be the case.

There are several theories:

1. Most feel that the difficulty lies with a developmental delay in the bladder's micturition (urination) cycle. These children simply need more time for their nighttime control to fully develop. Just as some children walk and talk before others their same age, bladder control also varies per child.

2. It was once believed that an inadequate production of an anti-diuretic hormone (ADH) was responsible for concentrating urine when dehydrated. Secretion of this hormone is normally high at night. However, this is no longer believed to be true. Some children respond to this hormone in medication form (called "desmopressin" or DDAVP) which decreases urine output at night.
3. Children with enuresis do not have abnormal sleep patterns. However, children often wet the bed during deep sleep, which causes parents to think their child is a deep sleeper.

A physical cause for enuresis is unusual in those children who:

- » Wet only during sleep.
- » Have never had a urinary tract infection.
- » Do not wet during the day.

A physical cause for enuresis might be present in children who:

- » Wet day and night.
- » Have urinary tract infections.
- » Have trouble with bowel control or stool retention.

Many children who are referred for bedwetting also have daytime urologic symptoms (i.e., urinary urgency, frequency, accidents). The management of this group of children varies in some ways from those who are wet only at night.

4. Nocturnal Enuresis (Nighttime Bedwetting)

Evaluation

All children who desire treatment for bedwetting benefit from treatment of stool retention first. An x-ray of your child's abdomen may be recommended to determine if this is the case. If a child with nighttime wetting presents with a normal history and physical examination, further testing beyond an x-ray is not typically necessary.

Management

Since bedwetting is very common until the child reaches 7 years old, it is difficult to justify treatment in this age group unless the cause is bowel bladder dysfunction. At any age, decisions regarding treatment should take into account the extent the problem affects the child and the child's level of motivation. Quite often, the child has no physical abnormality and does not need long-term and expensive therapy.

Treatment will always consist of first treating constipation (page 4) and bladder dysfunction (page 7). Once these are treated and the bedwetting persists, then we advance to prescribing medication, conditioning, or a combination of approaches.

Conditioning

Using a bedwetting alarm is a form of conditioning that is designed to awaken the child when he/she begins to wet. An alarm is worn on the shoulder or the wrist and activated by a small moisture sensor that is attached directly onto the child's underwear. There are a few types of alarms on the market: one type makes an audible alarm, another makes a vibrating sensation, and one can do both. The traditional alarm emits a sound when it senses that your child has urinated. We highly recommend an alarm that makes a sound as you will need to hear the alarm in order to help your child wake up.

Bedwetting alarms are fairly inexpensive (around \$45). They can be labor-intensive and require patience. The major causes of failure is poor compliance from the child and the parents, incorrect use of the alarm, and not treating bowel bladder dysfunction prior to using the alarm. This tactic can only be successful if parents assume the responsibility of supervising this conditional therapy; it is critical that parents help the child wake completely to the alarm. When there is 100 percent compliance, at least 95 percent of children will attain continence at night in about 6 to 8 weeks.

Repetitively arousing the child at the time of the wetting can ultimately condition the child to recognize that urination is about to occur, and teaches the child to prevent the reflex to urinate.

Methods often tried by parents before they seek medical attention, such as limiting fluids before bedtime, awakening the child at night at random, and reward-punishment strategies are generally ineffective. Children with simple enuresis will outgrow this pattern eventually.

Drug therapy

There is no medication that cures enuresis. Medications used in the treatment of enuresis address only the symptoms. When the drug is stopped, the enuresis will usually return unless the child has naturally outgrown the enuresis. The most commonly used drug is called DDAVP (desmopressin acetate).

DDAVP (desmopressin acetate): This drug mimics the natural hormone that tells the kidneys to conserve body water and concentrate the urine.

DDAVP:

- » Promotes water re-absorption resulting in increased urine concentration and decreased urine output during sleep.
- » Is generally recommended for children over 6 years old.
- » Is available in small pills that can be chewed.
- » Can be used on an intermittent basis for overnight trips and camp outings if the child responds to it.
- » Has shown significant improvement for 25 to 65 percent of children.
- » Has minimal side effects.
- » Has high relapse rates after discontinuing use (approximately 80 percent).
- » If the child responds positively, usage is only about 3 to 6 months; then the dose is gradually tapered down over several weeks.

It is important that DDAVP be used only at bedtime to reduce the risk of fluid overload and electrolyte abnormalities. Children must not drink fluids after taking the medication. DDAVP is safe and often effective, but it is expensive and is not a cure.

4. Nocturnal Enuresis (Nighttime Bedwetting)

Bedwetting Alarm Instructions

A bedwetting alarm should NEVER be used until constipation/ stool retention (proven clear by x-ray or after performing a bowel clean out, page 6) and bladder dysfunction (page 9) are cured first.

Please follow these instructions for best results:

1. **Buy a bedwetting alarm.** The best resource is online, (www.BedWettingStore.com or www.Amazon.com). Prices range from \$40-\$200. It is not necessary to buy an expensive alarm—please purchase a loud sound alarm and does not just vibrate.
2. **Encourage your child's motivation.** If the child and family are not ready and willing to commit to an 8-week period, then it is best to start the alarm when everyone is excited and ready to be dry.
3. **Sleeping arrangements should be made for 8 weeks.** If the parent assisting the child is a sound sleeper, they may consider sleeping in the same room.
4. **The child must urinate right before bed.**
5. **Set up for the bedwetting alarm:**
 - Place sensor in underwear (no boxers), then place pull-up over underwear (if using pull-ups).
 - Follow directions that come with alarm.
6. **Prior to sleep, the child should chant,** “When the alarm goes off, I will wake up to a complete awake state” twenty (20) times. This will help the child awaken with the alarm.
7. **The child will go to bed and the alarm will ring when the child begins to urinate.** They may just urinate a little, or they may completely empty their bladder.
8. **EVERY time the alarm rings:**
 - The parent will wake up the child.
 - The child will urinate in the toilet (to empty any urine not emptied when alarm went off).
 - Put on dry underwear and Pull-Up.
 - **MOST IMPORTANT:** The child must be completely awake. This may take 15 to 20 minutes. Create a password each night that he/she must remember in the morning. If they do not remember the word in the morning, then they were not awake enough and will require more activity (shower, walking, talking, etc.) to be really awake.
 - Repeat alarm set-up, and go back to bed.

What to expect: The child will begin to have less urine noted in the Pull-Up, (this means the child is waking up to the alarm quicker, prior to emptying bladder completely). Give rewards for following recommendations and trying hard to wake up, not for being dry. The alarm will ring less and less with time.

Please consider donating your alarm when your child is cured to our pediatric urology families.



5. Urologic Tests

While these tests are not always necessary, your child may need one or more of the following special diagnostic tests to rule out congenital or neurologic causes of incontinence and to decide the best course of treatment.

URINALYSIS

Your child may be asked to urinate into a cup when he/she arrives at their appointment. This urine is then analyzed in several different categories. It may be used to check for early signs of disease, such as diabetes, kidney disease, or urinary tract infection. The urinalysis provides a wealth of information.

URINE CULTURE

If it is suspected that your child has a urinary tract infection (UTI) either by symptoms or by a positive urinalysis, a urine culture will be necessary (this can be done using the same urine as the urinalysis). The urine culture tells us what organism is causing the infection so we may determine the appropriate therapy. The culture results take two days.

KIDNEY/URETER/BLADDER RADIOGRAPHY (KUB)

This test uses standard x-ray technology to obtain pictures of internal organs. A KUB can show kidney stones, tumors, and stool retention. It can also help—to a limited extent—evaluate for any spinal anomalies. For this test, your child will be asked hold still as the x-ray machine takes a picture. There is no discomfort involved.

RENAL/BLADDER ULTRASOUND (RBUS)

This is a test used to look at the kidneys, ureters, and bladder. It can be used to detect congenital anomalies, dilation, obstruction, stones, and other urinary tract problems. For this test, a small lubricated probe is placed on the skin over the area to be examined (“jelly on the belly”). Ultrasounds involve no radiation and are painless.

VOIDING CYSTOURETHROGRAM (VCUG)

This study gives us important information regarding the shape and size of the bladder, the bladder neck (or opening) and the tubes that drain the urine from the kidneys into the bladder called ureters. It allows us to diagnosis reflux (the abnormal back-flow of urine from the bladder into the ureter and up to the kidney). It also allows additional anatomic information of the urethra (urine tube which brings urine from the bladder outside the body) to make sure no blockage is present. This test is often used to evaluate a child after a urinary tract infection. During this exam, a small tube or “catheter” is passed through the urethra (the hole where the urine comes out), and then advanced into the bladder. The insertion may cause some discomfort or the urge to urinate. The bladder is then filled, through a catheter, with liquid contrast (looks like water) that can be seen on an x-ray monitor. Then x-rays are taken during filling of the bladder and while the child urinates. This test is typically done by the pediatric urology nurse practitioner or pediatric radiologist.

URODYNAMICS

Urodynamics are rarely done for children with incontinence or urinary tract infections when there is concern for neurological disorders, or other problems. For this exam, a special catheter is passed through the urethra into the bladder and electrodes (similar to those used for an EKG) are painlessly placed on the perineum (near the buttocks). A small catheter is also placed in the rectum. The electrodes and the catheters are connected to a computer and as the bladder is slowly filled with liquid contrast (looks like water) measurements of bladder pressure and pelvic floor activity are taken. X-ray pictures for a VCUG are taken at the same time. This test will give us a better idea whether or not the bladder is working together with the external sphincter in a coordinated fashion and whether there are possible nerve problems.

URINARY FLOW RATE

Your child may be asked to urinate in a special toilet that measures urinary flow rate. By looking at the rate at which urine comes out when your child urinates, we can get a better idea as to whether he/she is voiding completely and correctly. Ideally, urinary flow rate resembles a bell curve, with the flow rate peaking mid-urination, and ending gradually, not abruptly.

KIDNEY (RENAL) SCAN

This test is not done for incontinence alone, but may be requested if there is a history of urinary tract infections or after a positive finding on an ultrasound or VCUG. It is used to better demonstrate the actual function and/or drainage of the kidneys. A kidney scan can also show if there is kidney damage and/or scarring that may have resulted from a previous urinary tract infection.

MAGNETIC RESONANCE IMAGING (MRI)

An MRI provides detailed pictures of soft tissues without the obstruction of overlying bone. It allows us to see if organs are normal in size and position, if there are any growths or lesions, and sometimes if the organ is functioning normally. MRI of the spine may reveal a neurologic disorder called “tethered spinal cord.” Younger children will be put to sleep (given general anesthesia) for this test.

6. Resources for Parents

UCSF Benioff Children's Hospitals
Pediatric Urology:
www.childrenshospitaloakland.org/urology

Steve Hodges, MD
Pediatric Urologist, Wake Forest University
Website for parents on Pediatric Bowel and Bladder Dysfunction:
www.bedwettingandaccidents.com

"It's No Accident: Breakthrough Solutions To Your Child's Wetting, Constipation, Utis, And Other Potty Problems"

Steve Hodges, MD
Pediatric Urologist
A book for parents available on Amazon.com

"Bedwetting and Accidents Aren't Your Fault: Why Potty Accidents Happen and How to Make Them Stop"

Steve Hodges, MD
Pediatric Urologist
A book for parents available on Amazon.com

Is Miralax Toxic for Children?
www.itsnoaccident.net/is-miralax-toxic-for-children/

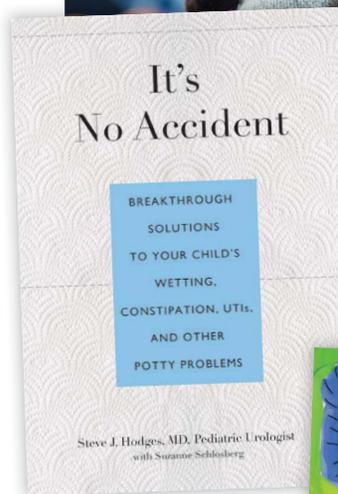
Pedia-lax products (over the counter enemas):
www.pedia-lax.com/products

Bedwetting presentation by Children's Hospital of Philadelphia:
<http://app.sliderocket.com/app/fullplayer.aspx?id=E58EE980-DCFC-108F-AFB6-1CE8349FEE5D>

Watches to remind kids to urinate:
www.woblwatch.com

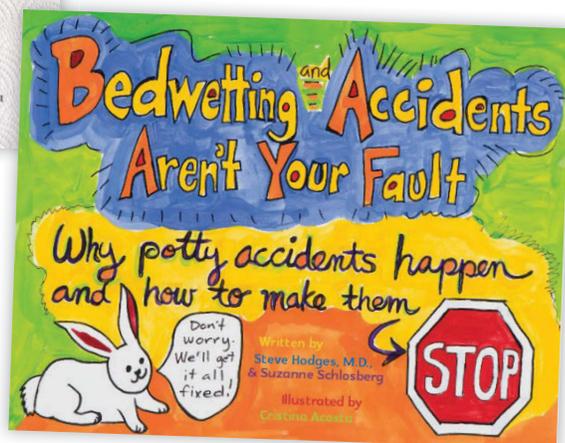
www.amazon.com/VibraLITE-Mini-12-Alarm-Vibrating-Watch/dp/B009OGE6S8

Bedwetting alarms:
www.pottymd.com
www.bedwettingstore.com



Highly Recommended for Parents

"It's No Accident: Breakthrough Solutions To Your Child's Wetting, Constipation, Utis, And Other Potty Problems"



Highly Recommended for Parents

"Bedwetting and Accidents Aren't Your Fault: How Potty Accidents Happen and How to Make Them Stop"

7. References

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8. Instruction Check Off for Referring Provider

Instruction Check Off for Referring Provider

1. Bowel Program (check one)

Please consult your provider prior to starting the Bowel Program below.

OPTION 1:

- Children <45 lbs:** MiraLAX® 7 capfuls in 32 ounces any liquid over 24 hours (will produce increased/ loose stool). Then ½ capful in 4 ounces daily until urology appointment.
- Children >45 lbs:** MiraLAX® 14 capfuls in 64 ounces any liquid over 24 hours (will produce increased/ loose stool). Then 1 capful in 8 ounces daily until urology appointment.

OPTION 2:

- Children <45 lbs:** Magnesium citrate solution, 100 ml daily for 3 days (will produce increased/loose stool). Then Pedia-Lax® Chewable Tablets 1-3 tablets daily until urology appointment.
- Children >45 lbs:** Magnesium citrate solution 150 ml daily for 2 days (will produce increased/loose stool). Then Pedia-Lax® Chewable Tablets 3-6 tablets daily until urology appointment.

OPTION 3:

- Children <45 lbs:** Pedia-Lax® Enema/saline enema: ½ enema after dinner every evening followed by 15 minute toilet sit, daily until urology appointment.
- Children >45 lbs:** Pedia-Lax® Enema/saline enema: 1 enema after dinner every evening followed by 15 minute toilet sit, daily until urology appointment.

2. Leg Abduction

1. Pull panties/pants/tights all the way down to ankles.
2. Open legs wide when sitting down to pee (as though you were sitting on a horse).
3. Lean forward, watch urine stream come out.

3. Tea Baths

1. Fill bath tub with warm water.
2. Add 5-6 cheap black tea bags (i.e. Lipton - cheap!).
3. Sit in bath cross-legged for 10-15 minutes once or twice daily until irritation resolves.
4. Rinse bath tub thoroughly to prevent staining.

4. Timed Voiding

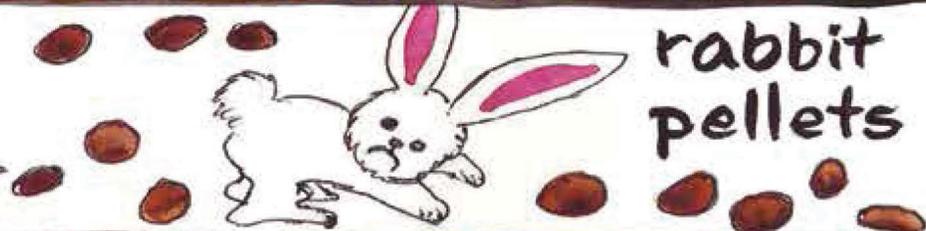
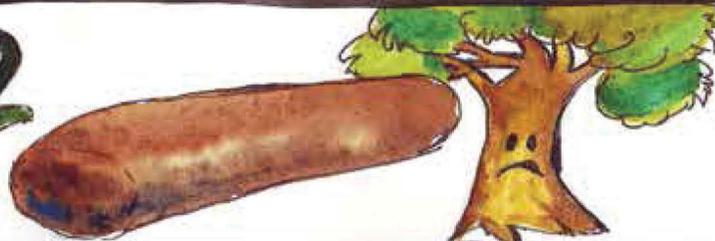
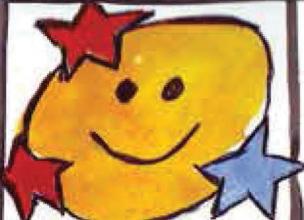
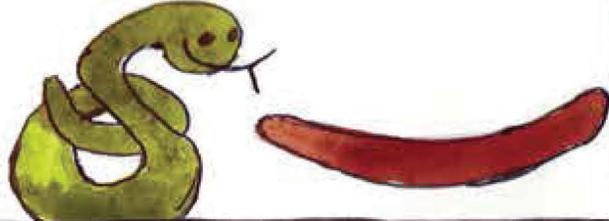
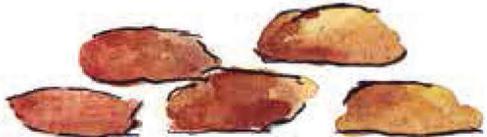
Have your child try to urinate at least every 2-3 hours during the day, even if they do not feel the urge to urinate.

Consider an alarm watch to remind them to urinate on a schedule during the day. Otherwise, look at your child's schedule during the day, many children eat 3 meals and 3 snacks, if so, then they can urine every time they eat (when eating one is usually near a restroom).

5. Increase Fluids During the Day

AGE/WEIGHT	OUNCES/DAY
<input type="checkbox"/> <2 years old/<10 kg	30-35 ounces/day
<input type="checkbox"/> 2-5 years old/<20 kg	40-50 ounces/day
<input type="checkbox"/> 6-12 years old/<50 kg	50-60 ounces/day
<input type="checkbox"/> Teens	60-70 ounces/day

NOTES:

MY POOP CHART		
	1. 	rabbit pellets
	2. 	big ol' logs
	3. 	thick and bumpy sausage
	4. 	smooth mushy snakes
	5. 	mushy blobs
	6. 	lumpy gravy
	7. 	diarrhea



A GUIDE TO TREATING YOUR CHILD'S Constipation, Wetting, and Urinary Tract Infection



Marin

1300 S. Eliseo Dr., Suite 204
Greenbrae, CA 94904
(415) 353-2200

Modesto

1444 Florida Ave., Suite 100
Modesto, CA 95350
(415) 353-2200

Oakland

744 52nd St.
Oakland, CA 94609
(510) 428-3402

Pleasanton

5565 W. Las Positas Blvd. Suite 140
Pleasanton, CA 94588
(415) 353-2200

San Francisco

1975 Fourth St.
San Francisco, CA 94158
(415) 353-2200

San Mateo

101 S. San Mateo Dr., Suite 205
San Mateo, CA 94401
(415) 353-2200

Walnut Creek

2401 Shadelands Dr.
Walnut Creek, CA 94598
(510) 428-3402