UCSF PEDIATRIC UROLOGY

Laurence S. Baskin, MD
Hillary Copp, MD, MS
Michael DiSandro, MD

Anne Arnhym, CPNP
Angelique Champeau, CPNP

Child and Family Instructional Information

Constipation and Urologic Problems

In order to understand constipation, one must first understand normal bowel function. Stool is formed as a result of digestion of the 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. For many it is in the morning after a hot beverage, for some it is in the evening after a warm bath or shower. Some people also will note that a bowel movement does not happen everyday but every other day. The importance is knowing that there is a pattern to the time of bowel movements.

Regularity can be affected by: foods, medications (ditropan), activity, emotions, 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 evacuations
- Hard and/or small stool
- Abnormally large stool
- Difficult or painful defecation
- Stool accidents or smearing of stool in the undergarments (encopresis)

What Causes Constipation?

The most common cause of constipation in the otherwise healthy child is "withholding". Children will withhold stool for many different 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
- Intercurrent illness

When the child withholds 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. So, 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 rectum is full and overtime lose the ability to evacuate the bowel completely. Another problem that may occur, exacerbating this process, is 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 incontinence (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

(The rectum seems to know the difference between solid stool and gas, but does not seem to know the difference between liquid stool and gas. Subsequently, 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 3-6 times more often than girls. This may be because of the standing versus sitting voiding position used by boys during urination. When we urinate, the pelvic floor muscles relax, when the pelvic floor muscles relax, stool in the rectum may 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, the girls will not soil.

¬ *It is important to note that no organic etiology is found in 90% to 95% of children with constipation.*

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

Differences Between Children and Adults

	Children	Adults
Prevalence	Mostly boys	Mostly woman
Social Classes	Equal	Non-white, low income
		Adolescent/young adult
Transit Time	16 hours	30-48 hours after puberty
Behavior	Withholding	Straining
Incontinence	Common	Uncommon
Disease	Rare	Common
Medications	Rare	Common
Sedentary life	Rare	Yes
Fiber diet	Rarely helpful	Helpful
Biofeedback	Unclear benefit	Helpful with pelvic floor dyssynergia

Bladder Problems as a Cause of Constipation

Bladder problems can also cause constipation. Children use the same muscles to withhold urine as they do for withholding stool. Certain causes of childhood incontinence such as classic voiding dysfunction or an uninhibited (hyper or overactive) bladder (see separate handout) can cause children to contract their pelvic floor muscles in an attempt to remain continent of urine. This increase in activity can cause these children to retain stool as well, leading to the previously mentioned dysfunctional cycle. In other words, if a child is chronically contracting the pelvic floor to retain urine then they will not only retain stool but they will have difficulty relaxing the pelvic floor at the time of a bowel movement.

Why is my *urology* specialist concerned about constipation?

Constipation can be the cause of urinary tract infections and childhood urinary incontinence. As mentioned earlier, some causes of childhood

incontinence can also cause constipation. In addition, some medications used in urology for the treatment of incontinence can also cause constipation.

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 “uninhibited bladders” (see separate handout) can actually have resolution of the uninhibited bladder contractions after treatment of constipation.
- Vesicoureteral reflux (see separate handout) is more likely to resolve if concurrent 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 with mere treatment of constipation.
- Again, with regards to vesicoureteral reflux (see separate handout), constipated children are less likely to have resolution of vesicoureteral reflux, more likely to have break through urinary tract infections, and more likely to have post operative complications.

Please note, while often brought up as a concern, there is actually no evidence that constipation causes or contributes to colon cancer.

How do I know if my child is constipated?

It is very difficult to assess constipation 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.

Based on the history and physical exam, your urology practitioner may simply just assume your child is constipated (based on symptoms and physical exam) and treat your child for constipation. If the history and physical exam are too difficult to illicit, or “unknown”, which is not uncommon,

then the urology practitioner may want to obtain an x-ray to thoroughly assess for constipation. The x-ray is useful as it allows the doctor/nurse practitioner to assess exactly how constipated a child is and then tailor treatment. However, the x-ray does expose the children to a bit of radiation so, if there is a high suspicion of constipation it may be better to just go ahead and treat the child without the x-ray.

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

Our goal is to re-establish normal bowel movements and relieve constipation, thereby decreasing urinary tract infections, urinary incontinence and, when necessary, stool incontinence.

Normal bowel movements:

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

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

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. This will take anywhere from 3 to 7 days depending 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 1-2, continent, soft stools per day. This phase will most often involve medication initially, but the medication is eventually weaned.

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. The 4 primary categories are:

- Lubricants (mineral oil)
- Stimulants – senna (senokot), bisacodyl (ducolax)

- Stool Softeners - ducosate (colace)
- Osmotic Laxatives (miralax, magnesium supplements (magnesium citrate milk of magnesia), lactulose (enulose)

In our practice, for the treatment of chronic constipation, we use primarily the lubricants and the osmotic laxatives. This is because the lubricants and osmotic laxatives are safe and effective and they 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).
The stimulants are best used only for the short term; for example, cleaning the bowel prior to a procedure. Some believe that chronic use of stimulants will take away the body's normal reflex to have a bowel movement (in other words stimulants can become addictive).
The 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.

Initial Clean Out Phase:
The clean out process is carried out over the first three days to a week. It is essential to get out all the stool initially. The success of the entire treatment is dependent on a successful initial clean out. Stool continence cannot be achieved without this initial process. 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 due to its tolerability to children (doesn't taste bad), is VERY effective, and has limited side effects. In fact, in our clinical experience, Miralax causes the least amount of side effects (nausea, cramping, soiling and bloating) of all the "clean out" medications. The primary negatives of Miralax are that it requires a prescription and can be expensive.

- **Mineral Oil**
  Mineral oil is a lubricant. The oil lubricates the bowel allowing the stool to pass easier and preventing the body from reabsorbing too much water from the stool (keeping it soft). The benefit of mineral oil is it is inexpensive and over the counter, therefore, easy to obtain. Children do not seem to suffer significant cramping symptoms. One problem with mineral oil is some children refuse to take it due to the taste and consistency. However, mineral oil can be made quite palatable by mixing with ice and fruit in a blender or mixing with ice cream in a blender. Another problem with mineral oil is it will tend to "ooze" from the rectum long after the clean out phase causing some orange staining to the undergarments.

- **Magnesium supplements (Magnesium Citrate, Milk of Magnesia)**
  Magnesium supplement is another osmotic laxative. While it is easy to obtain (over the counter), inexpensive and quite effective, it does seem to cause the most significant cramping of the 3 medications.

Maintenance Phase:

Now that the bowel has been "cleaned out" we must keep the bowel cleaned out. We do this in the maintenance phase. This phase may last as long as 6 months. 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.

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 1-2 soft stools per day. As the bowel regains its elasticity and form, over time, the dose should be gradually decreased. Most children will require the Miralax for the first one to 3 months of the maintenance program.

- **Mineral Oil**

Mineral oil can also be used effectively as a maintenance medication, and with the smaller doses used in the maintenance phase, does not seem to cause soiling or oozing of stool that occurs when using mineral oil as a clean out.

- **Lacutlose**

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 the symptoms of cramping and gas. This medication is prescription only.

- **Diet**

Water

An important step in treating constipation is increasing the daily intake of water. This will help soften the stools due to the fact that water makes up the majority of stool. If you do not drink enough water, then your stools will be hard.

Fiber

Fiber bulks up the stool and gives it a soft consistency. Increased fiber is recommended in almost all literature with regards to treatment of constipation, interestingly, there is actually no direct evidence that increased dietary fiber intake is effective in childhood constipation.
Our nutrition and dietetics department here at UCSF recommends the age of the child plus 2 grams of fiber as a goal for fiber intake in children (example: a 6 year old child plus 2 grams of fiber would be 8 grams of fiber per day).

Fiber by diet:

- Increase daily intake of raw vegetables and fruits. Avoid too many apples or bananas because this may worsen constipation. Dried apricots (excellent source of fiber) or other dried fruits are often popular with kids because they taste sweet.
- Limit diary products like milk, cheese, yogurt, etc. The child should not exceed their daily allowance for dairy products to stimulate growth.

- Encourage fruit juices like prune, grape or other juices with pulp.
- May need to try fiber cookies or other cookies or snack bars containing high fiber content.
- Try cereals high in fiber or containing bran products.
- There are 2 grams of fiber in;1 1/2 grapefruits, 3 cups of watermelon, 20 cherries, 1/2 cup broccoli, 3/4 cup cauliflower

Fiber by supplement:

There are many different types of supplemental fiber and they are all over the counter. For the younger children, the powder form might be the best choice as it can easily be mixed in liquid. For the older child, who can swallow pills, the tablet or capsule form is probably the easiest. For the child somewhere “in-between”, perhaps the wafers would be the best choice (in our practice, we call the fiber wafers “Scooby Snacks”). The fluid/fiber ratio is important! Not enough fluid with the fiber can make constipation worse. If using the wafers or tablets, it is best to have the child drink the liquid first and then give them the fiber (that way if they don’t drink all the liquid you can give them less fiber). Of the powders, benefiber, seems to dissolve the best in water/juice and; therefore, more palatable to small children. Benefiber is available over the counter at any local pharmacy or may be ordered directly through from the company that produces it. You may call (800) 828-9194 to order it.

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 15-20 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. Most texts would recommend that children sit on the toilet after EVERY meal. However, in our practice we find that to be VERY difficult, especially with the school age child. So, depending on your child’s individual situation and severity, you will be asked you have your child sit on the toilet after breakfast, 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 with in 20 minutes he/she may get up. If your child stools before the time limit is up, he/she my get up early.

Is there anything else I can do to help my child solve this problem?
Yes!

- Avoid blame, criticism or punishment for bowel accidents.
- Always reward your child for following the recommendations (not necessarily or success)
- Do not allow siblings or classmates to tease the child.
- Encourage the child's teacher to participant in this process, allowing the child to have ready access to bathroom at school. We can write a note for you if needed for the school.

What about biofeedback?
Biofeedback has become quite popular in the treatment of stool and urinary incontinence; however, at this point in time there is only limited evidence showing a short-term benefit. It appears that there is not long-term benefit from adding biofeedback training to conventional treatment of constipation in children.

Individual Constipation Treatment Worksheet
(see next page)

Individual Constipation Treatment Worksheet

Clean out:

☐**Miralax**
- ☐1 scoop in 8 oz of liquid 3 times per day for _____days
- ☐1/2 of a scoop in 4 oz of liquid 3 times per day for____days

☐**Mineral oil**
- ☐_____oz _____ times per day for _____days

☐**Magnesium citrate (Mg Citrate)**
- ☐1/2 bottle (150 ml's) at bedtime for _____nights
- ☐1 bottle)300 ml's) at bedtime for _____nights

☐**Other**_____

Maintenance:

☐*Medication*

☐**Miralax**
- ☐1 scoop in 8 oz
- ☐1/2 scoop in 4 oz liquid
- ☐ _____teaspoons in _____oz liquid
- ☐ Other_____

☐Every night ☐every morning ☐every afternoon
☐Only if no bowel movement that day

☐**Lactulose**
- ☐ _____teaspoon(s)
- ☐ _____tablespoon(s)

☐2 times per day ☐3 times per day

☐**Other** _____

☐*Fiber*
- ☐Wafers
- ☐ Tablet/ Capsule
- ☐ Powder

☐1/2 the recommended adult dose with 4 oz of liquid
☐1 full recommended adult dose with 8 oz liquid
☐ _____teaspoons with _____liquid

☐Every morning☐every night

☐*Daily Sit*
Have your child sit on the toilet for 15 to 20 minutes:
☐After dinner ☐after lunch ☐after breakfast ☐after snack at _____

References

- Abi-Hanna A, Lake AM: Constipation and encopresis in childhood. Pediatric Review, 19(1): 23-30, 1998
- Benning MA, Buller HA, Taminiau: Biofeedback training in chronic constipation. Archives of Disabled Children 1993; 68: 126-9.
- Dohil R, Roberts E, Jones FK, Jenkins HR. Constipation and reversible urinary tract abnormalities. Archives of Disease in Childhood 1994; 70: 56-57.
- Issenman RM, Filmer RB, Gorski PA: A review of bowel and bladder control development in children: how gastrointestinal and urologic conditions relate to problems in toilet training. Pediatrics, 103(6 Pt2): 1346-1352, 1999.
- Solzi G, Di Lorenzo C: Are constipated children different from constipated adults: Dig Dis, 17(5-6): 308-315, 1999.
- Koff SA, Wagner TT, Jayanthi VR: The relationship among dysfunctional elimination syndromes, primary vesicoureteral reflux and urinary tract infections in children, Journal of Urology, 160 (Sep): 1019-1022, 1998.
- Loening-Bauke V: Urinary incontinence and urinary tract infection and their resolution with treatment of chronic constipation of childhood. Pediatrics, 100(AUG): 228-232, 1997.
- Loening-Bauke V: Constipation in early childhood: patient characteristics, treatment, and long term follow up. Gut, 34(10): 1400-1404, 1993.
- Loening-Bauke V: Encopresis. Current Opinion in Pediatrics 2002, 14: 570-575.
- Michelson E.J: Enuresis and Encopresis: Ten Years of Progress: Journal of American Academy of Child Adolescent Psychiatry, 40:10, (Oct) 2001.
- Nurko MD, Garcia-Aranda JA, Worona LB, Ziochisty O. Cisapride for the treatment of constipation in children: a double blind study. Journal of Pediatrics 2000: 136:35-40.
- Nurko MD, Garcia-Aranda JA, Worona LB, Ziochisty O. Treatment of Intractable Constipation in Children: Experience with Cisapride. Gastroenterology and Nutrition, 1996; 22:38-44.
- Pashankar DS, Bishop WP. Efficacy and optimal dose of daily polyethylene glycol 3350 for treatment of constipation and encopresis in children. Journal of Pediatrics
2001: 139(3).

- Roma E, Adamidis D, Nikolara R, Constantopoulos A, Messaritakis J. Diet and chronic constipation in children: the role of fiber. Journal of Pediatric Gastroenterol Nutrition 1999; 28: 169-174.
- Van der Plas RN, Benninga MA, Buller HA, et al. Biofeedback training in treatment of childhood constipation: a randomized controlled study. Lancet 1996; 348: 776-780.
- Youseff NN, and DI Lorenzo V: Childhood Constipation-evaluation and treatment. Journal of Gastroenterology 2001; 33(3): 199-205.

See the next page for contact information.

Contact Information:

Laurence S. Baskin, MD
http://urology.ucsf.edu/people/laurence-s-baskin#

Hillary Copp, MD, MS
http://urology.ucsf.edu/people/hillary-l-copp

Michael DiSandro, MD
http://urology.ucsf.edu/people/michael-j-disandro

Appointments & Location

Mission Bay Benioff Children's Hospital (Surgical Admissions)
1975 4th Street
San Francisco, CA 94143
415.353.2200 (Phone)
415.353.2480 (Fax)

Children's Hospital & Research Center Oakland
747 52nd Street Ambulatory Care 4th
Oakland, CA 94609
510.428.3402 (Phone)

PEDIATRIC NURSE PRACTITIONERS

Anne Arnhym, CPNP
Certified Pediatric Nurse Practitioner
Anne.Arnhym@ucsf.edu

Angelique Champeau, CPNP
Certified Pediatric Nurse Practitioner
Angelique.Champeau@ucsf.edu