

Balloon Dilation of the Eustachian Tube

Effective: July 1, 2021

Next Review: March 2022

Last Review: May 2021

IMPORTANT REMINDER

Medical Policies are developed to provide guidance for members and providers regarding coverage in accordance with contract terms. Benefit determinations are based in all cases on the applicable contract language. To the extent there may be any conflict between the Medical Policy and contract language, the contract language takes precedence.

PLEASE NOTE: Contracts exclude from coverage, among other things, services or procedures that are considered investigational or cosmetic. Providers may bill members for services or procedures that are considered investigational or cosmetic. Providers are encouraged to inform members before rendering such services that the members are likely to be financially responsible for the cost of these services.

DESCRIPTION

Balloon dilation of the Eustachian tube is a tuboplasty procedure intended to improve the patency of the cartilaginous Eustachian tube. During the procedure, a saline-filled balloon catheter is introduced into the Eustachian tube through the nose using a minimally invasive transnasal endoscopic method. Pressure is maintained for approximately two minutes after which the balloon is emptied and removed. The procedure is usually performed under general anesthesia.

MEDICAL POLICY CRITERIA

- I. Balloon dilation of the eustachian tube for treatment of chronic obstructive eustachian tube dysfunction in adults (18 years and older) may be considered **medically necessary** when all of the following Criteria are met (A. – D.):
 - A. Patient has chronic signs and symptoms of obstructive eustachian tube dysfunction that impairs function and meets all of the following Criteria (1. – 4.):
 1. The patient does not have patulous eustachian tube dysfunction or another contraindication (See Policy Guidelines); and
 2. Symptoms have occurred for at least 12 months including but not limited to aural fullness, aural pressure, otalgia, or hearing loss; and

3. The patient does not have other causes of aural fullness such as temporomandibular joint disorders, extrinsic obstruction of the eustachian tube, superior semicircular canal dehiscence, and endolymphatic hydrops; and
 4. Symptoms are continuous rather than episodic (e.g., symptoms occur only in response to baro-challenge such as pressure changes while flying); and
- B. The patient has undergone a comprehensive diagnostic assessment documenting all of the following findings:
 1. Abnormal tympanogram (Type B or C); and
 2. Abnormal tympanic membrane (retracted membrane, effusion, perforation, or any other abnormality identified on exam); and
 - C. Failure to respond to appropriate medical management of co-occurring conditions, including 4-6 weeks of a nasal steroid spray if indicated. Co-occurring conditions include but are not limited to allergic rhinitis, rhinosinusitis, and laryngopharyngeal reflux; and
 - D. If the patient had a history of tympanostomy tube placement, symptoms of obstructive eustachian tube dysfunction should have improved while tubes were patent.
- II. Balloon dilation of the eustachian tube is considered **not medically necessary** when Criterion I. is not met.
 - III. Balloon dilation of the eustachian tube is considered **investigational** for repeat balloon dilation of the eustachian tube and all other indications.

NOTE: A summary of the supporting rationale for the policy criteria is at the end of the policy.

POLICY GUIDELINES

Contraindications to Balloon Dilation of the Eustachian Tube

The following patients should not be considered for balloon dilation of the eustachian tube:

- Patients with patulous eustachian tube dysfunction
 - A diagnosis of patulous ETD is suggested by symptoms of autophony of voice, audible respirations, pulsatile tinnitus, and/or aural fullness.
- Patients with extrinsic reversible or irreversible causes of eustachian tube dysfunction including but not limited to:
 - craniofacial syndromes, including cleft palate spectrum
 - neoplasms causing extrinsic obstruction of the eustachian tube
 - history of radiation therapy to the nasopharynx
 - enlarged adenoid pads
 - nasopharyngeal mass
 - neuromuscular disorders that lead to hypotonia/ineffective eustachian tube dynamic opening
 - systemic mucosal or autoimmune inflammatory disease affecting the mucosa of the nasopharynx and eustachian tube (e.g. Samter's triad, Wegener's disease, mucosal pemphigus) that is ongoing/active (i.e. not in remission)

- Patients with aural fullness but normal exam and tympanogram
- Patients with chronic and severe atelectatic ears

LIST OF INFORMATION NEEDED FOR REVIEW

REQUIRED DOCUMENTATION:

The information below **must** be submitted for review to determine whether policy criteria are met. If any of these items are not submitted, it could impact our review and decision outcome.

- History and physical/chart notes including length of time signs and specific symptoms of obstructive eustachian tube dysfunction have been present and have impaired function.
- Indication for the requested service.
- Documentation patulous eustachian tube dysfunction and other contraindications to the procedure have been ruled out.
- Diagnostic findings documenting abnormal tympanogram and an abnormal tympanic membrane.
- Documentation of failure of medical management for any co-occurring conditions and specify length of time it was trialed.
- If there is a history of tympanostomy tube placement, provide documentation that symptoms of obstructive eustachian tube dysfunction improved while tubes were patent.

CROSS REFERENCES

1. [Balloon Ostial Dilatation for Treatment of Sinusitis](#), Surgery, Policy No. 153

BACKGROUND

EUSTACHIAN TUBE FUNCTION

The Eustachian tube (ET) connects the middle ear space to the nasopharynx. It is approximately 36 mm long in adults. The ET ventilates the middle ear space to equalize pressure across the tympanic membrane, clears mucociliary secretions, and protects the middle ear from infection and reflux of nasopharyngeal contents.^[1] The tube opens during swallowing or yawning.

Eustachian tube dysfunction (ETD) occurs when the functional valve of the ET fails to open and/or close properly. This failure may be due to inflammation or anatomic abnormalities. ET dilatory dysfunction (ETDD) is most commonly caused by inflammation including rhinosinusitis and allergic rhinitis. ETDD can cause symptoms such as muffled hearing, ear fullness, tinnitus, and vertigo.^[2] Chronic ETDD can lead to hearing loss, otitis media, tympanic membrane perforation, and cholesteatomas.

EPIDEMIOLOGY OF ETD

The epidemiology of ETD, including incidence and prevalence of the disorder and associated symptoms in the community, primary care, and referral populations, is not well-characterized. Data are also lacking to describe the natural history of the disorder and impact on patient functioning.

DIAGNOSIS AND OUTCOME MEASURES

There are no comprehensive guidelines regarding the diagnosis of ETD. Schilder (2015) published a consensus statement from an international group of scientists and physicians with expertise in Eustachian tube disorders, prompted by a Health Technology Assessment from the UK National Institute of Health and Research stating that an important limitation with available evidence for treatments of ETD is a lack of consensus on the definition and diagnosis.^[1] The meeting was funded by Acclarent, a manufacturer of a dilation technology. The following summarize relevant 2015 consensus statements from the group.

- There is no universally accepted set of patient-reported symptom scores, functional tests, or scoring systems to diagnose ETD.
- Diagnosis of ETDD should consider patient-reported symptoms along with evidence of negative pressure in the middle ear assessed by clinical assessment.
- Transient ETD is ETD with symptoms and signs lasting less than 3 months while chronic ETD is ETD with symptoms and signs lasting for more than 3 months.
- Future clinical trials should include outcomes related to patient-reported symptoms, otoscopy, tympanometry, and pure-tone audiometry, and outcomes should be assessed at baseline, in the short term (6 weeks to 3 months) and in the long term (6-12 months).
- The 7-item Eustachian Tube Dysfunction Questionnaire (ETDQ-7) is the only patient-reported outcome scale to have undergone initial validation studies.

Tympanometry is a frequently used outcome measure in ETD. Tympanometry measures the mobility of the tympanic membrane and graphically displays results in tympanograms. Tympanograms are classified by the height and location of the tympanometric peak. They are classified into three general patterns: type A indicates normal middle ear and ET function; type B indicates poor tympanic membrane mobility (“flat” tympanogram); and type C indicates the presence of negative middle ear pressure.^[3]

The ETDQ-7 is used to assess ETD-related symptoms such as pressure, pain, “clogged” ears, and muffled hearing over the previous month. The 7 items are rated by patients on a 7-level scale from 1 (no problem) to 7 (severe problem). The overall score is reported as a mean item score with a range from 1.0 to 7.0. ETDQ-7 has been shown to be a valid and reliable symptom score for use in adults with ETD with overall score of 2.1 or higher having high accuracy to detect the presence of ETD.^[4]

Other important outcomes for evaluating a treatment for ETD are hearing outcomes, otitis media, clearance of middle ear effusion, tympanic membrane retraction, and quality of life. Another important consideration is the need for additional treatment, e.g., additional surgical procedures (including reintervention).

TREATMENT OF ETDD

Medical management of ETDD is directed by the underlying etiology: treatment of viral or bacterial rhinosinusitis; systemic decongestants, antihistamines, or nasal steroid sprays for allergic rhinitis; behavioral modifications and/or proton pump inhibitors for laryngopharyngeal reflux; and treatment of mass lesions. Although topical nasal steroids are commonly used for ETDD, triamcinolone acetonide failed to show benefit in patients ages six and older presenting

with otitis media with effusion and/or negative middle ear pressure in a randomized, placebo-controlled, double-blind trial published in 2011.^[5]

Patients who continue to have symptoms following medical management may be treated with surgery. Available surgical management includes myringotomy with placement of tympanostomy tubes or eustachian tuboplasty. There is limited evidence supporting use of these surgical techniques.^[6] Norman (2014) reported that eustachian tuboplasty (other than balloon dilation) has been evaluated in seven case series and was associated with improvement in symptoms in 36% to 92% of patients with low rates (13%-36%) of conversion to type A tympanogram (which is normal). Myringotomy and tympanostomy have been evaluated in two case series and were associated with symptom alleviation in a subgroup of patients.^[6]

REGULATORY STATUS

In December 2015, the AERA® (Acclarent) was granted a de novo 510(k) classification by the U.S. Food and Drug Administration (FDA) (class II, FDA product code: PNZ).^[7] The new classification applies to this device and substantially equivalent devices of this generic type. The device was cleared for marketing by FDA through the 510(k) process (K163509) in January 2018. The AERA® is cleared for dilating the Eustachian tube in patients ages 22 and older with persistent ETD.

In April 2017, the XprESS™ ENT Dilation System (Entellus Medical, Plymouth, MN) was cleared for marketing by FDA through the 510(k) process (K163509).^[8] FDA determined that this device was substantially equivalent to existing devices for use in Eustachian tube dysfunction. The predicate devices are XprESS™ Multi-Sinus Dilation System and AERA® Eustachian Tube Balloon Dilation System.

EVIDENCE SUMMARY

SCIENTIFIC EVIDENCE

Evaluating the safety and effectiveness of balloon dilation of the Eustachian tube requires randomized comparisons with standard treatments. These comparisons are necessary to determine whether the benefits of balloon dilation of the Eustachian tube outweigh any risks and whether they offer advantages over conventional methods with respect to increasing quality of life and decreasing long-term morbidity and mortality, or secondary outcomes such as improved Eustachian tube function. The evidence summary below is focused on systematic reviews and randomized controlled trials (RCTs).

Systematic Reviews

Froehlich (2020) conducted a systematic review and meta-analysis of balloon dilation for eustachian tube dysfunction.^[9] Twelve studies were included in the meta-analysis, including three RCTs, five prospective observational studies, and four case series. One RCT (Liang 2016) that compared balloon dilation to tympanic paracentesis reported tympanometry and otoscopy scores but not symptoms. The other two RCTs compared balloon dilation plus medical management to medical management alone and used the ETDQ-7 to measure symptoms. Pooled analyses showed improvements in subjective and objective measures including ETDQ-7 scores, tympanograms, otoscopy exams, and ability to perform a Valsalva maneuver. Improvements appeared to be maintained in studies with longer-term follow up (3-

12 months). Case series included in these reviews consistently reported that patients experienced improvement when comparing symptoms before and after balloon dilation. The studies varied in the type of medical management used to treat eustachian tube dysfunction before and after balloon dilation.

The results of two additional systematic reviews and meta-analyses for adults with ETD who were treated with balloon dilation are discussed here. Huisman (2018)^[10] provided pooled results for 15 case series (n=1,155) while Hwang (2016)^[11] provided qualitative summaries only, for nine case series (n=474). Most selected case series provided follow-up of less than a year. All case series reported that patients experienced improvement when comparing symptoms before and after balloon dilation. The selected studies differed with respect to other treatments for ETD used before and after balloon dilation. In Huisman (2018), revisions due to failure of the first ET balloon dilation procedure were reported in three of the 15 studies (n=714); 122 revisions were reported. Huisman (2018) also reported studies had methodological limitations including risk of bias and high heterogeneity and that high quality RCTs are needed.

Jufas (2016) published a SR that evaluated balloon dilation, with a transtympanic approach for Eustachian tube dysfunction (ETD).^[12] Three limited case series were included. The authors concluded there was a high risk of bias and safety and efficacy outcomes were conflicting.

Randrup (2015) published a SR evaluating balloon eustachian tuboplasty for ETD.^[13] The authors evaluated nine case series and health outcomes for 443 patients. All case series were poor quality and had a high risk of bias.

Randomized Controlled Trials

Meyer (2018) published the results of a one-year-follow-up-inclusive, prospective, multi-center RCT of balloon dilation as a treatment for persistent eustachian tube dysfunction (ETD) and compared the intervention to continued medical therapy (control).^[14] Inclusion criteria required patients be diagnosed with medically refractory, persistent ETD. Participants were randomly assigned (1:1) to intervention or control; however, control participants were offered the intervention after six weeks if their symptoms remained. The outcomes measured include primary efficacy endpoint using Eustachian Tube Dysfunction Questionnaire (ETDQ-7) scores and the rate of complications. The trial involved 60 randomized participants (31 intervention, 29 control). Mean (SD) change in overall ETDQ-7 score at six weeks was 2.9 (1.4) for balloon dilation compared with 0.6 (1.0) for control: balloon dilation was superior to control (p<0.0001). No complications were reported in either study arm. Among participants with abnormal baseline assessments, improvements in tympanogram type (p < 0.006) and tympanic membrane position (p<0.001) were significantly better for balloon dilation than control. Improvements in the ETDQ-7 scores were maintained through 12 months after balloon dilation. Limitations of this RCT are its small sample size and the inability to blind the participants to their treatment.

Cutler (2019) reported longer-term follow-up data on a subset of patients from the treatment arm of the RCT reported by Meyer.^[15] Of 58 patients from the original study who were eligible for the extension study, 47 were enrolled in the follow up study. The mean follow-up time was 29.4 months post-procedure. Changes from baseline at the end of the longer-term follow-up period were similar to improvements observed at one year on outcome measures including the ETDQ-7, normalized tympanogram, ability to perform the Valsalva maneuver, and patient satisfaction. One patient underwent a revision ET dilation after 362 days, performed

concurrently with balloon dilation for recurrent sinus disease. No other surgeries or adverse events were reported.

Poe (2017) published a randomized trial (n=323) comparing balloon dilation of the eustachian tube (BDET) with ET balloon catheter (ETBC) plus medical management versus medical management alone. Participants were 22 years or older, had persistent patient-reported symptoms of ETD (ETDQ-7; mean item score, ≥ 2.1), abnormal tympanometry (type B or type C), and failed medical management including either a minimum of four weeks of daily use of any intranasal steroid spray or a minimum of one course of an oral steroid.^[16] The balloon catheter used in the trial was a custom-designed ET balloon catheter (Acclarent). The RCT results are also described in the AERA (Acclarent) de novo summary from the Food and Drug Administration.^[7]

The investigators in this study were required to perform three successful ETBC procedures in nonrandomized “lead-in” patients who were then followed for durability and safety outcomes. Randomization and analyses were performed at the person-level regardless of whether the patient had unilateral or bilateral ETD. The primary efficacy outcome (normalization of tympanometry) was assessed by both site investigators and a blinded, independent evaluator; discrepancies were resolved by a second independent evaluator. For bilaterally treated patients, both ears had to be rated as normalized for that patient to be considered normalized for the primary outcome. Patients completed follow-up visits at 2, 6, 12, 24, and 52 weeks but data from the 52-week visit have not been reported. Patients in the medical management arm were allowed to receive BDET after the six-week visit. Trial enrollment was stopped early after the second preplanned look when the prespecified O’Brien-Fleming stopping boundary for the primary outcome was crossed.

At baseline, the mean ETDQ-7 score was 4.7, 43% of patients had allergic rhinitis, and 61% of patients had at least one prior ear tube surgery. By the second interim analysis, 162 patients had been assigned to ETBC and 141 were included in analysis; 80 had been assigned to medical management and 72 were included in analysis. Patients were included in analysis if they received the study treatment for which they were randomized and had 6-week follow-up data. Approximately 52% of ETBC patients experienced tympanogram normalization at 6 weeks compared with 14% of medical management patients ($p < .001$). The publication reported that sensitivity analysis was performed to test the robustness of results for the impact of missing data in the analysis cohort versus an intention-to-treat cohort, but the method of sensitivity analyses was not described. It was noted that there was a significant treatment by site interaction. Two sites had a higher percentage of tympanogram normalization for MM subjects than for ETBC subjects while the remaining sites had higher normalization for ETBC. The pre-specified secondary efficacy outcome (percentage with minimal clinically important difference change of 0.5 points on ETDQ-7) was not reported in the publication but was reported in the FDA summary. The minimal clinically important difference change in ETDQ-7 scores was observed for 91% of ETBC patients at 6 weeks compared with 45% of medical management patients (p not reported). Fifty-six percent of ETBC patients had an ETDQ-7 mean item score of less than 2.1 at six weeks compared with about 9% of medical management patients ($p < 0.001$). See the summary of results in table 2 below.

Comparative analyses were not possible after six weeks because 82% of medical management patients elected to ETBC after 6 weeks. Durability of the effect is supported by analysis of tympanogram normalization in 170 patients with week 24 data (98 randomized to ETBC and 74 from the lead-in); 62% of those randomized to ETBC and 58% of lead-in patients

demonstrated tympanogram normalization at 24 weeks. Data from 52 weeks have not been reported.

This trial had methodological limitations, including the inability to blind patients, the exclusion of patients who did not received the assigned treatment, and the premature ending of the study. In addition, there were relevance gaps that prevented the RCT from providing enough evidence to guide treatment for ETDD. These included but are not limited to:

- Patients continued nasal steroids and other medications prescribed prior to the study
- Hearing outcomes were not reported
- Short-term follow-up prevented evaluation of long-term outcomes.

Table 2. Summary of Key RCT Results

Study (Year)	Normalization of Tympanometry (% of patients)	ETDQ-7 Symptom Scores <2.1 (% of patients) ^a	Change in Mean ETDQ-7 Score (SD)	Change in Mucosal Inflammation	Positive modified Valsalva Maneuver (% ears)	SAEs (no. of events)
Poe (2017)^[16]						
N	211	208		NR	NR	NR
BDET plus MM	52%	56%		+22%	33%	4
MM	14%	9%		-5%	3%	1
Tx effect	RR=NR	RR=NR		NR	NR	NR
p	<0.001	<0.001				
Meyer (2018)^[14]						
N			28			
BDET plus MM			-2.9 (1.4)			
N			27			
MM			-0.6 (1.0)			
p			<0.0001			

BDET: balloon dilation of the Eustachian tube; BL: baseline; ETDQ-7: 7-item Eustachian Tube Dysfunction Questionnaire; MM: medical management; NR: not reported; RR: relative risk; SAE: serious adverse event; Tx: treatment.

^a The prespecified secondary outcome was the proportion of subjects achieving an improvement of at least a minimal clinically important difference of 0.5 points; it was not reported.

Adverse events were only briefly described in the publication but are more fully described in the Food and Drug Administration summary.^[7] Two-hundred ninety-nine patients who were treated with ETBC were included in the safety analysis (80 lead-in patients, 149 patients randomized ETBC, 70 patients randomized to medical management who received ETBC). There were 16 nonserious device or procedure-related adverse events in 13 patients—most commonly, epistaxis and ETD. Two patients had three potentially device-related adverse events: mucosal tear, worsened ETD, and conductive hearing loss. The potentially device- or procedure-related adverse events were mild or moderate in severity and resolved without sequelae. Five serious adverse events were reported (four events in the BDET group, one event in the MM group); all were thought to be unrelated to device, procedure, or medication.

A 12-month follow-up on the treatment group was published by Anand (2019), which reported that the overall number of patient with normalized tympanograms and ETDQ-7 scores at one year were comparable to those reported after six weeks (71/128 vs. 73/143 and 71/124 vs. 79/142, respectively).^[17] Results in the control group were not assessed.

Nonrandomized Studies

Satmis (2018) published a retrospective cohort study of 42 consecutive adult patients with chronic dilatory eustachian tube dysfunction. Patients in a tertiary referral hospital setting who received transnasal balloon dilation of the Eustachian tube were evaluated. Objective outcome measures included the ETDQ-7 score, bone conduction threshold, and tympanic membrane and middle ear conditions, which were pre and postoperatively collected. Mean ETDQ-7 scores improved from 4.28 to 3.09 and from 4.10 to 2.96 postoperatively at one and three months, respectively. There was a 62.0% improvement in tympanic membrane and middle ear condition. No serious procedure related complications were reported.

PRACTICE GUIDELINE SUMMARY

NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE (NICE)

In 2019, The National Institute for Health and Care Excellence (NICE) published updated guidance on balloon dilation of the eustachian tube.^[18] The guidance was based on a rapid review of the evidence and stated: "Evidence on the safety and efficacy of balloon dilation for eustachian tube dysfunction is adequate to support the use of this procedure provided that standard arrangements are in place for clinical governance, consent and audit." NICE standard arrangements recommendations mean that there is enough evidence for doctors to consider the procedure as an option. The guidance also noted:

- The procedure was not effective in all patients, and there was little evidence on the benefit of repeat procedures.
- The procedure is only indicated for chronic eustachian tube dysfunction refractory to medical treatment.

AMERICAN ACADEMY OF OTOLARYNGOLOGY-HEAD AND NECK SURGERY FOUNDATION

In 2019, The American Academy of Otolaryngology published a clinical consensus statement on balloon dilation of the eustachian tube.^[19] The target population was defined as adults ages 18 years or older who are candidates for BDET because of obstructive eustachian tube dysfunction (ETD) in 1 or both ears for 3 months or longer that significantly affects quality of life or functional health status. The expert panel concluded:

- BDET is an option for treatment of patients with obstructive ETD.
- The diagnosis of obstructive ETD should not be made without a comprehensive and multifaceted assessment, including otoscopy, audiometry, and nasal endoscopy.
- BDET is contraindicated for patients diagnosed as having a patulous ETD
- Further study will be needed to refine patient selection and outcome assessment.

The authors emphasized the importance of identifying other potentially treatable causes of ETD, including allergic rhinitis, rhinosinusitis, and laryngopharyngeal reflux, and noted that medical management of these disorders is indicated prior to offering BDET. They also noted that potential risks of BDET that are relevant to patient counseling include bleeding, scarring, infection, development of patulous ETD, and/or the need for additional procedures.

SUMMARY

There is enough research to show that balloon dilation of the Eustachian tube improves health outcomes in patients with chronic signs and symptoms under certain circumstances.

Additionally, clinical practice guidelines recommend the use of balloon dilation of the Eustachian tube for select patients. Therefore, the use of balloon dilation of the Eustachian tube may be considered medically necessary for the treatment of Eustachian tube dysfunction when policy criteria are met.

Due to not showing positive health outcomes for patients who do meet patient selection criteria, the use of balloon dilation for the treatment of Eustachian tube dysfunction is considered not medically necessary when policy criteria are not met.

There is not enough research to show that balloon dilation of the Eustachian tube improves health outcomes for people with any other indication or for repeat balloon dilation procedures. Therefore, balloon dilation of the Eustachian tube is considered investigational for the treatment for any other indication or repeat balloon dilation procedures.

REFERENCES

1. AG Schilder, MF Bhutta, CC Butler, et al. Eustachian tube dysfunction: consensus statement on definition, types, clinical presentation and diagnosis. *Clinical otolaryngology : official journal of ENT-UK ; official journal of Netherlands Society for Oto-Rhino-Laryngology & Cervico-Facial Surgery*. 2015;40(5):407-11. PMID: 26347263
2. JW Seibert, CJ Danner. Eustachian tube function and the middle ear. *Otolaryngol Clin North Am*. 2006;39:1221-35. PMID: 17097443
3. J Katz. *Handbook of Clinical Audiology*. 5th ed. Baltimore: Lippincott Williams & Wilkins, 2002, pp.
4. ED McCoul, VK Anand, PJ Christos. Validating the clinical assessment of eustachian tube dysfunction: The Eustachian Tube Dysfunction Questionnaire (ETDQ-7). *The Laryngoscope*. 2012;122(5):1137-41. PMID: 22374681
5. MB Gluth, DR McDonald, AL Weaver, CD Bauch, CW Beatty, LJ Orvidas. Management of eustachian tube dysfunction with nasal steroid spray: a prospective, randomized, placebo-controlled trial. *Arch Otolaryngol Head Neck Surg*. 2011;137:449-55. PMID: 21576556
6. G Norman, A Llewellyn, M Harden, et al. Systematic review of the limited evidence base for treatments of Eustachian tube dysfunction: a health technology assessment. *Clinical otolaryngology : official journal of ENT-UK ; official journal of Netherlands Society for Oto-Rhino-Laryngology & Cervico-Facial Surgery*. 2014;39(1):6-21. PMID: 24438176
7. FDA. Food and Drug Administration. De Novo Classification Request For Acclarent Aera™ Eustachian Tube Balloon Dilation System. 2015. [cited 4/15/2021]. Available from: https://www.accessdata.fda.gov/cdrh_docs/reviews/den150056.pdf.
8. FaDA (FDA). The XprESS ENT Dilation System [cited 4/15/2021]. Available from: https://www.accessdata.fda.gov/cdrh_docs/pdf16/k163509.pdf.
9. MH Froehlich, PT Le, SA Nguyen, TR McRackan, HG Rizk, TA Meyer. Eustachian Tube Balloon Dilation: A Systematic Review and Meta-analysis of Treatment Outcomes. *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery*. 2020;163(5):870-82. PMID: 32482125
10. JML Huisman, FJ Verdam, I Stegeman, JA de Ru. Treatment of Eustachian tube dysfunction with balloon dilation: A systematic review. *The Laryngoscope*. 2018;128(1):237-47. PMID: 28799657
11. SY Hwang, S Kok, J Walton. Balloon dilation for eustachian tube dysfunction: systematic review. *J Laryngol Otol*. 2016;130 Suppl 4:S2-6. PMID: 27488333

12. N Jufas, N Patel. Transtympanic balloon dilatation of the eustachian tube: systematic review. *J Laryngol Otol.* 2016;130:425-30. PMID: 26965576
13. TS Randrup, T Ovesen. Balloon eustachian tuboplasty: a systematic review. *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery.* 2015;152:383-92. PMID: 25605694
14. TA Meyer, EM O'Malley, RJ Schlosser, et al. A Randomized Controlled Trial of Balloon Dilation as a Treatment for Persistent Eustachian Tube Dysfunction With 1-Year Follow-Up. *Otology & neurotology : official publication of the American Otological Society, American Neurotology Society [and] European Academy of Otology and Neurotology.* 2018;39(7):894-902. PMID: 29912819
15. JL Cutler, TA Meyer, SA Nguyen, EM O'Malley, L Thackeray, PW Slater. Long-term Outcomes of Balloon Dilation for Persistent Eustachian Tube Dysfunction. *Otology & neurotology : official publication of the American Otological Society, American Neurotology Society [and] European Academy of Otology and Neurotology.* 2019;40(10):1322-25. PMID: 31385858
16. D Poe, V Anand, M Dean, et al. Balloon dilation of the eustachian tube for dilatary dysfunction: A randomized controlled trial. *The Laryngoscope.* 2017. PMID: 28940574
17. V Anand, D Poe, M Dean, et al. Balloon Dilation of the Eustachian Tube: 12-Month Follow-up of the Randomized Controlled Trial Treatment Group. *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery.* 2019;160(4):687-94. PMID: 30620688
18. NIfHaC Excellence. Balloon Dilation for Chronic Eustachian Tube Dysfunction. [cited 4/15/2021]. Available from: <https://www.nice.org.uk/guidance/ipg665>.
19. DL Tucci, ED McCoul, RM Rosenfeld, et al. Clinical Consensus Statement: Balloon Dilation of the Eustachian Tube. *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery.* 2019;161(1):6-17. PMID: 31161864
20. BlueCross BlueShield Association Medical Policy Reference Manual "Balloon Dilation of the Eustachian Tube." Policy 7.01.158.

CODES

Codes	Number	Description
CPT	69705	Nasopharyngoscopy, surgical, with dilation of eustachian tube (ie, balloon dilation); unilateral
	69706	Nasopharyngoscopy, surgical, with dilation of eustachian tube (ie, balloon dilation); bilateral
	69799	Unlisted procedure, middle ear
HCPCS	None	
	C9745	Nasal endoscopy, surgical; balloon dilation of eustachian tube (Deleted 01/01/2021)

Date of Origin: June 2017