Fecal Incontinence Management

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DESCRIPTION

Fecal incontinence (FI) is the involuntary loss of flatus, liquid, or stool. Fecal incontinence (FI) may be caused by damage to the anal sphincter (e.g., childbirth, surgery), diarrhea, fecal impaction, illnesses that cause the inability to expand and store fecal matter (e.g., inflammatory bowel disease [IBD], Crohn's disease or injury). Although it is considered a benign disorder, severe fecal incontinence (FI) is a distressing and socially isolating medical condition. Individuals who suffer from this condition often alter their lifestyle to minimize the likelihood of bowel accidents in public places. Over time, this can result in progressive social isolation and work incapacity.

Prior to treatment for fecal incontinence (FI), an evaluation must be performed. The initial assessment includes basic office tests, a history and physical, and laboratory tests. Anorectal manometry is a test that uses a pressure sensitive tube to check the sensitivity and function of the rectum. It also measures the ability of the anal sphincter muscles to respond to signals. Anorectal ultrasonography is an ultrasound that is specific to the anus and rectum. This is utilized to evaluate the structure of the anal sphincter muscles. Rectal

sensory testing is utilized to detect abnormal rectal sensation. When rectal sensation is reduced, stool may leak before the external sphincter contracts.
The majority of cases of fecal incontinence (FI) are mild-to-moderate and can be managed with medical interventions including anti-diarrheal medications (loperimide, codeine, diphenoxylate, atropine), treatment of underlying infections or inflammatory disorders as indicated, pelvic floor biofeedback, defecation programs (bowel training), and dietary management (increase dietary fiber with psyllium products or synthetic analogues).

For some individuals with a sphincter defect, surgical procedures such as direct sphincter repair (sphincteroplasty), post-anal repair, or total pelvic floor repair may be attempted. Sphincteroplasty is utilized to repair a defect in the sphincter muscle in which the two ends of the muscle are cut and overlapped onto one another and then sewn into place to restore the complete circle of muscle. For individuals with severe fecal incontinence (FI) who have failed medical interventions and who are not candidates for sphincter repair, the choices are limited, and alternative treatment options have been proposed and investigated to include the following:

- bowel control anal insert (Renew Anal Insert)
- injectable bulking agents (Solesta or autologous fat)
- peripheral floor stimulation (PFS) (electrical [InToneMV] or magnetic [translumbosacral neuromodulation therapy [TNT])
- posterior tibial nerve stimulation (PTNS)
- surgical placement of anal rectal sling (TOPAS System)
- transanal radiofrequency ablation
- vaginal bowel control, vaginal insert (Eclipse System)

Clinical Context and Therapy Purpose
In patients who have fecal incontinence (FI) is to provide a treatment option that is an alternative to or an improvement on existing therapies.

Patients
The relevant population of interest is individuals with fecal incontinence (FI). Fecal incontinence (FI) can have a substantial impact on the quality of life (QOL). Estimates from the National Center for Health Statistics have suggested that among noninstitutionalized persons, 65 years of age or older, 17% have reported issues with fecal incontinence. Risk factors for fecal incontinence are similar in genotypical XY and genotypical XX individuals: older age, diarrhea, fecal urgency, urinary incontinence, and diabetes.

Interventions
The therapies being considered are transanal radiofrequency ablation; injectable bulking agents (Solesta or autologous fat); posterior tibial nerve stimulation (PTNS); vaginal bowel control, vaginal insert (Eclipse System); bowel control anal insert (Renew Anal Insert); peripheral floor stimulation (electrical [InToneMV] or magnetic

[translumbosacral neuromodulation therapy [TNT]); and surgical placement of anal rectal sling (TOPAS system).

Comparators
The following therapies are currently being used to make decisions about fecal incontinence: conservative therapy, sacral nerve stimulation and surgery.

Outcomes
The general outcomes of interest are symptom reduction, symptom recurrence, and treatment related adverse events.

Anal Sling
The Trans-Obturator Posterior Anal Sling (TOPAS) System is a posterior anal sling that is minimally invasive, permanent mesh implant designed to restore and maintain anatomic support of the pelvic floor muscles in genotypical XX individuals with fecal incontinence who have failed conservative therapy.

The TOPAS system is comprised of a knitted, Type 1 polypropylene monofilament mesh, which is covered by removable insertion sheaths, and two insertion needles. Implantation is through a transobturator approach via two small incisions in both the thighs and buttocks, requiring about 30 minutes for implantation and a short period for recovery. The implanted mesh is self-fixating and permanent with tissue in-growth providing additional anatomical support to the anorectum.

The FDA approval for the TOPAS system was based on the following pre-market approval study that reported 1- year outcomes in a prospective multicenter study evaluating this treatment modality. A total of 152 women were implanted with the TOPAS system at 14 centers in the United States. Fecal incontinence (FI) was assessed preoperatively and at the 12-month follow up with a 14-day bowel diary, Cleveland Clinic Incontinence Scores, and FI Quality of Life questionnaires. Treatment success was defined as reduction in number of FI episodes of ≥50% compared to baseline. Missing bowel diary data were considered treatment failures. The Wilcoxon signed rank test was used to compare changes observed at 12 months versus baseline. Mean age was 59.6 years old (SD 9.7). The mean duration of FI was 110 months (range 8-712 months). Mean length of the implant procedure was 33.4 (SD 11.6) minutes. Mean EBL was 12.9 (SD 10.5) mL. Average follow-up was 24.9 months. At 12 months, 69.1% of patients met the criteria for treatment success, and 19% of subjects reported complete continence. FI episodes/week decreased from a median of 9.0 (range 2-40) at baseline to 2.5 (range 0-40) ($P < .001$). FI days decreased from a median of 5.0 (range 1.5-7) at baseline to 2.0 (range 0-7) ($P < .001$) over a 7-day period. FI associated with urgency decreased from a median at baseline of 2.0 (range 0-26) to 0 (range 0-14.5) ($P < .001$). The mean Cleveland Clinic Incontinence Scores decreased from 13.9 at baseline to 9.6 at 12 months ($P < .001$). FI Quality of Life scores for all 4 domains improved significantly from baseline to 12 months ($P < .001$). A total of 66 subjects experienced 104 procedure and/or device-related adverse events (AEs). Most AEs were short in duration and 97%

were managed without therapy or with nonsurgical interventions. No treatment-related deaths, erosions, extrusions, or device revisions were reported. The most common AE categories were pelvic pain (n = 47) and infection (n = 26). Those subjects experiencing pelvic pain had a mean pain score (0-10 scale, 0 = no pain) during the 12-month follow-up of 1.2 (SD 2.4).

Based on the FDA approval (2016) for the TOPAS system the patients currently enrolled in the TOPAS PMA study will be followed through 5 years (60 months) of follow-up to monitor the long-term performance and safety of the TOPAS system.

UptoDate
(Literature Current through 03/2022: Updated 11/2021) Robson et al. reported the surgical placement of a perianal sling designed to enhance the anorectal angle may be a potential option for patients, but additional studies are needed.

Anal Sling: Summary of Evidence
Based on the available literature regarding the Trans-Obturator Posterior Anal Sling (TOPAS) System which is a posterior anal sling designed to restore and maintain anatomic support of the pelvic floor muscles in genotypical XX individuals with fecal incontinence (FI) who have failed conservative therapy, while the premarket study was promising further randomized controlled trials (RCTs) are needed to determine long term efficacy of this device. The evidence is insufficient to determine the effects of the technology on net health outcomes.

Bulking Agents
Several agents similar to those used for urinary incontinence (e.g., Durasphere, silicone biomaterial, etc.) have been studied for the treatment of fecal incontinence. To date, only one bulking agent has been approved by the FDA for the treatment of fecal incontinence. This formulation is a non-animal stabilized hyaluronic acid/dextranomer in stabilized hyaluronic acid (NASHA Dx) and is marketed by Q-Med as Solesta. Solesta is a sterile gel that is injected into the anal canal. It is composed of naturally made materials, dextranomer and sodium hyaluronate. Solesta is classified as a medical device (injectable bulking agent) and not a drug.

UptoDate
(Literature Current through 03/2022: Updated 11/2021) Robson et al. reported use the injectable anal bulking agent, dextranomer stabilized in hyaluronic acid, in patients with passive fecal incontinence. It is hypothesized that injection of anal bulking agents may enhance resting anal pressures and thereby improve fecal continence, especially in patients with passive fecal incontinence. Studies have suggested limited efficacy in the treatment of fecal incontinence while further studies are awaited.

- A randomized trial with 206 patients compared injection with dextranomer-hyaluronic acid with sham injections of no substance. After six months of follow-up, 71 of 136 (52 percent) patients in the active treatment arm reported a 50 percent or greater reduction in incontinence episodes, compared with 22 of 70

patients (32 percent) in the sham arm. Complications included proctalgia, rectal hemorrhage, and an abscess (14, 7, and 1 percent, respectively). No significant improvements between active and sham patients were noted in three of the four parts of the fecal incontinence quality of life scale (lifestyle, depression and self-perception, and embarrassment scales), and only a small improvement was noted in the coping and behavior scale. Only 6 percent of treated patients were fully continent at six months. A limitation of the study was that patients were not characterized clinically as to whether they had urge or passive incontinence or manometrically. The limited efficacy of dextranomer-hyaluronic acid in this study may be due to the inclusion of patients with urge incontinence. Patients with urge incontinence often have external anal sphincter weakness or decreased rectal compliance, and it is biologically plausible that they are unlikely to benefit from an injectable bulking agent.

- An open-label study included 115 patients with fecal incontinence treated with dextranomer-hyaluronic acid. Of the 83 individuals who completed 24-month follow-up, 63 percent experienced a ≥50 percent reduction in the total number of episodes of fecal incontinence and a significant increase in the number of incontinence-free days at 24 months, as compared with baseline (22 versus 15 days).

- In a trial of 126 patients with fecal incontinence who were followed for two years, clinical improvement measured by incontinence scores was not significantly different for patients who received injection with dextranomer-hyaluronic acid compared with patients who had sphincter training with biofeedback.

- In 2011, dextranomer-hyaluronic acid gel was approved by the United States Food and Drug Administration the treatment of fecal incontinence in adult patients who have failed conservative therapy. Four 1 mL injections into the deep submucosa are given in the proximal part of the high-pressure zone of the anal canal, approximately 5 mm above the dentate line. If the response is inadequate after a minimum of four weeks, treatment can be repeated a second time.

- Other injectable materials have been used to augment the internal anal sphincter (e.g., silicone biomaterial, collagen, carbon-coated microbeads), but there are limited data to support their use.

Bulking Agents: Randomized Controlled Trials

(2013) Dehli et al. published findings of an RCT evaluating Solesta. A total of 126 adults with fecal incontinence were randomized to injectable bulking agents (n=62) or a 6-month biofeedback intervention (n=64). Patients in the bulking agent group who reported minor or no symptom improvement at 3 months received a second injection. The primary efficacy outcome was incontinence severity, as measured by the St. Mark's Fecal Incontinence Grading System score, which ranges from 0 (perfect continence) to 24 (maximal incontinence). A St. Mark's score of at least 4 was required for study

participation. Ten (8%) patients dropped out of the study before 6 months. At the 6-month follow-up, the mean St. Mark's score in the biofeedback group had decreased from 12.6 points (95% CI, 11.4 to 13.8) at baseline to 9.2 points (95% CI, 7.9 to 10.5). In the bulking agents group, mean scores were 12.9 (95% CI, 11.8 to 14.0) at baseline and 8.9 (95% CI, 7.6 to 10.2) at 6 months. This difference between groups in St. Mark's score reduction was not statistically significant. In addition, change in St. Mark's score did not differ between groups at 24 months, and only 61 (49%) patients completed the 24-month follow-up. Three of the first 10 patients in the bulking agent group developed infections at the injection site and underwent treatment; subsequent patients in this group received prophylactic antibiotics.

(2013) Morris et al. completed a randomized controlled trial, conducted by in Australia, compared 2 bulking agents for fecal incontinence. Neither agent was FDA approved for use in the United States. The trial was terminated early because 1 of the agents was removed from the Australian Pharmaceutical Benefits Scheme. The trial found no difference in efficacy between agents. The trial lacked a comparison group of patients not receiving bulking agents, which limits the ability to draw conclusions about the relative efficacy of bulking agents to sham or alternative treatments.

(2011) The RCT evaluating Solesta, included in the Cochrane review, was an industry-sponsored multicenter trial, reported by Graf et al. (2011), that compared Solesta with sham treatment in 206 adults. To be eligible for inclusion, patients had to have a Cleveland Clinic Florida Fecal Incontinence Score of 10 or higher, at least 4 documented incontinence episodes in 2 weeks, symptoms for at least 12 months, and failure of at least 1 medically supervised conservative treatment (which could include dietary modification, fiber supplements, or loperamide hydrochloride). Patients received an initial injection, and those with persistent symptoms and no substantial adverse effects at 1 month were offered a second injection. A total of 112 (86%) patients in the active treatment group and 61 (87%) patients in the sham group received a second procedure. Response to treatment was defined as a reduction in the number of incontinence episodes by 50% or more compared with baseline. The trial was double-blind for the first 6 months of follow-up; at 6 months, patients in the sham group were offered active treatment. Thus, the primary efficacy outcome was assessed at 6 months.

A total of 197 (96%) of 206 randomized patients completed 6-month follow-up and were included in the primary efficacy analysis. Seventy-one (52%) in the active treatment group and 22 (31%) in the sham group had a 50% or greater reduction in incontinence episodes at 6 months. The difference between groups was statistically significant (odds ratio, 2.36; 95% CI, 1.24 to 4.47; p=.009). Findings for secondary outcomes at 6 months were mixed. For example, the mean increase in the number of incontinence-free days was significantly higher in the active treatment group (3.1) than the sham group (1.7; p=.016), but the median decrease in the number of incontinence episodes did not differ significantly between groups (6.0 vs. 3.0, respectively; p=.09). Moreover, change in the Cleveland Clinic Florida Fecal Incontinence Score did not differ significantly between groups at 6 months (2.5 points for active treatment vs. 1.7 points for sham treatment).

Quality of life was measured by the Fecal Incontinence Quality of Life instrument, which has 4 subscales. One of the 4 subscales (coping and behavior) improved significantly more in the treatment group than in the sham group at 6 months. Change in scores on the other 3 subscales (lifestyle, depression and self-perception, embarrassment) did not differ significantly between groups at 6 months. Trialists did not report the proportion of patient's continent at follow-up, either as a primary or secondary outcome.

During the 6-month blinded treatment phase, 128 adverse events were reported in the active treatment group and 29 in the sham group. The most common adverse event in the active treatment group was proctalgia, which occurred in 19 (14%) patients (vs. 2 [3%] patients in the sham group). Moreover, 10 (7%) patients in the active treatment group and 1 (1%) patient in the sham group had a rectal hemorrhage. Injection site bleeding occurred in 12 (17%) patients in the sham group and in 7 (5%) patients in the active treatment group. Two serious adverse events were reported, both in the active treatment group (1 rectal abscess, 1 prostate abscess).

Bulking Agents: Systematic Reviews
(2019) Brunner et al. in a review on "Modern strategies for the treatment of fecal incontinence", noted that bulking agents are an alternative – predominantly in passive FI, although the evidence is limited due to the use of different substances and techniques, lack of long-term results and sub-optimal study designs.

(2017) Hong et al completed a systematic review and meta-analysis which examined the mid-term outcomes of treatment with injectable bulking agents and identified predictive factors for improvement in FI. PubMed, Embase, Web of Science, and Cochrane Library databases were searched using the terms injection, bulking agents, and fecal incontinence. Studies with a minimum follow-up of 1 year were included. The improvement rate in FI was calculated by percent change in validated FIS following injection treatment. To explore the impact of predictive factors on improvement in incontinence, univariate meta-regressions were conducted using the random-effect model. A total of 889 patients in 23 articles were included. The weighted mean follow-up duration was 23.7 months (95 % CI: 19.3 to 28.2); 11 different bulking agents were used and 4 validated FISs were used. The Cleveland Clinic Fecal Incontinence score (CC-FIS) was used in 19 studies. Most studies reported a statistically significant improvement in FIS. The pooled mean pre-operative CC-FIS (n = 637) was 12.4 (95 % CI: 11.4 to 13.3). The pooled mean CC-FIS at last follow-up (n = 590) was 7.7 (95 % CI: 6.1 to 9.3). The weighted mean difference in CC-FIS between pre-operative visit and last follow-up was 4.9 (95 % CI: 4.0-5.8). Hence, the rate of improvement in FI was 39.5 % based on CC-FIS. Meta-regression revealed that the peri-anal injection route and implants intact on endo-anal ultrasonography were predictive of greater improvement in incontinence. The manometric data revealed that the initial increase in the mean resting pressure following injection was attenuated over time. The pooled rate of adverse events (AEs) was 18.0 % (95 % CI: 10.0 to 30.1). In most cases, AEs were minor and resolved within a couple of weeks. The authors concluded that administration of injectable bulking agents resulted in significant mid-term improvement in FIS. They stated that peri-anal injection route and

implants intact on endo-anal ultrasound (EAUS) were predictive of higher improvement in FI; however, given the paucity of RCTs in the literature, further research is needed to improve the quality of the evidence.

(2016) The Agency for Healthcare Research and Quality (AHRQ) assessed the efficacy and comparative effectiveness of surgical and nonsurgical treatments for fecal incontinence (FI) in adults. Sixty-three unique studies met inclusion criteria; an additional 53 surgical case series were examined for adverse effects. Enrolled adults were mostly female with mixed FI etiologies. Most randomized controlled trials (RCTs) were nonsurgical (n = 38); 13 examined pelvic floor muscle training (PFMT) and PFMT with biofeedback (PFMT-BF). Meta-analysis was not possible because numerous outcomes were used. Low-strength evidence suggests that dietary fiber (psyllium) decreases FI episodes (-2.5 per week) at 1 month; clonidine has no effect; and PFMT-BF with electrostimulation is no more effective than PFMT-BF for FI severity and the FI Quality of Life scale (FIQL) over 2 to 3 months. Low-strength evidence at 6 months suggests that dextranomer anal bulking injections are more effective than sham injections on the FIQL, the number of FI-free days, and the percent of adults with at least 50-percent reduction from baseline in FI episodes, but no more effective than PFMT-BF with or without electrostimulation on FI severity (PFMT-BF -5.4 vs. dextranomer -4.6 point Vaizey score improvements) and the FIQL, and no more effective than sham injection on FI severity (-2.5 vs. -1.7 point sham improvement in Cleveland Clinic FI score [CCFIS]) or FI episode frequency. Moderate-strength evidence suggests that Durasphere® (off label) bulking injections reduce FI severity up to 6 months (-4 to -5 points CCFIS), but gains diminish thereafter. Evidence was insufficient for all other surgical and nonsurgical comparisons. Surgical improvements varied. Noninvasive nonsurgical treatments had few minor adverse effects (AEs). Surgical treatments were associated with more frequent and more severe complications than nonsurgical interventions. AEs were most frequent for the artificial bowel sphincter (22–100% of adults). Surgical AEs ranged from minor to major (infection, bowel obstruction, perforation, fistula). Major surgical complications often required reoperation, fewer required permanent colostomy. Only 12 percent of RCTs were high quality. The authors found limited evidence to support any FI treatments beyond 3 to 6 months. Comparing the effectiveness of FI surgical and nonsurgical treatments is difficult because nonsurgical approaches generally precede surgery. Most current interventions show modest improvements in FI outcomes that meet minimal important differences (MIDs) in the short term, where MID is known. More invasive surgical procedures have substantial complications. Numerous outcome measures and lack of compliance with study reporting standards are modifiable impediments in the field. Future studies should focus on longer term effects and attempt to identify subgroups of adults by FI etiology that might benefit from specific interventions.

(2013) Maeda et al. updated a Cochrane review assessing perianal injectable bulking agents for treating fecal incontinence. Reviewers identified 5 RCTs (N=382 patients) comparing bulking agents with placebo, no intervention, or an alternative intervention. The 5 trials all included adults with internal anal sphincter dysfunction or passive fecal incontinence who had failed previous conservative treatments (e.g., pelvic floor muscle

training). One of the 5 trials (detailed next) used the FDA approved bulking agent dextranomer in stabilized hyaluronic acid (Solesta). Two trials used a placebo or sham control, 2 compared different bulking agents, and the fifth trial compared 2 methods of injecting the same agent. Length of follow-up ranged from 3 to 12 months. Four trials were judged to be of high or uncertain risk of bias. The greatest potential source of bias was lack (or unclear) blinding of outcome assessment and lack of blinding of surgeons performing the procedure. Due to heterogeneity among trials, study findings were not pooled. Overall, conclusions on efficacy were limited by the small number of RCTs identified, most of which had methodologic limitations, and lack of long-term follow-up.

Bulking Agents: Uncontrolled Trials
(2013) La Torre et al. conducted an uncontrolled study on longer term data on Solesta are available. A total of 115 patients with fecal incontinence received 4 injections of Solesta. Eighty-three (72%) of 115 patients completed the 24-month follow-up. The primary efficacy end point was a response to treatment, defined as a minimum 50% reduction from baseline in the number of fecal incontinence episodes recorded in a 28-day diary. At the 24-month follow-up, 52 (63%) of 83 patients with data available had responded to treatment. The median number of incontinence-free days in a 28-day period increased from 14.6 at baseline to 21.7 at 24 months. The study lacked a comparison group and had a high dropout rate.

Summary of Evidence
Based on review of the available literature on Solesta (NASHA/Dx) for fecal incontinence (FI), which included RCTs, systemic reviews and prospective uncontrolled trials. Patient populations in studies ranged from 21–206 and consisted of non-responders to conservative treatment. Outcomes included the change in the number of incontinence episodes and the number of days without incontinence. Follow-up ranged from three months to three years. The available evidence showed that NASHA/Dx treatment for fecal incontinence is associated with modest but statistically significant improvements at follow-up compared with pretreatment status in 64%–74% of patients at one year, 59%–63% at two years, and 45% at three years. However, the overall quality of the evidence was found to be low due to the paucity of controlled studies and small sample sizes. Loss to follow-up was also found to be a limitation of the evidence. Given the large placebo effect observed in studies of treatments for fecal incontinence, larger, independent, randomized, sham-controlled studies are needed to further evaluate the efficacy, durability, and safety of this treatment. The evidence is insufficient to determine the effects of the technology on net health outcomes.

Other materials such as autologous fat have been used as bulking agents for the treatment of fecal incontinence (FI) but have not demonstrated sustained effectiveness and did not show they were more efficacious than placebo. While autologous substances may have a nonimmunogenic advantage, their use may be limited by resorption and fibrous replacement along with local discomfort associated with harvesting procedures. Larger, independent, randomized, sham-controlled studies are needed to further evaluate the

efficacy, durability, and safety of this treatment. The evidence is insufficient to determine the effects of the technology on net health outcomes.

Pelvic Floor Stimulation (PFS)
Pelvic floor stimulation (PFS) involves electrical stimulation of pelvic floor muscles using either a probe wired to a device for controlling the electrical stimulation or, more recently, extracorporeal electromagnetic (also called magnetic) pulses. Methods of electrical PFS have varied in location (e.g., vaginal, rectal), stimulus frequency, stimulus intensity or amplitude, pulse duration, pulse to rest ratio, treatments per day, number of treatment days per week, length of time for each treatment session, and overall time period for device use between clinical and home settings. Variations in the amplitude and frequency of the electrical pulse are used to mimic and stimulate the different physiologic mechanisms of the voiding response, depending on the etiology of the incontinence (i.e., either detrusor instability, stress incontinence, or a mixed pattern). Magnetic PFS does not require an internal electrode.

Patients receiving electrical PFS may undergo treatment in a physician's office or physical therapy facility, or patients may undergo initial training in a physician's office followed by home treatment with a rented or purchased pelvic floor stimulator. Magnetic PFS may be administered in the physician's office.

In 2014, the InTone® MV (InControl Medical), a non-implantable device that provides electrical stimulation and/or biofeedback via manometry, was cleared by the FDA. The device is intended to treat male and female urinary and fecal incontinence.

Pelvic Floor Stimulation (PFS): Randomized Controlled Trials
(2015) An RCT by Cohen-Zubary et al. allocated 42 women with fecal incontinence to 6 weeks of electrical stimulation (n=22) or biofeedback training (n=20). Biofeedback sessions were conducted in-clinic and electrical PFS sessions at home following an initial training in-clinic. Thirty-six (86%) women completed the trial and were included in the analysis; the analysis was not intention-to-treat. The trial's primary endpoints were an improvement in frequency of fecal, urine, and gas incontinence, assessed using visual analog scale scores. There were no statistically significant differences between groups for the primary outcomes. The mean visual analog scale score (standard deviation) for solid stool incontinence at baseline in the stimulation group was 2.9 (2.8), which decreased to 0.9 (0.9) at follow-up. In the biofeedback group, the baseline visual analog scale score was 1.1 (2.1) and 0.3 (0.5) at follow-up. The between-group difference for this outcome was not statistically significant. For within-group changes, the electrical stimulation group improved significantly on solid stool incontinence-but not on liquid stool or gas incontinence-and the biofeedback group did not improve significantly on any of the fecal incontinence outcomes.

(2006) Norton et al. in the U.K. published a sham-controlled randomized trial that included 90 adults with fecal incontinence. Patients used a home electric PFS device for 8 weeks. Patients allocated to active treatment had the stimulation set at 35 Hz, with a 0.5-

second ramped pulse. The sham stimulator looked identical, but stimulation was set at 1 Hz below the level tested for therapeutic effect. Patients were blinded to the treatment group; although nurses who trained patients on device use were not. The primary outcome was patient self-report of efficacy, using a rating scale ranging from -5 to +5 to indicate symptom change. Seventy (78%) of the 90 patients completed the trial. In an intention-to-treat analysis (assigning patients who dropped out a value of 0), there was no statistically significant difference between groups in patient ratings of symptom change. On a scale of -5 to +5, there was a median rating of 0 in each group (p=.92). In a completer analysis, the median change in symptoms was 2 in the active treatment group and 1 in the sham group (p=.74). Groups did not differ significantly on other secondary outcomes such as the frequency of urge or passive incontinence after treatment.

Several RCTs have evaluated electrical stimulation for treating fecal incontinence. Only 1 was sham-controlled, and it did not find that active stimulation produced better results than sham stimulation. Systematic reviews of RCTs have not found that electrical stimulation is superior to control interventions for treating fecal incontinence.

Magnetic pelvic floor stimulation device the FENIX Continence Restoration System is comprised of an annular series of connected titanium beads and each bead contains a magnetic core which is magnetically attracted to adjacent beads. Collectively, this attraction augments the native anal sphincter providing needed resistance to involuntary opening of the anal canal. The Fenix implant is supplied sterile and placed through a perineal incision. However, in 2017 Torax Medical announced the discontinuation of sales and clinical studies of the FENIX Continence Restoration System.

Translumbosacral neuromodulation therapy (TNT) is a non-invasive treatment that uses the power of the magnet to stimulate and heal nerves key to bowel control. This is currently an ongoing study for the disabling and common problem of stool leakage, or fecal incontinence (FI). Translumbosacral neuromodulation therapy (TNT) has shown some early promise in strengthening connections between nerves and muscles that enable an individual to control stool release. Participants in the trial should have had problems with fecal incontinence for about six months and at least one episode per week. Some exclusionary criteria for this study include those with known neurological problems like a spinal cord or head injury and other anal problems like inflamed hemorrhoids. This larger study will help to determine the optimal dose and give investigators more insight on how it works. Investigators at the Medical College of Georgia and Augusta University Health System as well as Harvard University's Massachusetts General Hospital in Boston are exploring the potential of magnetic stimulation in 132 patients, including 44 participants receiving sham treatment to help assess its efficacy and safety. They are giving TNT sessions once a week for over six weeks to 88 patients at a dose of either 2,400 or 3,600 magnetic stimulations at 1 hertz the frequency per second and performing the lookalike sham on 44 patients. The study outcomes will include whether participants experience a 50% or greater reduction in episodes of stool leakage, like those in an earlier, smaller study. They also will look at related factors like the consistency of the stool, the severity of fecal incontinence episodes, rectal sensation, quality of life and examine nerve

function and gut and brain interactions. To further assess its long-term efficacy, the investigators are evaluating whether reinforcement treatment helps and how long the effects last. They will examine 88 patients again at 12, 24 and 48 weeks and assess whether the actual treatment, rather than the placebo or sham, improves leakage. The only side effects patients have reported to date is some temporary tingling in the treatment area, likely prompted by rejuvenated nerves.

Currently no completed randomized or non-randomized RCTs were identified that evaluated magnetic pelvic floor stimulation as a treatment of fecal incontinence. There is currently an ongoing study regarding the use of translumbosacral neuromodulation therapy (TNT) which is a non-invasive treatment that uses the power of the magnet to stimulate and heal nerves key to bowel control.

Pelvic Floor Stimulation (PFS): Systematic Reviews

(2013) Vonthein et al. searched for studies on the impact of biofeedback and/or electrical PFS for treating fecal incontinence in adults. They identified 13 RCTs that used 1 or both of these treatments and reported health outcomes (e.g., remission or response rates using validated scales). A pooled analysis of trial results did not find statistically significant differences in rates of remission when comparing electrical PFS with a control intervention (RR, 0.47; 95% CI, 0.13 to 1.72). A pooled analysis of studies comparing electrical PFS plus biofeedback with electrical PFS alone found a significantly higher rate of remission with the combination intervention (RR, 22.97; 95% CI, 1.81 to 291.69). The latter analysis focused on the efficacy of biofeedback and not electrical PFS. Additionally, the confidence interval was very wide, indicating an imprecise estimate of the treatment effect. The Vonthein et al. (2013) review included only 2 RCTs on electrical PFS that were published after a Cochrane review (below). These 2 trials included the combination of amplitude-modulated medium-frequency stimulation and biofeedback. Electrical PFS was not evaluated in the absence of biofeedback.

(2007) A Cochrane review by Hosker et al. identified 4 RCTs evaluating electrical stimulation as a treatment of fecal incontinence in adults. One trial was sham-controlled, another compared electrical PFS with levatorplasty, and 2 used electrical PFS as an adjunct treatment. Reviewers did not pool study findings; they concluded that there is insufficient evidence to draw conclusions on the efficacy of electrical PFS for treating fecal incontinence.

Pelvic Floor Stimulation (PFS): Summary of Evidence

For individuals who have fecal incontinence who receive *electrical* pelvic floor stimulation (PFS), the evidence includes randomized controlled trials (RCTs) and systematic reviews. Among the RCTs that have evaluated electrical PFS as a treatment for fecal incontinence only 1 trial was sham-controlled, and it did not find that electrical stimulation improved the net health outcome. Systematic reviews of RCTs have not found that electrical stimulation is superior to control interventions for treating fecal incontinence. The evidence is insufficient to determine the effects of the technology on net health outcomes.

For individuals who have fecal incontinence who receive *magnetic* pelvic floor stimulation (PFS), the evidence includes no randomized or non-randomized controlled trials (RCTs). The evidence is insufficient to determine the effects of the technology on net health outcomes.

Posterior Tibial Nerve Stimulation (PTNS)
Posterior tibial nerve stimulation (PTNS) involves a battery powered external electrical pulse generator and a needle electrode lead set. The needle probe is implanted in the tibial nerve and is attached to the electrical pulse generator. This minimally invasive neuromodulation system was developed as a less-invasive alternative to sacral nerve stimulation (SNS). It is designed to deliver retrograde access to the sacral nerve through percutaneous electrical stimulation of the tibial nerve. PTNS has also been proposed for treatment of fecal incontinence. Published literature consists of small observational studies quantified by measurements of fecal incontinence (FI) episodes, ability to defer defecation, quality of life improvement and treatment success.

PTNS treatment includes a 12-week initial treatment phase followed by an indefinite maintenance treatment phase, with each of these phases having different treatment protocols. The initial treatment phase consists of 1 to 3 weekly 30-minute treatment sessions for 12 weeks.

Posterior Tibial Nerve Stimulation (PTNS): Nonrandomized Studies
(2018) Sanagapalli et al. conducted a retrospective chart review of consecutive patients with multiple sclerosis-related fecal incontinence who had failed conservative therapy and who were subsequently treated with PTNS. Patients (N=33) received 8 weekly treatments of PTNS, with responders receiving an additional 4 weeks of treatment. Subjects were classified as responders based on the Wexner Fecal Incontinence Score if scores at the end of treatment were either half of the baseline score or if the score was less than 10. Twenty-six (79%) of the patients were classified as responders. Responders tended to be more symptomatic at baseline and had greater improvements in quality-of-life scores.

Posterior Tibial Nerve Stimulation (PTNS): Randomized Controlled Trails
(2017) Horrocks et. al. conducted a post hoc analysis of data from the CONFIDeNT trial, to evaluate factors associated with the efficacy of percutaneous tibial nerve stimulation (PTNS) for fecal incontinence. The study population comprised 205 patients from the CONtrol of Fecal Incontinence using Distal NeuromodulaTion Trial. The primary outcome was a binary indicator of success (≥50% reduction in weekly FI episodes after 12 weeks of treatment) or failure, as per the original trial characteristics including baseline FI symptom type, defecatory urgency, and co-existent symptoms of baseline liquid stool consistency and obstructive defecation (OD) were defined a priori. Univariable and multivariable analyses were performed to explore these factors as predictors of response to PTNS and sham. In both univariable and multivariable analysis, the presence of OD symptoms negatively predicted outcome in patients who received

PTNS (OR, 0.38; 95% CI, 0.16-0.91; P = .029), and positively predicted sham response (OR, 3.45; 95% CI, 1.31-9.21; P = .012). No other tested variable affected outcome. Re-analysis of the primary outcome excluding patients with OD symptoms (n = 112) resulted in a significant clinical effect of PTNS compared to sham (48.9% vs 18.2% response, P = .002; multivariable OR, 4.71; 95% CI, 1.71-12.93; P = .003). The authors concluded concomitant OD symptoms negatively affected the clinical outcome of PTNS versus sham in a major randomized controlled trial. Future appropriately designed studies could further explore this observation with potential for future stratified patient selection.

The Neuromodulation for Accidental Bowel Leakage (NOTABLe) sham-controlled trial of PTNS in women with fecal incontinence (N=166) was completed in March 2020 (NCT03278613) and results have not yet been published.

Posterior Tibial Nerve Stimulation (PTNS): Systematic Reviews
(2020) Tan et al. performed a systematic review and meta-analysis to quantify placebo effects and responses following sham electrical nerve stimulation in fecal incontinence (FI) and constipation. Successful treatments following electrical nerve stimulation have been commonly reported in patients with fecal incontinence and constipation. However, many of these nerve stimulation trials have not implemented sham controls, and are, therefore, unable to differentiate overall treatment responses from placebo. A literature search of Ovid MEDLINE, PubMed, EMBASE, and Cochrane databases was conducted from inception to April 2017. Randomized sham-controlled trials investigating the effect of lower gastrointestinal electrical nerve stimulation in fecal incontinence and constipation were included. Pediatric and non-sham- controlled trials were excluded. Ten randomized sham-controlled trials were included. Sham stimulation resulted in improvements in fecal incontinence episodes by 1.3 episodes per week (95% CI -2.53 to -0.01, p = 0.05), fecal urgency by 1.5 episodes per week (CI -3.32 to 0.25, p = 0.09), and Cleveland Clinic Severity scores by 2.2 points (CI 1.01 to 3.36, p = 0.0003). Sham also improved symptoms of constipation with improved stool frequency (1.3 episodes per week, CI 1.16 to 1.42, p < 0.00001), Wexner Constipation scores (5.0 points, CI -7.45 to -2.54 p < 0.0001), and Gastrointestinal Quality of Life scores (7.9 points, CI -0.46 to 16.18, p = 0.06). The authors concluded Sham stimulation is associated with clinical and statistically meaningful improvements in symptoms of fecal incontinence and constipation, as well as quality of life scores, highlighting the importance of sham controls in nerve stimulation trials. Noncontrolled studies should be interpreted with caution.

(2019) Iacona et al. stated that neuromodulation is the application of electrical stimulation on nerve fibers to modulate the neuronal activity. Its use for chronic constipation and FI has increased in popularity over the past few years. Invasive and non-invasive techniques are currently available. These investigators reviewed the current literature on the application of the neuromodulation techniques in the management of chronic constipation and FI in children. They carried out a search of Healthcare Database Advanced Search, Embase, Medline, and Cochrane database in accordance with PRISMA guideline. Terms used in the search included neuromodulation, nerve

stimulation, fecal/fecal incontinence, incontinence, constipation, children, and pediatric/pediatric. A total of 241 papers were screened; 14 were included for the systematic review: 7 were selected for the ISNM (implantable sacral nerve modulation) technique, 1 for the transcutaneous tibial nerve stimulation), 1 for the transcutaneous sacral nerve modulation), and 5 for the transcutaneous interferential sacral nerve stimulation. Results showed an overall improvement in constipation symptoms in 79 to 85.7 % of patients, resolution of symptoms in 40 %, reduced use of ACE stoma/trans-anal irrigation system in 12.5 to 38.4 %, and improvement in incontinence symptoms in 75 %. High complication rate was reported (17 to 50 %) in the ISNM group. No complications were reported in the non-invasive group. The authors concluded that neuromodulation is a promising tool in the management of constipation refractory to medical treatment and FI in children. Non-invasive techniques provided good results with no complications. These researchers stated that a longer-term follow-up will provide more information regarding patient compliance and sustainability of benefits of these new techniques.

(2019) Sarveazad et al. completed a systematic review and meta-analysis to investigate the role of posterior tibial nerve stimulation (PTNS) in the control of fecal incontinence (FI). Two independent reviewers extensively searched in the electronic databases of Medline, Embase, Cochrane Central Register of Controlled Trials (CENTRAL), Web of Science, CINAHL, and Scopus for the studies published until the end of 2016. Only randomized clinical trials were included. The studied outcomes included FI episodes, FI score, resting pressure, squeezing pressure, and maximum tolerable pressure. The data were reported as Standardized Mean Differences (SMD) with 95% confidence interval. Five articles were included in the present study (249 patients under treatment with PTNS and 239 in the sham group). Analyses showed that PTNS led to a significant decrease in the number of FI episodes (SMD=-0.38; 95% CI: -0.67-0.10; P=0.009). Yet, it did not have an effect on FI score (SMD=0.13; 95% CI: -0.49-0.75; P=0.68), resting pressure (SMD=0.12; 95% CI: -0.14-0.37; P=0.67), squeezing pressure (SMD=-0.27; 95% CI: -1.03-0.50; P=0.50), and maximum tolerable pressure (SMD=-0.10; 95% CI: -0.40-0.24; P=0.52). The authors concluded based on the results, it seems that the prescription of PTNS alone cannot significantly improve FI.

(2018) Simillis et al. completed a systematic review and meta-analysis comparing the clinical outcomes and effectiveness of sacral nerve stimulation (SNS) versus percutaneous tibial nerve stimulation (PTNS) for treating fecal incontinence (FI) in adults. A literature search of MEDLINE, Embase, Science Citation Index Expanded and Cochrane was performed in order to identify studies comparing SNS and PTNS for treating FI. A risk of bias assessment was performed using The Cochrane Collaboration's risk of bias tool. A random effects model was used for the meta-analysis. Four studies (one randomized controlled trial and three nonrandomized prospective studies) reported on 302 patients: 109 underwent SNS and 193 underwent PTNS. All included studies noted an improvement in symptoms after treatment, without any significant difference in efficacy between SNS and PTNS. Meta-analysis demonstrated that the Wexner score improved significantly with SNS compared to PTNS (weighted mean difference 2.27;

95% confidence interval 3.42, 1.12; P < 0.01). Moreover, SNS was also associated with a significant reduction in FI episodes per week and a greater improvement in the Fecal Incontinence Quality of Life coping and depression domains, compared to PTNS on short-term follow-up. Only two studies reported on adverse events, reporting no serious adverse events with neither SNS nor PTNS. The authors concluded current evidence suggests that SNS results in significantly improved functional outcomes and quality of life compared to PTNS. No serious adverse events were identified with either treatment. Further, high-quality, multi-center randomized controlled trials with standardized outcome measures and long-term follow-up are required in this field.

Posterior Tibial Nerve Stimulation (PTNS): Summary of Evidence
Based on review of the literature for individuals who have fecal incontinence who receive posterior tibial nerve stimulation (PTNS), the evidence includes several randomized controlled trials (RCTs) and systematic reviews. The available RCTs have not found a clear benefit of PTNS. Neither of the sham-controlled trials found that active stimulation was superior to sham for achieving the primary outcome, at least a 50% reduction in mean weekly fecal incontinence episodes. The larger sham-controlled randomized trial did find a significantly greater decrease in the absolute number of weekly incontinence episodes in the active treatment group, but the overall trial findings did not suggest the superiority of PTNS over sham treatment. A meta-analysis of a single RCT and several observational studies reported that patients receiving sacral nerve simulation experienced significant benefits compared with patients receiving PTNS. A post hoc analysis of the larger trial suggested a subset of patients with fecal incontinence (those without concomitant obstructive defecation) may benefit from PTNS. Also, The Urgent® PC Neuromodulation System and NURO™ Neuromodulation System are not FDA cleared for the treatment of fecal incontinence. The evidence is insufficient to determine the effects of the technology on net health outcomes.

Renew Anal Insert
The Renew Anal Insert (Renew Medical, Inc.) is a silicone rectal insert device available by prescription for patients with accidental bowel leakage (ABL) or fecal bowel incontinence. This device is designed for self-insertion to comfortably seal the rectum from the inside to help prevent accidental bowel leakage (ABL)/fecal incontinence (FI) and is suitable for use in genotypical XY and genotypical XX individuals. Renew inserts are designed for single-use and are naturally expelled with a bowel movement.

(2019) Leo et al. stated that the Renew Anal Insert is a recent treatment for patients who suffer from passive fecal incontinence (FI). These researchers examined the effectiveness of the insert and patients' satisfaction with it. A retrospective audit of patients who were treated with the Renew Anal Insert was undertaken. The St Mark's Incontinence Score was used to evaluate clinical outcome. Renew size, the number of inserts used per day and per week had also been recorded. Subjective assessment of symptoms, how beneficial Renew was and how satisfied patients were with the device were all recorded. Major events and side effects were also noted. A total of 30 patients received Renew as a treatment for passive FI in 2016. The median St Mark's

Incontinence Score was 15 (range of 7 to 18) at baseline and 10 (range of 2 to 18) at first follow-up ($p < 0.0001$) at a median of 11 (range of 8 to 14) weeks; 11 (37 %) patients used the regular size and 19 (63 %) the large size. Patients used an average of 1.67 inserts per day (range of 1 to 3) on an average of 3.58 days per week (1 to 7); 3 patients reported a deterioration in symptoms, 7 (23 %) had no change and 20 (67 %) showed a significant improvement; 6 patients (20 %) did not like the device; while 24 (80 %) liked it; 17 patients (57 %) wanted to continue this treatment in the long-term. The authors concluded that the Renew device appeared to be an acceptable and effective therapeutic option for passive FI. However, these researchers stated that further work is needed to compare it with other treatments and establish its position in the treatment pathway.

Renew Anal Insert: Summary of Evidence
Based on review of the literature the Renew Anal Insert is a treatment for patients who suffer from fecal incontinence (FI)/accidental bowel leakage (ABL). While this device may be promising as a therapeutic option for the treatment of FI/ABL, further randomized controlled trials (RCTs) are needed to compare the Renew Anal Insert with other treatments for FI/ABL to establish the efficacy of this device. The evidence is insufficient to determine the effects of the technology on net health outcomes.

Transanal Radiofrequency Therapy
Transanal radiofrequency (RF) therapy, the Secca System has been investigated as a minimally invasive treatment of fecal incontinence (FI). In this outpatient procedure using conscious sedation, radiofrequency energy is delivered to the sphincteric complex of the anal canal to create discrete thermal lesions. Over several months, these lesions heal and the tissue contracts, changing the tone of the tissue and improving continence.

UptoDate
(Literature Current through 03/2022: Updated 11/2021) Robson et al. reports the following in regard to radiofrequency ablation. Radiofrequency ablation (RFA) is a procedure that involves delivering temperature-controlled radiofrequency energy to the anorectal junction to create thermal lesions in the muscle while preserving mucosal integrity. RFA is a minimally invasive treatment for fecal incontinence that takes less than one hour to perform and is generally performed under local anesthesia and sedation. While some small, prospective studies have demonstrated efficacy, conflicting results have also been published, and randomized trials are lacking.

Transanal Radiofrequency Therapy: Summary of Evidence
In order to determine the long-term efficacy of transanal radiofrequency therapy as a treatment of fecal incontinence (FI), it should be compared to conservative therapies that are considered standard of care for this condition. The peer-reviewed literature on this topic consists primarily of non-randomized uncontrolled trials, none of which compared transanal radiofrequency treatment to conservative treatments or alternative treatments. Additionally, most of the peer-reviewed literature consists of small studies with short-term follow-up. Studies to date have not distinguished between the five types of fecal incontinence (stress, urge, overflow, functional and mixed incontinence). Larger,

prospective randomized trials comparing transanal radiofrequency treatment to other conservative or alternative treatments of fecal incontinence and demonstrating long-term improved patient outcomes are needed to accurately determine the efficacy of this treatment and identify which population of individuals with fecal incontinence might benefit from this treatment. The evidence is insufficient to determine the effects of the technology on net health outcomes.

In 2014, the American College of Gastroenterology (ACG), in a clinical guideline on the management of benign anorectal disorders, concluded that "there is insufficient evidence to recommend radiofrequency ablation treatment to the anal sphincter (SECCA) at this time (no recommendation, insufficient evidence)."

In 2015, a clinical practice guideline for the treatment of fecal incontinence by the American Society of Colon and Rectal Surgeons (ASCRS) concluded that the reported evidence for radiofrequency treatment is relatively sparse and has relevant limitations. Most studies reviewed have been small, single-center series with short-term follow-up. In addition, the authors observed that while long-term follow-up is very limited, any clinical benefit achieved in the short term appears to be sustained in the long term. The authors also noted that individuals with inflammatory bowel disease (IBD), chronic constipation, diarrhea, and history of pelvic radiation were not included in the studies reviewed. They stated that "because of the limitations in the available data, alternative treatments should be pursued before considering radiofrequency energy delivery."

In 2016, the Agency for Healthcare Research and Quality (AHRQ) published a systematic review on treatments for fecal incontinence. The authors found a lack of comparative studies on Secca procedure and concluded that the evidence for the procedure was insufficient.

Vaginal Insert for Bowel Control

The Eclipse™ Vaginal Insert system (e.g., Pelvalon, Inc.) is a non-surgical therapy for genotypical XX individuals experiencing loss of bowel control. The inflatable vaginal insert is designed to exert pressure on the rectal vault to treat fecal incontinence. According to the manufacturer, the Eclipse™ system consists of a vaginal insert and a pressure-regulated pump. The insert, consisting of a silicone-covered stainless-steel base and a posteriorly directed balloon, is placed in the vaginal vault and inflated. The balloon is deflated via the pump when the user needs to have a bowel movement and the balloon is inflated again when the bowel movement is finished. The initial fitting and inflation is performed by a clinician, and a trial period is provided for one week or so for the patient to decide if the insert fits well and whether it is right for the individual. If the trial period is successful, the patient may begin using the Eclipse insert which is intended for long-term use, in which the patient can inflate and deflate the device as needed at home.

UptoDate

(Literature Current through 03/2022: Updated 11/2021) Robson et al. reported a vaginal insert with a pressure-regulated pump to temporarily occlude the rectum has been shown

to reduce incontinence episodes by 50 percent in approximately 80 percent of women at one month. However, studies are needed to evaluate its efficacy in the long-term.

(2015) Holly et al. evaluated the effectiveness and safety of a vaginal bowel-control device and pump system (Eclipse System) for fecal incontinence treatment. Women with a minimum of four fecal incontinence episodes over 2 weeks were fit with the intravaginal device. Treatment success, defined as a 50% or greater reduction of incontinent episodes, was assessed at 1 month. Participants were invited into an optional extended-wear period of another 2 months. Secondary outcomes included symptom improvement measured by the Fecal Incontinence Quality of Life, Modified Manchester Health Questionnaire, and Patient Global Impression of Improvement. Adverse events were collected. Intention-to-treat analysis included participants who were successfully fit entering treatment. Per protocol, analysis included participants with a valid 1-month treatment diary. Sixty-one of 110 (55.5%) participants from six clinical sites were successfully fit and entered treatment. At 1 month, intention-to-treat success was 78.7% (48/61, P<.001); per protocol success, 85.7% (48/56, P<.001) and 85.7% (48/56) considered bowel symptoms "very much better" or "much better." There was significant improvement in all Fecal Incontinence Quality of Life (P<.001) and Modified Manchester (P ≤.007) subscales. Success rate at 3 months was 86.4% (38/44; 95% confidence interval 73–95%). There were no serious adverse events; the most common study-wide device-related adverse event was pelvic cramping or discomfort (25/110 participants [22.7%]), the majority of events (16/25 [64%]) occurring during the fitting period. This study has several limitations. Optimally, a randomized trial would have minimized bias. The inclusion of a control arm, although desirable, is uncommon in trials of fecal incontinence therapies because of the nonuniform presentation of the condition and the lack of a gold standard treatment. A common methodology in fecal incontinence intervention trials, as selected in this study, was for participants to serve as their own controls. Although this method is subject to inherent treatment, selection, and recall bias, it does serve to minimize individual variation in disease presentation, a significant factor in studies regarding fecal incontinence. In addition to study design, the length of follow-up was short. Because this is a completely new treatment option, it was important to investigate the potential side effects and tolerability in addition to efficacy. A longer-term outcome study is needed to provide this important information.

Vaginal Insert for Bowel Control: Summary of Evidence

Based on review of the available literature while this device may show promise in reducing fecal incontinence (FI) episodes in genotypical XX individuals, the study was non-randomized and was only evaluated for one month. Randomized controlled trials (RCTs) with longer-term follow-up are needed to evaluate the long-term efficacy of this device. The evidence is insufficient to determine the effects of the technology on net health outcomes.

Practice Guidelines and Position Statements

American College of Gastroenterology (ACG)
(2021) The American College of Gastroenterology (ACG) published guidelines on the Management of Benign Anorectal Disorders which stated the following information:

- Anal plugs
    - Anal plugs are mechanical barrier devices. Renew is a silicone anal insert that is disposable. In 1 study of 30 patients with FI, 20% disliked the device, 23% showed no change, and 12% reported worse symptoms of FI; however, 57% of patients wished to continue using the device (248). In a second study, the Renew device was used in 15 patients with an ileoanal pouch (249): 8 of 15 (53%) found the Renew device to be acceptable, and 6 of 15 (40%) reported it to be effective. The Peristeen anal plug is available in Europe. One review concluded that plugs are difficult to tolerate but may be useful in a select group of patients and may be used as an adjunct to other treatments.

    - The Eclipse vaginal bowel control device is a balloon that is inserted into the vagina and acts as a mechanical barrier, compressing the anterior wall of the rectum. The correct-sized balloon has to be selected for each patient, and manual dexterity is required to deflate, inflate, insert, and remove the device. Two case series were published: In the first series, 61 patients were evaluated for 1 month. A 50% reduction in FI was reported by 86%, and quality of life improved. Adverse events such as cramping and abdominal pain were reported during the fitting period. Another study showed reductions in urgency, frequency, and incomplete evacuations in more than 50% of the patients.

- Injectable bulking agents
    - Injectable bulking agents, which are used to augment the urethral sphincter and treat urinary incontinence, were approved by the US Food and Drug Administration for managing FI. In a multicenter, placebo-controlled randomized trial of a perianal bulking agent (dextranomer in stabilized hyaluronic acid [NASHA Dx]) in 206 patients with FI, a ≥50% reduction in incontinence episodes was reported more frequently for NASHA Dx (52% patients) than placebo (31% patients). The number of patients who became completely continent was not provided. Two serious adverse events occurred (i.e., rectal abscess and prostatic abscess), but most adverse events were minor. Treatment did not affect embarrassment scores related to FI. Anorectal physiological tests and imaging were not performed; hence, patient characteristics and mechanisms of action were unknown.
- A prospective multicenter trial in 136 FI patients found that fecal continence improved in 52% of patients in 6 months, and this was sustained after 36 months

(255). Further studies to compare the effects of bulking agents to biofeedback therapy in FI are ongoing (256).

- Radiofrequency stimulation (SECCA procedure)
    - The SECCA procedure involves radiofrequency stimulation of the muscles in the anal canal to increase muscle connective tissue ratio and scarring (257) via a probe with needles in the anal canal performed under local anesthesia and sedation. Despite initial positive studies including a multi-center trial from 2003 (258), more recent reports suggest poor long-term results.
- Miscellaneous devices
    - Numerous attempts have been made to artificially enhance the anal sphincter to improve continence. Most of these devices have shown unacceptable complication rates or explant rates (271–273) and are not currently available. The newest of these devices, which is a thin expandable prosthesis that is implanted in the intersphincteric space, has only been evaluated in very few patients.

(*Accessed April 2022*)

American College of Obstetricians and Gynecologists (ACOG)

(2019) The American College of Obstetricians and Gynecologists published a practice bulletin on the clinical management of fecal incontinence in women.

- The College stated that "anal sphincter bulking agents may be effective in decreasing fecal incontinence episodes up to 6 months and can be considered as a short-term treatment option for fecal incontinence in women who have failed more conservative treatments." This recommendation is based on limited or inconsistent scientific evidence. (*Accessed April 2022*)

American Gastroenterological Association (AGA)

(2017) The American Gastroenterological Association (AGA) published an expert review on surgical interventions and device-aided therapy for the treatment of fecal incontinence and defecation disorders which stated:

- Surgical options may be considered in patients with fecal incontinence and defecation disorders, but only after conservative therapy has failed. Examples of conservative therapies include dietary modification, fiber supplements, bowel training programs, pelvic floor exercises, medications, or biofeedback. (*Accessed April 2022*)

American Society of Colon and Rectal Surgeons (ASCRS)

(2015) The American Society of Colon and Rectal Surgeons concluded in the practice parameters for the treatment of fecal incontinence the following information:

- The Society gave a weak recommendation based on moderate-quality evidence (2B) that injection of bulking agents into the anal canal may help to decrease episodes of passive fecal incontinence. Studies reviewed showed modest short-term improvements, and no study identified showed a long-term benefit of bulking agents.

- The Society concluded that the reported evidence for radiofrequency treatment is relatively sparse and has relevant limitations. Most studies reviewed have been small, single-center series with short-term follow-up. In addition, the authors observed that while long-term follow-up is very limited, any clinical benefit achieved in the short term appears to be sustained in the long term. The authors also noted that individuals with inflammatory bowel disease (IBD), chronic constipation, diarrhea, and history of pelvic radiation were not included in the studies reviewed. They stated that "because of the limitations in the available data, alternative treatments should be pursued before considering radiofrequency energy delivery." (*Accessed April 2022*)

National Institute for Health and Clinical Excellence (NICE)
The National Institute for Health and Clinical Excellence (NICE) concluded the following information in the "injectable bulking agents for fecal incontinence" procedures guidance:

- "Current evidence on the safety and efficacy of injectable bulking agents for fecal incontinence does not appear adequate for this procedure to be used without special arrangements for consent and for audit or research, which should take place in the context of a clinical trial or formal audit protocol that includes infodrmation on well-defined patient groups." (*Accessed April 2022*)

Regulatory Status

Device	510(k) Approval	Information
Eclipse System	2015	The FDA approved the vaginal insert which was designed to provide bowel control in genotyipical XX individuals with fecal incontinence.
InTone® MV	2014	It is a non-implantable device that provides electrical stimulation and/or biofeedback via manometry. The device is intended to treat urinary and fecal incontinence.
NASHA Dx marketed as Solesta®	2011	Approved by FDA through the premarket approval process as a bulking agent to treat fecal incontinence in patients 18 years and older who have failed conservative therapy.
NURO™ Neuromodulation System		The device has been cleared by the FDA treat patients suffering from urinary urgency, urinary frequency, and urge incontinence. *It has not been FDA cleared for indications, such as the treatment of fecal incontinence.*
Secca System	2002	received FDA clearance under the investigational device exemption in March of 2002, consists of a hand-held anoscopic device with electrodes and a radiofrequency generator. Per FDA label indications,

		the Secca System is intended for use specifically in the treatment of fecal incontinence in patients who experience incontinence of stool (solid or liquid) at least once per week and who have failed conservative therapy.
TOPAS Treatment (hereafter TOPAS System)	2016	It is a mesh implant with minimally invasive delivery, to provide support to the anorectum and reduce the incidence of fecal incontinence (FI) episodes in genotypical XX individuals who have failed conservative therapies.
Urgent® PC Neuromodulation System	2005	The device has been cleared by the FDA treat patients suffering from urinary urgency, urinary frequency, and urge incontinence. *It has not been FDA cleared for indications, such as the treatment of fecal incontinence.*

PRIOR APPROVAL

Not applicable.

POLICY

See Related Medical Policies

- 02.01.04 Biofeedback
- 08.01.21 Sacral Nerve Stimulation/Neuromodulation

Devices used for the treatment of fecal incontinence (FI) are considered **investigational** because the effectiveness has not been established by the available, published peer reviewed literature therefore, the evidence is insufficient to determine the effects of the technology on net health outcomes to include but are not limited to the following:

- Anal inserts for bowel control (e.g., Renew Anal Insert)
- Electrical pelvic floor stimulation (e.g., InToneMV)
- Injectable bulking agents (e.g., Solesta or autologous fat)
- Magnetic pelvic floor stimulation (e.g., Translumbosacral Neuromodulation Therapy [TNT])
- Posterior tibial nerve stimulation (e.g., PTNS)
- Surgical placement of anal sling (e.g., TOPAS System)
- Transanal radiofrequency therapy (e.g., Secca procedure)
- Vaginal bowel control systems (e.g., Eclipse System)

PROCEDURE CODES AND BILLING GUIDELINES

To report provider services, use appropriate CPT* codes, Alpha Numeric (HCPCS level 2) codes, Revenue codes, and/or ICD diagnosis codes.

- 0587T Percutaneous implantation or replacement of integrated single device neurostimulation system including electrode array and receiver or pulse generator, including analysis, programming, and imaging guidance when performed, posterior tibial nerve
- 0588T Revision or removal of integrated single device neurostimulation system including electrode array and receiver or pulse generator, including analysis, programming, and imaging guidance when performed, posterior tibial nerve
- 0589T Electronic analysis with simple programming of implanted integrated neurostimulation system (eg, electrode array and receiver), including contact group(s), amplitude, pulse width, frequency (Hz), on/off cycling, burst, dose lockout, patient-selectable parameters, responsive neurostimulation, detection algorithms, closed-loop parameters, and passive parameters, when performed by physician or other qualified health care professional, posterior tibial nerve, 1-3 parameters
- 0590T Electronic analysis with complex programming of implanted integrated neurostimulation system (eg, electrode array and receiver), including contact group(s), amplitude, pulse width, frequency (Hz), on/off cycling, burst, dose lockout, patient-selectable parameters, responsive neurostimulation, detection algorithms, closed-loop parameters, and passive parameters, when performed by physician or other qualified health care professional, posterior tibial nerve, 4 or more parameter
- 46999 Unlisted procedure, anus (*may be indicated for bulking agents using Solesta or autologous fat; Eclipse System, anal sling TOPAS system or transanal radiofrequency therapy*)
- 58999 Unlisted procedure, female genital system (nonobstetrical) (*when indicated for Eclipse system*)
- 64566 Posterior tibial neurostimulation, percutaneous needle electrode, single treatment, includes programming
- 97014 Application of a modality to 1 or more areas; electrical stimulation (unattended) (*when indicated for pelvic floor stimulation [PFS]*)
- 97032 Application of a modality to 1 or more areas; electrical stimulation (manual), each 15 minutes (*when indicated for pelvic floor stimulation [PFS])*
- A4337 Incontinence supply rectal insert, any type each (when indicated for *Renew Anal Insert*)
- A4563 Rectal control system for vaginal insertion, for long term use, includes pump and all supplies and accessories, any type each (when indicated for *Eclipse System*)
- E0740 Incontinence treatment system, pelvic floor stimulator, monitor, sensor, and/or trainer
- L8605 Injectable bulking agent, dextranomer/hyaluronic acid copolymer implant, anal canal, 1 ml, includes shipping and necessary supplies

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POLICY HISTORY

Date	Reason	Action
May 2022	Annual Review	Policy Revised
May 2021	Annual Review	Policy Revised
June 2020	Interim Review	Policy Revised
May 2020	Annual Review	Policy Revised
November 2019	Interim Review	Policy Revised
May 2019	Annual Review	Policy Revised
May 2018	Annual Review	Policy Revised
May 2017	Annual Review	Policy Revised
June 2016	Annual Review	Policy Revised
July 2015	Annual Review	Policy Revised
August 2014	Annual Review	Policy Revised
September 2013	New Policy	New Policy

New information or technology that would be relevant for Wellmark to consider when this policy is next reviewed may be submitted to:

Wellmark Blue Cross and Blue Shield
Medical Policy Analyst
PO Box 9232
Des Moines, IA 50306-9232

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