Biofeedback as a Treatment of Urinary Incontinence in Adults

Policy Number: 2.01.27  Last Review: 10/2016
Origination: 7/2008  Next Review: 10/2017

Policy
Blue Cross and Blue Shield of Kansas City (Blue KC) will not provide coverage for biofeedback as a treatment of urinary incontinence. This is considered investigational.

Biofeedback and biofeedback devices are specifically excluded under many benefit plans. In addition, biofeedback and biofeedback devices are considered behavioral training and education/training in nature, and such services are also specifically excluded under many benefit plans.

When Policy Topic is covered
Not Applicable

When Policy Topic is not covered
Biofeedback in the outpatient setting is considered investigational as a treatment of urinary incontinence in adults.

Unsupervised home use of biofeedback for treatment of urinary incontinence is investigational.

Description of Procedure or Service

<table>
<thead>
<tr>
<th>Populations</th>
<th>Interventions</th>
<th>Comparators</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients/individuals with:</td>
<td>Interventions of interest are:</td>
<td>Comparators of interest are:</td>
<td>Relevant outcomes include:</td>
</tr>
<tr>
<td>● Adult-associated urinary</td>
<td>• Biofeedback in outpatient clinic or home settings</td>
<td>• PFMT without biofeedback</td>
<td>• Change in disease severity</td>
</tr>
<tr>
<td>incontinence</td>
<td>using an FDA-cleared device with PFMT</td>
<td></td>
<td>• Symptoms</td>
</tr>
</tbody>
</table>

PFMT: pelvic floor muscle training.

Biofeedback is a technique to teach patients self-regulation of physiologic processes not generally considered to be under voluntary control; a variety of
approaches and devices are available. Biofeedback, in conjunction with pelvic floor muscle training, is proposed as a treatment of urinary incontinence.

There is a lack of consistent evidence from randomized controlled trial (RCTs) that biofeedback improves incontinence outcomes in women or in men after prostate surgery compared with pelvic floor muscle exercises alone. No published evidence supports the unsupervised home use of biofeedback for treatment of urinary incontinence. The body of evidence consists of RCTs that have conflicting results.

**Background**

Urinary Incontinence is a common condition defined as an involuntary leakage of urine. Women are twice as likely to be affected as men, and prevalence increases with age. The severity of incontinence affects quality of life and treatment decisions. The types of urinary incontinence include stress, urge, overflow, functional, and postprostatectomy incontinence. Nonsurgical treatment options may include pharmacologic treatment, pelvic muscle exercises, bladder training exercises, electrical stimulation, and neuromodulation.

Biofeedback is a technique intended to teach patients self-regulation of certain physiologic processes not normally considered to be under voluntary control. The technique involves the feedback of a variety of types of information not commonly available to the patient, followed by a concerted effort on the part of the patient to use this feedback to help alter the physiologic process in some specific way. Biofeedback has been proposed as a treatment for a variety of diseases and disorders, including anxiety, headaches, hypertension, movement disorders, incontinence, pain, asthma, Raynaud disease, and insomnia. Biofeedback training is done either in individual or group sessions and as a single therapy or in combination with other therapies designed to teach relaxation. A typical program consists of 10 to 20 training sessions of 30 minutes each. Training sessions are performed in a quiet, nonarousing environment. Subjects are instructed to use mental techniques to affect the physiologic variable monitored, and feedback is provided for successful alteration of the physiologic parameter. This feedback may be in the form of signals, such as lights or tone, verbal praise, or other auditory or visual stimuli.

Biofeedback, in conjunction with PFMT, is a possible treatment modality for stress, urge, mixed, and overflow urinary incontinence because it may enhance awareness of body functions and the learning of exercises to train pelvic muscles. There are several proposed methods of biofeedback that may be employed for the treatment of urinary incontinence, including vaginal cones or weights, perineometers, and electromyographic (EMG) systems with vaginal and rectal sensors.

The various forms of biofeedback mainly differ in the nature of the disease or disorder under treatment, the biologic variable that the individual attempts to control, and the information that is fed back to the individual. Biofeedback techniques include peripheral skin temperature feedback, blood-volume-pulse feedback (vasoconstriction and dilation), vasoconstriction training (temporalis
artery), and EMG biofeedback; these may be used alone or in conjunction with other therapies (e.g., relaxation, behavioral management, medication).

**Regulatory Status**
A variety of biofeedback devices are cleared for marketing through the Food and Drug Administration’s (FDA) 510(k) process. The FDA defines a biofeedback device as “an instrument that provides a visual or auditory signal corresponding to the status of one or more of a patient's physiological parameters (e.g., brain alpha wave activity, muscle activity, skin temperature, etc.) so that the patient can control voluntarily these physiological parameters”.

**Rationale**
This policy was originally created in 1997 and was updated regularly with searches of the MEDLINE database. Most recently, the literature was reviewed through June 2, 2015. Following is a summary of the key literature to date.

As acknowledged in a 1995 TEC Assessment on biofeedback for various indications, there are several methodologic difficulties that arise in assessing biofeedback. For example, most interventions that include biofeedback are multimodal and include relaxation and behavioral instruction, which may have effects separate from those that may occur due to biofeedback. While studies may report a beneficial effect of multimodality treatment, without appropriate control conditions, it is impossible to isolate the specific contribution of biofeedback to the overall treatment effect. For example, relaxation, attention, or suggestion may account for successful results that have been attributed to biofeedback. These effects are nonspecific therapeutic factors, some of which can be considered placebo effects. To demonstrate efficacy of biofeedback for treating incontinence, studies are therefore needed that isolate the effect of biofeedback and demonstrate an improvement in health outcomes compared with other interventions such as relaxation or behavioral therapy alone. In addition, although studies in the 1990s found that feedback on physiologic processes provided patients with an enhanced ability to control these processes, evidence is needed on the relationship between a patient’s ability to exert control over the targeted physiologic process and any health benefits of the intervention. The latter finding underscores the importance of seeking controlled studies showing whether use of biofeedback improves disease-related health outcomes, as opposed to physiologic, intermediate outcomes.

**Women With Urinary Incontinence**
A number of randomized controlled trials (RCTs) addressing biofeedback for urinary incontinence have been published, and there are several systematic reviews of RCTs. In 2012, an Agency for Healthcare Research and Quality comparative effectiveness review was published. The review identified 6 RCTs with a total of 542 patients comparing pelvic floor muscle training (PFMT) including biofeedback with PFMT alone. A meta-analysis of these studies did not find a statistically significant difference between interventions in continence rates. When findings of the studies were pooled, the relative risk (RR) was 1.27 and the 95%
The confidence interval (CI) was 0.88 to 1.85. The absolute risk difference was 0.08 (95% CI, -0.03 to 0.19).

A 2011 Cochrane systematic review of RCTs included studies on feedback or biofeedback in conjunction with PFMT for treating urinary incontinence in women. To be included in the review, trials needed to study women with stress, urge, or mixed incontinence, and needed to have at least 2 arms with PFMT and at least 1 arm with feedback and/or biofeedback. Feedback was defined as verbal feedback by a clinician, whereas biofeedback involved use of an instrument or device. After examining 36 full-text articles, 24 trials were found to meet the review’s eligibility criteria, and 17 contributed data to the analysis of at least 1 primary outcome measure. Sixteen of the 24 trials included a comparison of PFMT plus biofeedback with PFMT alone; 9 of these included the same PFMT programs in both groups. The primary outcomes of the review were quality of life and improvement or cure. Nine trials used one of several validated quality-of-life instruments; however, only 4 of these reported data in a form that could be used for meta-analysis. Thus, quality-of-life results were not pooled. Data were pooled for the other primary outcome, improvement or cure, but there were a sufficient number of studies only for the comparison between PFMT with and without biofeedback. In a pooled analysis of 7 studies, there was a significant reduction in the proportion of women reporting “no improvement or cure” when biofeedback was added to muscle exercise (RR=0.75; 95% CI, 0.66 to 0.86). The authors noted that there may have been other differences between groups, such as more frequent contact with a health care professional or a greater number of treatment sessions, which might partially explain the difference in the improvement or cure rate in women who did or did not receive biofeedback. Moreover, when only the outcome ‘no cure’ was examined, there was not a significant difference between groups that did and did not receive biofeedback (5 studies; RR=0.92; 95% CI, 0.81 to 1.05). Among secondary outcomes, a pooled analysis of 7 trials did not find a significant difference in leakage episodes in a 24-hour period after treatment (mean difference = -0.01; 95% CI, -0.21 to 0.01). For the outcomes frequency and nocturia, data could not be combined but the review authors reported that the pattern was one of no difference between groups.

As noted in the description of the Cochrane review, previously described, studies evaluating biofeedback for treating urinary incontinence in women have used various combinations of interventions and a variety of comparison interventions. Selected larger RCTs that compared PFMT with and without biofeedback (ie, attempted to isolate the effect of biofeedback) and that were published as full articles are described next.

Burgio et al published a study in 2003 reporting on findings of a RCT with 222 women who had urge or mixed incontinence. Interventions in this 3-armed trial were as follows: (1) 74 patients who received behavioral training along with digital palpation instruction (no biofeedback) and 4 office visits in 8 weeks; (2) 73 patients who received biofeedback-assisted behavioral training and 4 office visits in 8 weeks; and (3) 75 patients who were given a self-help book with no office visits (control condition). Behavioral training in the 2 intervention groups included
teaching pelvic floor exercises, as well as skills and strategies for reducing incontinence. Patients in all groups kept bladder diaries through the 8-week treatment period. In an intention-to-treat analysis, the mean reduction in incontinence episodes was 69.4% in the behavioral training plus verbal feedback group, 63.1% in the behavioral training plus biofeedback group, and 58.6% in the control group. The 3 groups were not significantly different from one another (p=0.23). In addition, quality-of-life outcomes were similar in the 3 groups.

In 2006, Williams et al in the U.K. published a study that included 238 women who had failed a primary behavioral therapy (eg, advice on fluid intake, bladder reeducation, weight loss) for 3 months. They were randomized to receive intensive PFMT (n=79), PFMT using vaginal cones (n=80), or continued behavioral therapy (n=79) for 3 months. Patients in all 3 groups were seen in the clinic every other week for 8 weeks and also at 12 weeks. At 12 weeks, all 3 groups had moderate reductions in incontinence episodes and some improvement in voiding frequency; there were no statistically significant differences in outcomes among the 3 groups. For example, mean reduction in incontinence episodes over 24 hours was -1.03 in the PFMT group, -0.28 in the vaginal cone group, and -0.59 in the control group (p=0.2).

Several RCTs comparing the efficacy of PFMT alone with PFMT with biofeedback were published in 2012 and 2013. These studies tended not to find statistically significant differences in outcomes between interventions; however, sample sizes were small (ie, <25 per group) and thus the studies may have been underpowered.

**Section Summary**
Numerous RCTs have evaluated biofeedback as a treatment of urinary incontinence in women. The methodology of the studies has varied, and many were not able to isolate the potential contribution of biofeedback. A comparative effectiveness review did not find a statistically significant difference in continence rates when patients were treated with PFMT with biofeedback and PFMT without biofeedback. Previously, a Cochrane review evaluating biofeedback and/or verbal feedback as part of treatment for urinary incontinence found improvement in some outcomes (eg, improvement or cure) but not others (eg, cure, leakage episodes). There is a lack of consistent evidence from well-designed trials that biofeedback is an effective treatment of urinary incontinence.

**Men With Postprostatectomy Urinary Incontinence**
Several RCTs evaluating biofeedback to treat postprostatectomy urinary incontinence have been published. In addition, there have been several systematic reviews of RCTs.

In 2015, a Cochrane review was published on conservative treatments for postprostatectomy urinary incontinence. The review included a comparison of PFMT (with or without biofeedback) and sham or no treatment. It did not include an evaluation of the potential added value of biofeedback (ie, by comparing PFMT with biofeedback and PFMT without biofeedback).
Previously, in 2007, MacDonald et al published a systematic review of PFMT to improve urinary incontinence after radical prostatectomy. The review identified 3 studies (281 men) that compared biofeedback and PFMT with muscle training alone (written/verbal instructions provided). Study findings were not pooled; none of the individual trials found a statistically significant difference in outcomes between groups.

Representative relevant RCTs are described next.

A 2013 trial by Dijkstra-Eshuis et al in the Netherlands evaluated the impact of preoperative PFMT and biofeedback on postoperative stress urinary incontinence in men undergoing laparoscopic radical prostatectomy. Patients in the intervention group received 4 weekly sessions of biofeedback-assisted muscle training before surgery. Patients assigned to the control group did not have a presurgical intervention. The primary outcome was the rate of continence 1 year after surgery. The investigators originally planned to enroll 248 patients. However, an interim analysis after 122 patients were enrolled showed no significant benefit for the intervention group, even if the trial was completed as planned and therefore, the trial was halted prematurely. Among the 74 patients available for follow-up analysis, 66% in the intervention group and 80% in the control group were continent at 1 year.

In 2012, Tienforti et al in Italy compared biofeedback (sessions before and after surgery) in combination with written/verbal instructions on performing pelvic floor muscle exercises with a control intervention of written/verbal instructions alone. The study included 34 patients, 32 of whom (16 in each group) were available for the final 6-month analysis. By 6 months, 10 of 16 patients (62.5%) in the treatment group and 1 of 16 patients (6.3%) in the control group had achieved continence; this difference was statistically significant (p value not reported). The mean number of incontinence episodes per week was also significantly lower in the intervention group (2.7) than the control group (13.1) at 6 months.

Two trials have evaluated the combination of postoperative biofeedback and electrical stimulation in men with postprostatectomy incontinence. (These studies are also discussed in Policy No. 1.01.17.) The trials had mixed findings. Mariotti et al (2009) found a beneficial effect of the combined intervention of biofeedback and electrical stimulation, whereas the Goode et al (2011) study did not find a benefit compared with behavioral therapy alone. Both studies were limited in that they did not isolate the effect of biofeedback, and thus the independent effect of biofeedback on outcomes cannot be determined. The Mariotti trial, conducted in Italy, compared a program of pelvic floor electrical stimulation and electromyographic biofeedback (2 sessions weekly for 6 weeks) with written/verbal instructions for pelvic floor muscle exercises. Treatment started 7 days after catheter removal. All 60 patients (30 per group) completed the study through the 6-month follow-up. The mean time to regain continence was significantly shorter in the treatment group (8.0 weeks) than the control group (13.9 weeks, p=0.003). The continence rate was significantly higher in the
treatment group beginning at the 4-week visit and continuing through the 20-week visit at which time 29 of 30 (96.7%) in the treatment group and 18 of 30 (60%) in the control group were continent. The difference in the rate of continence was not statistically significantly different at the final, 6-month visit at which time 29 patients in the treatment group continued to be continent compared with 20 of 30 (66.7%) in the control group. In this study, the effect of biofeedback without electrical stimulation compared with written/verbal instructions to perform pelvic floor muscle exercises was not evaluated.

The 2011 study by Goode et al included 208 men with urinary incontinence persisting at least 1 year after radical prostatectomy. Men with preprostatectomy incontinence were excluded. Participants were randomized to 1 of 3 groups; 8 weeks of behavioral therapy (PFMT and bladder control exercises) (n=70), behavioral therapy plus biofeedback and electrical stimulation (n=70), and a delayed-treatment control group (n=68). The biofeedback and electrical stimulation intervention, called “behavior-plus,” consisted of in-office electrical stimulation with biofeedback using an anal probe and daily home pelvic floor electrical stimulation. After 8 weeks, patients in the 2 active treatment groups were given instructions for a maintenance program of pelvic floor exercises and fluid control and were followed up at 6 and 12 months. The primary efficacy outcome was reduction in the number of incontinent episodes at 8 weeks, as measured by a 7-day bladder diary. A total of 176 of 208 (85%) randomized men completed the 8 weeks of treatment. In an intention-to-treat analysis of the primary outcome, the mean reduction in incontinent episodes was 55% (28-13 episodes/week) in the behavioral therapy group, 51% (26-12 episodes/week) in the behavior-plus group, and 24% (25-20 episodes/week) in the control group. The overall difference between groups was statistically significant (p=0.001), but the behavior plus intervention did not result in a significantly better outcome than behavioral therapy alone. Findings were similar on other outcomes. For example, at the end of 8 weeks, there was a significantly higher rate of complete continence in the active treatment groups (11/70 [16%] in the behavior group, 12/70 [17%] in the behavior-plus group) than the control group (4/68 [6%]), but the group receiving biofeedback and electrical stimulation did not have a significantly higher continence rate than the group receiving behavioral therapy alone.

Section Summary
Several RCTs on biofeedback for prevention and/or treatment of postprostatectomy incontinence have been completed, with mixed results. Some studies report a significant improvement in symptoms with biofeedback, but others do not. This evidence is insufficient to determine whether biofeedback improves health outcomes for patients with postprostatectomy incontinence.

Summary of Evidence
There is a lack of consistent evidence from randomized controlled trials (RCTs) that biofeedback improves incontinence outcomes in women or in men after prostate surgery compared with pelvic floor muscle exercises alone. No published evidence supports the unsupervised home use of biofeedback for treatment of
urinary incontinence. The body of evidence consists of RCTs that have conflicting results.

Clinical Input Received From Physician Specialty Societies and Academic Medical Centers

While the various physician specialty societies and academic medical centers may collaborate with and make recommendations during this process, through the provision of appropriate reviewers, input received does not represent an endorsement or position statement by the physician specialty societies or academic medical centers, unless otherwise noted.

In response to requests, input was received through 4 physician specialty societies and 2 academic medical centers while this policy was under review in 2009. The clinical input was variable. Several reviewers commented about the lack of data (eg, those who cannot do pelvic exercises), as well as the inability to separate from the available literature the contribution of biofeedback to overall outcomes in many studies.

American College of Physicians

In 2014, the American College of Physicians published a clinical practice guideline on nonsurgical management of urinary incontinence in women. The guideline was based on literature published through December 2013. The authors concluded that low-quality evidence showed that pelvic floor muscle training (PFMT) with biofeedback using a vaginal electromyography probe increased continent compared to no active treatment and that high-quality evidence showed that this combination of treatments improved urinary incontinence symptoms compared to no active treatment. The guideline did not address the comparison of PFMT alone and PFMT plus biofeedback.

Agency for Healthcare Research and Quality

In April 2012, Agency for Healthcare Research and Quality published a comparative effectiveness review on nonsurgical treatment of urinary incontinence in women. (Evidence is discussed earlier). The review included the following conclusion on biofeedback: “Women with stress UI [urinary incontinence] can achieve continence performing PFMT. Continence rates are similar between those who undergo PFMT with and without biofeedback.”

National Institute for Health and Clinical Excellence

In 2013 the National Institute for Health and Clinical Excellence published an updated guideline on the management of urinary incontinence in women. The recommendation is: “perineometry or pelvic floor electromyography as biofeedback should not be used as a routine part of pelvic floor muscle training” but that “electrical stimulation and/or biofeedback should be considered in women who cannot actively contract pelvic floor muscles in order to aid motivation and adherence to therapy.” The conclusion regarding use of biofeedback is based on expert opinion.
**Canadian Urological Association**
In 2012, the Canadian Urological Association issued a guideline on treatment of adult urinary incontinence. The guideline included the following conclusions on the use of biofeedback:

**Postprostatectomy incontinence:** Preoperative biofeedback-assisted behavioral training may shorten the time to regain continence postoperatively and reduce the prevalence of severe incontinence 6 months after the procedure. Postoperative biofeedback did not appear to improve continence outcomes compared with PFMT.

**Stress incontinence:** The benefit of biofeedback is unknown.

**National Institutes of Health**
In 2007, National Institutes of Health convened a Consensus Development Conference, *Prevention of Fecal and Urinary Incontinence* and subsequently released a statement. Included in this statement was the following regarding PFMT and biofeedback:

“Pelvic floor muscle training and biofeedback are effective in preventing and reversing some pregnancy-related fecal and urinary incontinence for the first year after delivery. There is insufficient research on the sustained long-term benefits of pelvic floor muscle training or biofeedback on preventing fecal or urinary incontinence.”

**U.S. Preventive Services Task Force Recommendations**
Not applicable.

**Medicare National Coverage**
A national coverage determination was published in 2001 (publication no. 100-3, section 30.1.1). It states:

“This policy applies to biofeedback therapy rendered by a practitioner in an office or other facility setting.

Biofeedback is covered for the treatment of stress and/or urge incontinence in cognitively intact patients who have failed a documented trial of pelvic muscle exercise (PME) training. Biofeedback is not a treatment, per se, but a tool to help patients learn how to perform PME. Biofeedback-assisted PME incorporates the use of an electronic or mechanical device to relay visual and/or auditory evidence of pelvic floor muscle tone, in order to improve awareness of pelvic floor musculature and to assist patients in the performance of PME.

A failed trial of PME training is defined as no clinically significant improvement in urinary incontinence after completing 4 weeks of an ordered plan of pelvic muscle exercises to increase periurethral muscle strength.

Contractors may decide whether or not to cover biofeedback as an initial treatment modality.
Home use of biofeedback therapy is not covered.”

References

Billing Coding/Physician Documentation Information

**90875** Individual psychophysiological therapy incorporating biofeedback training by any modality (face-to-face with the patient), with psychotherapy (eg, insight oriented, behavior modifying or supportive psychotherapy); approximately 20-30 minutes

**90876** Individual psychophysiological therapy incorporating biofeedback training by any modality (face-to-face with the patient), with psychotherapy (eg, insight oriented, behavior modifying or supportive psychotherapy); approximately 45-50 minutes

**90901** Biofeedback training by any modality

**90911** Biofeedback training, perineal muscles, anorectal or urethral sphincter, including EMG and/or manometry

**E0746** Electromyography (EMG), biofeedback device

Policy Implementation/Update Information

7/1/08 New policy; considered investigational.
7/1/09 No policy statement changes.
7/1/10 Unsupervised home use of biofeedback for treatment of urinary incontinence included as investigational.
7/1/11 Policy statement revised; “outpatient setting” added to first policy statement.
7/1/12 No policy statement changes.
7/1/13 No policy statement changes.
10/1/13 No policy statement changes.
10/1/14 No policy statement changes.
10/1/15 No policy statement changes.
10/1/16 No policy statement changes.

State and Federal mandates and health plan contract language, including specific provisions/exclusions, take precedence over Medical Policy and must be considered first in determining eligibility for coverage. The medical policies contained herein are for informational purposes. The medical policies do not constitute medical advice or medical care. Treating health care providers are independent contractors and are neither employees nor agents Blue KC and are solely responsible for diagnosis, treatment and medical advice. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, photocopying, or otherwise, without permission from Blue KC.