

Surgery for Obstructive Sleep Apnea Clinical Coverage Criteria

Overview

Sleep-Disordered Breathing, often referred to as obstructive sleep apnea (OSA), is characterized by frequent episodes of apnea or hypopnea during sleep. Multiple detrimental physiologic changes may result from these apneic and hypopneic episodes. Non-surgical and surgical approaches to obstructive apnea and hypopnea have been developed.

Policy

This Policy applies to the following Fallon Health products:

- Sealon Medicare Plus, Fallon Medicare Plus Central (Medicare Advantage)
- MassHealth ACO
- ☑ NaviCare HMO SNP (Dual Eligible Medicare Advantage and MassHealth)
- ☑ NaviCare SCO (MassHealth-only)
- ☑ PACE (Summit Eldercare PACE, Fallon Health Weinberg PACE)
- Community Care (Commercial/Exchange)

Prior authorization by a Fallon Health Medical Director is required for surgery for obstructive sleep apnea.

Medicare Advantage

Fallon Health complies with CMS's national coverage determinations (NCDs), local coverage determinations (LCDs) of Medicare Contractors with jurisdiction for claims in the Plan's service area, and applicable Medicare statutes and regulations when making medical necessity determinations for Medicare Advantage members. When coverage criteria are not fully established in applicable Medicare statutes, regulations, NCDs or LCDs, Fallon Health may create internal coverage criteria under specific circumstances described at § 422.101(b)(6)(i) and (ii).

Medicare statutes and regulations do not have coverage criteria for surgery for obstructive sleep apnea. Medicare does not have an NCD for surgical treatment of obstructive sleep apnea. National Government Services, Inc., the Part A and B Medicare Administrative Contractor with jurisdiction in the Plan's service area does not have an LCD for surgery for obstructive sleep apnea (Medicare Coverage Database search 07/22/2024).

Coverage criteria for surgery for obstructive sleep apnea are not fully established by Medicare, therefore the Plan's coverage criteria are applicable.

MassHealth ACO

Fallon Health follows Medical Necessity Guidelines published by MassHealth when making medical necessity determinations for MassHealth members. In the absence of Medical Necessity Guidelines published by MassHealth, Fallon Health may create clinical coverage criteria in accordance with the definition of Medical Necessity in 130 CMR 450.204.

MassHealth has Guidelines for Medical Necessity Determination for Orthognathic Surgery that include coverage criteria for surgery for obstructive sleep apnea (MassHealth website search 07/22/2024), therefore, the Plan's coverage criteria are not applicable.

Link: MassHealth Guidelines for Medical Necessity Determination for Orthognathic Surgery

NaviCare HMO SNP, NaviCare SCO

For plan members enrolled in NaviCare, Fallon Health first follow's CMS's national coverage determinations (NCDs), local coverage determinations (LCDs) of Medicare Contractors with jurisdiction for claims in the Plan's service area, and applicable Medicare statutes and regulations when making medical necessity determinations.

When coverage criteria are not fully established in applicable Medicare statutes, regulations, NCDs or LCDs, or if the NaviCare member does not meet coverage criteria in applicable Medicare statutes, regulations, NCDs or LCDs, Fallon Health then follows Medical Necessity Guidelines published by MassHealth when making necessity determinations for NaviCare members.

PACE (Summit Eldercare PACE, Fallon Health Weinberg PACE)

Each PACE plan member is assigned to an Interdisciplinary Team. PACE provides participants with all the care and services covered by Medicare and Medicaid, as authorized by the interdisciplinary team, as well as additional medically necessary care and services not covered by Medicare and Medicaid. With the exception of emergency care and out-of-area urgently needed care, all care and services provided to PACE plan members must be authorized by the interdisciplinary team.

Fallon Health Clinical Coverage Criteria

Fallon Health Clinical Coverage Criteria for Surgery for Obstructive Sleep Apnea apply to Medicare Advantage and Community Care members.

These coverage criteria apply to uvulopalatopharyngoplasty (UPPP) and maxillomandibular advancement surgery (MMA) for the treatment of obstructive sleep apnea (OSA) in adults (age 18 years of age and older).

All of the following criteria must be met:

 Documentation of moderate/severe OSA defined as Apnea Index (AI) or Apnea Hypopnea Index (AHI) ≥ 15 events per hour, based on polysomnogram (PSG) or home sleep study test (HSAT) conducted within the previous 12 months, or

Documentation of mild OSA defined as AI 6-15 episodes per hour with average O₂ saturation < 85%, based on PSG or HSAT conducted within the previous 12 months, or

Documentation of mild OSA defined as $AHI \ge 5$ events per hour and < 15 events per hour, based on PSG or HSAT conducted within the previous 12 months and one of the following: a. Life threatening cardiac conditions independent of severity of apnea. OR

- b. Who are intolerant or incapable of using a CPAP or BiPAP device with documentation of failed trials, or in severe cases of abnormal upper airway anatomical obstructions that preclude the use of a CPAP or BiPAP device.
- 2. Must be within 20% above their ideal body weight, defined as the number of pounds on the upper limit of the range of weights sorted by sex and height, except for morbidly obese patients, defined as having a Body Mass Index of >40.
- 3. Trial and failure conservative therapy with a Continuous Positive Air Pressure (CPAP) device.

The Plan allows our affiliated sleep disorder laboratories to use the Apnea Index, Respiratory Disturbance Index, or Apnea Hypopnea Index with slight variations in rating definitions. The formulas for diagnosing the severity of sleep apnea are as follows:

Respiratory Disturbance Index (RDI) and Apnea Hypopnea Index (AHI) refer to the same formula:

RDI/AHI = (total number of apneas + hypopneas, including subtle hypopneas)

total number of sleep hours

Apnea Index (AI) is calculated using the following formula:

AI =total number of apneas t

Level	Apnea Index (AI) Episodes per Hour		Respiratory Disturbance Index (RDI) or Apnea Hypopnea Index (AHI)*
Mild	6-15 episodes/hour with average O2 saturation above 85%	or	≥ 5 < 15
Moderate	15-30 episodes/hour with average O2 saturation 80-85%	or	≥15<30
Severe	More than 30 episodes/hour with average O2 saturation below 80%. (However patients with an average O2 saturation below 85% and at least 6 episodes/hour of apnea may also meet the criteria for severe sleep apnea.)	or	>30

Independent of technique used (i.e., PSG or HSAT)

Exclusions

- The following procedures are considered not medically necessary for the treatment of obstructive sleep apnea or breathing disorders:
 - Laser assisted uvulopalatoplasty (LAUP) (HCPCS S2080) 0
 - Palate reduction with the Somnoplasty[™] System (Somnus Medical Systems) 0
 - Implantation of palatal implants (also known as the Pillar Procedure) 0
 - Tongue base suspension procedures, including but not limited to the AIRvance® 0 (formerly Repose) and the Encore™ tongue suspension systems
 - Submucosal radiofrequency tongue base ablation (CPT 41530) 0

Summary of Evidence

The diagnosis of obstructive sleep apnea (OSA) involves measuring breathing during sleep, based upon polysomnogram (PSG). Due to the high prevalence of OSA, there is significant cost associated with evaluating all patients suspected of having OSA with PSG (currently considered the gold standard diagnostic test). Further, there also may be limited access to in-laboratory testing in some areas. Home sleep apnea testing (HSAT), which has limitations, is an alternative method to diagnose OSA in adults, and may be less costly and more efficient in some populations. Measurement error is inevitable in HSAT, compared against PSG, as standard sleep staging channels are not typically monitored in HSAT (e.g., EEG, EOG and EMG monitoring are not typically performed), which results in use of the recording time rather than sleep time to define the denominator of the respiratory event index (REI: the term used to represent the frequency of apneas and hypopneas derived from HSAT) (Kapur et al., 2017).

The third edition of the International Classification of Sleep Disorders (ICSD-3) defines OSA as a PSG-determined obstructive respiratory disturbance index (RDI) \geq 5 events per hour associated with the typical symptoms of OSA (e.g., unrefreshing sleep, daytime sleepiness, fatigue or insomnia, awakening with a gasping or choking sensation, loud snoring, or witnessed apneas), or an obstructive RDI \geq 15 events per hour (even in the absence of symptoms). In addition to apneas and hypopneas that are included in the AHI, the RDI includes respiratory effort-related arousals (RERAs) (AASM, 2014).

The scoring of respiratory events is defined in The AASM Manual for the Scoring of Sleep and Associated Events: Rules, Terminology and Technical Specifications, Version 2.3 (AASM Scoring Manual). However, it should be noted that there is variability in the definition of a hypopnea event. The AASM Scoring Manual recommended definition requires that changes in flow be associated with a 3% oxygen desaturation or a cortical arousal but allows an alternative definition that requires association with a 4% oxygen desaturation without consideration of cortical arousals. Depending on which definition is used, the AHI may be considerably different in a given individual. The discrepancy between these and other hypopnea definitions used in research studies introduces complexity in the evaluation of evidence regarding the diagnosis of OSA (AASM, 2016).

AHI is the average number of episodes of apnea and hypopnea per hour of sleep without the use of a positive airway pressure (PAP) device and can only be measured in a type 1 (facility-based polysomnogram) or type II home-based sleep study. RDI is the episodes of apnea and hypopnea per hour of recording without the use of PAP and is reported in type III or IV home sleep study (Kapur et al., 2017).

Uvulopalatopharyngoplasty (UPPP)

The uvulopalatopharyngoplasty (UPPP) procedure was initially presented by Fujita and colleagues in 1981. This procedure enlarges the oropharyngeal airway lumen by excising redundant tissues from the soft palate, tonsillar pillars and uvula. After Fujita's publication, various revisions of his procedure were introduced, but none exhibited a significant enhancement in outcomes. Proper patient selection for UPPP surgery continues to be challenging. Although numerous methods exist for airway evaluation in OSA patients, most have a limited efficacy in forecasting success with UPPP (Sheen and Abdulateef, 2021). UPPP may be combined with tonsillectomy, adenoidectomy, partial or hemiglossectomy, genioglossus advancement with or without hyoid myotomy and suspension, or maxillomandibular advancement.

Uvulopalatopharyngoplasty (UPPP) is not recommended for severe obstructive sleep apnea with an apnea-hypopnea index (AHI) or respiratory disturbance index (RDI) that is 40 or above. An AHI or RDI of 40 or greater is most likely due to other unrecognized areas of hypopharyngeal obstruction that would not be expected to be improved with UPPP. UPPP is recommended for patients who have an AHI or RDI that is greater than or equal to 5 and less than 40 (Choi et al., 2016).

Janson et al., 1997 reported on long-term outcomes (4-8 years follow-up) in 25 of 34 consecutive patients with obstructive sleep apnea treated with uvulopalatopharyngoplasty (UPPP). Response to treatment was defined as a 50% or more reduction in AHI and a postoperative AHI of less than 10 apneas and hypopneas per hour. Sixteen patients (64%) were responders after 6 months and 12 (48%) at the long-term follow-up. Responders had a lower preoperative AHI (25 +/- 7) than did nonresponders (48 +/- 29) (P < .05). None of the 7 patients with preoperative AHI of more than 40 were responders (P < .01). No difference was seen in preoperative body mass index, lung function, ventilatory response to carbon dioxide, computed tomography scan of upper airways, or change in body mass index between responders and nonresponders. The authors recommend that UPPP should be reserved for patients with mild or moderate OSA and long-term follow-up is recommended because some initially successfully treated patients will relapse in the long term.

In a systematic review and meta-analysis of 11 studies published through December 2018, He et al., 2019, reported similar long-term results for UPPP. Compared with the short-term outcomes (3-12 months), the long-term outcomes were less effective, with apnea-hypopnea index increasing 12.3 events per hour (63.8%) and the surgical response decreasing from 67.3% to 44.35%. Subanalysis of individual patient data showed significant correlations of baseline body mass index, lowest arterial oxygen saturation, and proportion of sleep time with oxygen saturation <90% with long-term surgical response.

Maxillomandibular Advancement

Maxillomandibular advancement (MMA) involves Le Fort I maxillary and bilateral sagittal ramus split mandibular osteotomies with advancement of the maxilla and mandible followed by rigid

fixation. Generally, the maxilla is advanced first, with the mandible advanced into occlusion. Combined MMA alleviates pharyngeal obstruction by expanding the skeletal framework that the tongue and other soft tissue (Holty and Guilleminault, 2021). MMA is often combined with tonsillectomy, adenoidectomy, uvulopalatopharyngoplasty (UPPP), partial or hemiglossectomy, or genioglossus advancement with or without hyoid myotomy and suspension.

A 2010 meta-analysis conducted by Holty and Guilleminault identified 22 studies (627 subjects with OSA) and determined that MMA was highly effective with a mean decrease in AHI from 63.9 events per hour to 9.5 per hour (p<0.001). Using a random effects model, the pooled surgical success and cure (AHI < 5 per hour) rates were 86% and 43.2%, respectively. Predictors of increased surgical success include younger age, lower preoperative AHI and BMI, and greater degree of maxillary advancement (Holty and Guilleminault, 2010).

Boyd et al., (2015) reported on the long-term effectiveness and safety of maxillomandibular advancement for the treatment of OSA. Thirty adult patients (80% men, age 50.5 \pm 9.6 years participated in the study. The AHI decreased from a mean of 49 to 10.9 events per hour (p < 0.0001) at the time of long-term evaluation (6.6 \pm 2.8 years after MMA), with 46.7% of patients obtaining an AHI < 5 and 83.4% of patients attaining an AHI < 15 events per hour. The mean diastolic blood pressure decreased from 83.7 to 79.0 mm Hg (p < 0.05). Epworth Sleepiness Scale decreased from a mean of 12.1 to 6.0 (p < 0.01). Functional Outcomes of Sleep Questionnaire increased from a mean of 12.6 to 17.3 (p < 0.05). Few long-term treatment-related adverse events occurred, which had minimal impact on quality of life.

Zhou et al., 2021, evaluated the efficacy of eight different surgical treatments based on maxillomandibular advancement (MMA), which have emerged in recent years. The literature was searched from January 2010 to May 2020 for studies of adult OSA patients with different types of MMA procedures to perform a network meta-analysis. The outcomes were changes in the apneahypopnea index (AHI), the lowest pulse oxygen saturation (SpO₂ min) and the Epworth Sleepiness Scale (ESS). Eight studies were included and encompassed a total of 227 adult patients diagnosed with OSA. Among them, 225 patients underwent combined surgery or simple MMA surgery, including modified maxillomandibular advancement (MMMA),counterclockwise maxillomandibular advancement (CMMA), drug-induced sleep endoscopy and maxillomandibular advancement (MMA + DISE), transoral robotic surgery and maxillomandibular advancement (MMA + TORS), uvulopalatopharyngoplasty (UPPP), maxillomandibular advancement and uvulopalatopharyngoplasty (MMA + UPPP), uvulopalatopharyngoplasty with uvula preservation and maxillomandibular advancement (MMA + HUPPP); MMA consisting of Le Fort I osteotomy and bilateral inverted-L osteotomy (ILOs), genioplasty and iliac bone grafting; and MMA consisting of Le Fort I osteotomy, bilateral sagittal split ramus osteotomies and genioplasty. The results showed that the most effective surgical treatment is MMA + HUPPP [- 56.79 weighted mean difference (WMD); 95% confidence interval (CI): - 113.02 to - 3.33] (P < 0.00001), which was far superior to other approaches.

An AHRQ Comparative Effectiveness Review (Balk et al., 2011) found that the strength of evidence was insufficient to evaluate the relative efficacy of surgical interventions for the treatment of OSA. Six trials and one nonrandomized prospective study with unique interventions compared surgery with control treatment for the management of patients with OSA. Three studies were rated quality A, one quality B, and three quality C. The results were inconsistent across studies as to which outcomes were improved with surgery compared with no or sham surgery.

Similarly, the AHRQ review found that the strength of evidence was insufficient to determine the relative merits of surgical treatments versus CPAP. Of 12 studies (1 quality A, 11 quality C) comparing surgical modalities with CPAP, only two were RCTs, and they compared CPAP with uvulopalatopharyngoplasty (UPPP), removal of the soft tissue at the back of the throat, the uvula, and soft palate. While one of these trials found that CPAP resulted in a higher mortality benefit, the other found no difference between groups. Due to the heterogeneity of interventions and outcomes examined, the variability of findings across studies, and the inherent bias of all but one study regarding which patients received surgery, it was not possible to draw useful conclusions comparing surgical interventions with CPAP in the treatment of patients with OSA. The quality A

trial was the only unbiased comparison of surgery and CPAP (patients had previously received neither treatment). It did not find statistically significant differences in Epworth Sleepiness Scale (ESS) and quality of life measures between patients with mild to moderate OSA who had temperature-controlled radiofrequency tissue volume reduction of the soft palate and those who had CPAP at 2 months follow-up. Likewise, the other trial, comparing maxillomandibular advancement osteotomy and CPAP, did not find statistically significant differences in AHI and ESS in patients with severe OSA. For the nonrandomized studies, comparisons between surgery and CPAP are difficult to interpret since baseline patient characteristics (including sleep apnea severity) differed significantly between groups, particularly in regard to what previous treatments patients had. The reported findings on sleep study and quality of life measures were heterogeneous across studies.

American Academy of Sleep Medicine

The American Academy of Sleep Medicine (AASM, 2021) published practice guidelines on the referral of adults with OSA for surgical consultation (Kent et al., 2021). These guidelines replaced the 2010 Parameters for the Surgical Modifications of the Upper Airway for Obstructive Sleep Apnea in Adults (Aurora et al., 2010). The AASM commissioned a task force of experts in sleep medicine, otolaryngology, and bariatric surgery to develop recommendations and assign strengths based on a systematic review of the literature and an assessment of the evidence using the GRADE process. The task force evaluated the relevant literature and the quality of evidence, the balance of benefits and harms, patient values and preferences, and resource use considerations. Each recommendations statement is assigned a strength ("Strong" or "Conditional"). A Strong recommendation is one that clinicians should follow under most circumstances. A Conditional recommendation is one that requires that the clinician use clinical knowledge and experience and strongly consider the patient's values and preferences to determine the best course of action.

The treatment of adults with OSA should be based on a diagnosis of OSA established using objective testing performed in conjunction with a comprehensive sleep evaluation. The AASM guidelines note that positive airway pressure (PAP) is the most efficacious treatment for OSA, but effectiveness can be compromised when patients are unable to adhere to therapy or obtain adequate benefit, which is when surgical management may be indicated. It is expected that surgery proceed only once the surgeon and patient have mutually agreed upon an acceptable risk profile. Inherent to this evaluation is the understanding that some referred patients will not be appropriate for surgical interventions and are expected to be counseled as such by surgical colleagues.

The AASM strongly recommends that clinicians discuss referral to a sleep surgeon with adults with OSA and body mass index (BMI) < 40 kg/m² who are intolerant or unaccepting of PAP. The strong recommendation to discuss surgical referral with patients with a BMI < 40 kg/m² is not a recommendation against (and does not preclude) discussion of surgical referral with patients with a BMI \ge 40 kg/m² if the health care provider deems it an appropriate management discussion point.

For patients within the BMI range of $35-40 \text{ kg/m}^2$ who are intolerant or unaccepting of PAP, the AASM strongly recommends discussion regarding a referral to both sleep and bariatric surgeons to discuss management options. Other organizations, such as the National Heart, Lung, and Blood Institute, recommend consideration of bariatric surgery for individuals suffering from obesity (class II/III, BMI \ge 35 kg/m2) and OSA, regardless of PAP adherence status.

The AASM guideline recommendations are based on a systematic review and meta-analysis of 274 studies of surgical interventions, including procedures such as uvulopalatopharyngoplasty (UPPP), modified UPPP, maxillomandibular advancement (MMA), tongue base suspension, and hypoglossal nerve stimulation. The systematic review deemed most included data of low quality, consisting of mostly observational data (Kent et al., 2021a).

A total of 4 RCTs and 239 observational studies investigated the use of surgery as rescue therapy for participants who were intolerant or unaccepting of PAP to improve 1 or more of the following outcomes: excessive sleepiness, quality of life (QOL), sleep quality, snoring, blood pressure (BP), perioperative death, permanent dysphagia, apnea-hypopnea index (AHI), respiratory disturbance index (RDI),lowest oxygen saturation (LSAT), and oxygen desaturation index (ODI). Participants included in the studies had a BMI <40 kg/m². Participants in the RCTs had moderate to severe OSA and received UPPP with or without tonsillectomy. Participants in the control group originally received no treatment but were eventually treated with the same procedure(s). Participants in the observational studies represented a broad population of adults undergoing a wide variety of surgical interventions for OSA including palatal modification, tongue base resection, multilevel pharyngeal airway surgery, nasal surgery, maxillomandibular advancement, and hypoglossal nerve stimulation. The Task Force determined that the overall quality of evidence for the use of surgical treatments in patients who are intolerant or unaccepting of PAP was low based on the critical outcomes and downgrading of the evidence due to risk of bias associated with observational studies and imprecision within the RCTs.

Based on their combined clinical experience and the substantial effects of surgery on objective and subjective measures of disease, the Task Force judged that the potential benefits of a discussion regarding referral to a sleep surgeon with patients intolerant or unaccepting of PAP therapy outweigh the potential harms of untreated OSA. The Task Force observed that the balance of risks vs benefits for upper airway surgery is variable and dependent upon an individual patient's OSA severity, symptoms, medical comorbidities, and selected surgical therapy but noted that a discussion of individualized risks and benefits is a standard component of the preoperative informed consent process.

American Academy of Otolaryngology - Head and Neck Surgery Position Statement: Uvulopalatopharyngoplasty

Uvulopalatopharyngoplasty (UPPP) is a valid and generally safe treatment for OSAS in appropriately selected patients. UPPP, first described by Fujita in 1981. UPPP usually reduces the Apnea Hypopnea Index (AHI) but does not usually normalize it (AAO-HNS, 2019).

Analysis of Evidence (Rational for Determination)

The evidence suggests surgical treatments including uvulopalatopharyngoplasty (UPPP) and maxillomandibular advancement (MMA) are associated with improvements in clinical outcomes for adults with obstructive sleep apnea (OSA) who have failed continuous positive air pressure (CPAP). Given the proven safety and efficacy of CPAP in patients with OSA, surgery cannot be recommended as a first line therapy.

Coding

The following codes are included below for informational purposes only; inclusion of a code does not constitute or imply coverage or reimbursement.

Code	Description
21141	Reconstruction midface, LeFort 1; single piece, segment movement in
	any direction (eg, for Long Face Syndrome), without bone graft
21142	Reconstruction midface, LeFort 1; 2 pieces, segment movement in any
	direction, without bone graft
21143	Reconstruction midface, LeFort 1; 3 or more pieces, segment movement
	in any direction, without bone graft
21145	Reconstruction midface, LeFort 1; single piece, segment movement in
	any direction requiring bone grafts (includes obtaining autografts)
21146	Reconstruction midface, LeFort 1; 2 pieces, segment movement in any
	direction, requiring bone grafts (includes obtaining autografts) (eg,
	ungrafted unilateral alveolar cleft)
21147	Reconstruction midface, LeFort 1; 3 or more pieces, segment movement
	in any direction, requiring bone grafts (includes obtaining autografts) (eg,

	ungrafted bilateral alveolar cleft or multiple osteotomies)	
21193	Reconstruction of mandibular rami, horizontal, vertical, C, or L osteotomy; without bone graft	
21194	Reconstruction of mandibular rami, horizontal, vertical, C, or L osteotomy; with bone graft (includes obtaining graft)	
21195	Reconstruction of mandibular rami and/or body, sagittal split; without internal rigid fixation	
21196	Reconstruction of mandibular rami and/or body, sagittal split; with internal rigid fixation	
21198	Osteotomy, mandible, segmental;	
21199	Osteotomy, mandible, segmental; with genioglossus advancement	
21206	Osteotomy, maxilla, segmental (eg, Wassmund or Schuchard)	
21685	Hyoid myotomy and suspension	
42145	Palatopharyngoplasty (eg, uvulopalatopharyngoplasty, uvulopharyngoplasty)	

References

- 1. Epstein LJ, et al. Clinical guideline for the evaluation, management and long-term care of obstructive sleep apnea in adults. *Journal of Clinical Sleep Medicine*. 2009;5(3):263-76.
- 2. Aurora RN, et al. Practice parameters for the surgical modifications of the upper airway for obstructive sleep apnea in adults. *Sleep*. 2010 Oct 1;33(10):1408-13.
- Yousuf A, Beigh Z, Khursheed RS, et. al. Clinical predictors for successful uvulopalatopharyngoplasty in the management of obstructive sleep apnea. *Int J Otolaryngol.* 2013;2013:290265.
- 4. Thaler ER, Rassekh CH, Lee JM, et. al, Outcomes for multilevel surgery for sleep apnea: Obstructive sleep apnea, transoral robotic surgery, and uvulopalatopharyngoplasty. *Laryngoscope*. 2016 Jan;126(1):266-9.
- 5. Spicuzza L, Caruso D, Di Maria G. Obstructive sleep apnoea syndrome and its management. *Ther Adv Chronic Dis.* 2015 Sep;6(5):273-85.
- Goodday RH, Bourque SE, Edwards PB. Objective and Subjective Outcomes Following Maxillomandibular Advancement Surgery for Treatment of Patients With Extremely Severe Obstructive Sleep Apnea (Apnea-Hypopnea Index >100). *J Oral Maxillofac Surg.* 2016 Mar;74(3):583-9.
- 7. Camacho M, Liu SY, Certal V, et. al. Large maxillomandibular advancements for obstructive sleep apnea: An operative technique evolved over 30 years. *J Craniomaxillofac Surg.* 2015 Sep;43(7):1113-8.
- 8. Bostanci A, Turhan M. A systematic review of tongue base suspension techniques as an isolated procedure or combined with uvulopalatopharyngoplasty in obstructive sleep apnea. *Eur Arch Otorhinolaryngol.* 2015 Oct 27.
- 9. Choi JH, Cho SH, Kim SN, et al. Predicting Outcomes after Uvulopalatopharyngoplasty for Adult Obstructive Sleep Apnea: A Meta-analysis. *Otolaryngol Head Neck Surg.* 2016 Aug 2.
- Butterfield KJ, Marks PL, McLean L, Newton J. Quality of Life Assessment After Maxillomandibular Advancement Surgery for Obstructive Sleep Apnea. J Oral Maxillofac Surg. 2016 Jun;74(6):1228-37.
- 11. Friedman JJ, Salapatas AM, Bonzelaar LB, et al. Changing Rates of Morbidity and Mortality in Obstructive Sleep Apnea Surgery. *Otolaryngol Head Neck Surg.* 2017 Jul;157(1):123-127.
- Boyd SB, Chigurupati R, Cillo JE Jr, et. al. Maxillomandibular Advancement Improves Multiple Health-Related and Functional Outcomes in Patients With Obstructive Sleep Apnea: A Multicenter Study. J Oral Maxillofac Surg. 2019 Feb;77(2):352-370.
- Boyd SB, Chigurupati R, Cillo et.al. Maxillomandibular Advancement Improves Multiple Health-Related and Functional Outcomes in Patients With Obstructive Sleep Apnea: A Multicenter Study. J Oral Maxillofac Surg. 2019 Feb;77(2):352-370.
- Kapur VK, Auckley DH, Chowdhuri S, et al. Clinical Practice Guideline for Diagnostic Testing for Adult Obstructive Sleep Apnea: An American Academy of Sleep Medicine Clinical Practice Guideline. J Clin Sleep Med. 2017 Mar 15;13(3):479-504.

- 15. American Academy of Sleep Medicine. International Classification of Sleep Disorders. 3rd ed. Darien, IL: American Academy of Sleep Medicine; 2014.
- Berry RB, Brooks R, Gamaldo CE, et al. for the American Academy of Sleep Medicine. The AASM Manual for the Scoring of Sleep and Associated Events: Rules, Terminology and Technical Specifications. Darien, IL: American Academy of Sleep Medicine; 2016. Version 2.3.
- 17. Spector AR, Loriaux D, Farjat AE. The Clinical Significance of Apneas Versus Hypopneas: Is There Really a Difference? *Cureus*. 2019 Apr 28;11(4):e4560.
- 18. Goyal M, Johnson J. Obstructive Sleep Apnea Diagnosis and Management. *Mo Med.* 2017 Mar-Apr;114(2):120-124.
- Balk EM, Moorthy D, Obadan NO, et al. Diagnosis and Treatment of Obstructive Sleep Apnea in Adults [Internet]. Rockville (MD): Agency for Healthcare Research and Quality (US); 2011 Jul. Report No.: 11-EHC052. AHRQ Comparative Effectiveness Reviews. 2011. PMID: 21977519.
- 20. Sundaram S, Bridgman SA, Lim J, et al. Surgery for obstructive sleep apnoea. *Cochrane Database Syst Rev.* 2005(4):CD001004.
- 21. American Academy of Otolaryngology Head and Neck Surgery. Position Statement: Uvulopalatopharyngoplasty. Revised 01/11/2019.
- 22. Cahali MB, Formigoni GG, Gebrim EM, Miziara ID. Lateral pharyngoplasty versus uvulopalatopharyngoplasty: a clinical, polysomnographic and computed tomography measurement comparison. *Sleep.* 2004 Aug 1;27(5):942-50.
- Kent D, Stanley J, Aurora RN, et al. Referral of adults with obstructive sleep apnea for surgical consultation: an American Academy of Sleep Medicine clinical practice guideline. J Clin Sleep Med. 2021;17(12):2499-505.
- 24. Kent D, Stanley J, Aurora RN, et al. Referral of adults with obstructive sleep apnea for surgical consultation: an American Academy of Sleep Medicine systematic review, meta-analysis, and GRADE assessment. *J Clin Sleep Med*. 2021a;17(12):2507-31.
- 25. Maniaci A, Di Luca M, Lechien JR, et al. Lateral pharyngoplasty vs. traditional uvulopalatopharyngoplasty for patients with OSA: systematic review and meta-analysis. *Sleep Breath*. 2022 Dec;26(4):1539-1550.
- 26. Kezirian EJ, Weaver EM, Yueh B, Deyo RA, Khuri SF, Daley J et al. Incidence of serious complications after uvulopalatophryngoplasty. *Laryngoscope*. 2004 Mar. 114(3):450-3.
- 27. Sheen D, Abdulateef S. Uvulopalatopharyngoplasty. Oral Maxillofac Surg Clin North Am. 2021 May;33(2):295-303.
- Janson Č, Gislason T, Bengtsson H, et al. Long-term follow-up of patients with obstructive sleep apnea treated with uvulopalatopharyngoplasty. *Arch Otolaryngol Head Neck Surg.* 1997 Mar;123(3):257-62.
- 29. Browaldh N, Nerfeldt P, Lysdahl M, et al. SKUP3 randomised controlled trial: polysomnographic results after uvulopalatopharyngoplasty in selected patients with obstructive sleep apnoea. *Thorax.* 2013;68(9):846–853. 37.
- 30. Browaldh N, Bring J, Friberg D. SKUP(3) RCT; continuous study: changes in sleepiness and quality of life after modified UPPP. *Laryngoscope*. 2016;126(6): 1484–1491. 38.
- MacKay S, Carney AS, Catcheside PG, et al. Effect of multilevel upper airway surgery vs medical management on the apnea-hypopnea index and patient-reported daytime sleepiness among patients with moderate or severe obstructive sleep apnea: the SAMS randomized clinical trial. *JAMA*. 2020;324(12): 1168–1179. 39.
- Sommer UJ, Heiser C, Gahleitner C, et al. Tonsillectomy with uvulopalatopharyngoplasty in obstructive sleep apnea: a two-center randomized controlled trial. *Dtsch Arztebl Int.* 2016;113(1-2):1–8.
- Choi JH, Cho SH, Kim SN, Suh JD, Cho JH. Predicting Outcomes after Uvulopalatopharyngoplasty for Adult Obstructive Sleep Apnea: A Meta-analysis. *Otolaryngol Head Neck Surg.* 2016 Dec;155(6):904-913.
- He M, Yin G, Zhan S, Xu J, Cao X, Li J, Ye J. Long-term Efficacy of Uvulopalatopharyngoplasty among Adult Patients with Obstructive Sleep Apnea: A Systematic Review and Meta-analysis. *Otolaryngol Head Neck Surg.* 2019 Sep;161(3):401-411.

- 35. Holty JE, Guilleminault C. Surgical options for the treatment of obstructive sleep apnea. *Med Clin North Am.* 2010 May;94(3):479-515.
- Holty JE, Guilleminault C. Maxillomandibular advancement for the treatment of obstructive sleep apnea: a systematic review and meta-analysis. *Sleep Med Rev.* 2010 Oct;14(5):287-97.
- Boyd SB, Walters AS, Waite P, Harding SM, Song Y. Long-Term Effectiveness and Safety of Maxillomandibular Advancement for Treatment of Obstructive Sleep Apnea. J Clin Sleep Med. 2015 Jul 15;11(7):699-708.
- Boyd SB, Chigurupati R, Cillo JE Jr, et al. Maxillomandibular Advancement Improves Multiple Health-Related and Functional Outcomes in Patients With Obstructive Sleep Apnea: A Multicenter Study. J Oral Maxillofac Surg. 2019 Feb;77(2):352-370.
- Zaghi S, Holty JÉ, Certal V, et al. Maxillomandibular Advancement for Treatment of Obstructive Sleep Apnea: A Meta-analysis. JAMA Otolaryngol Head Neck Surg. 2016 Jan;142(1):58-66.
- 40. Zhou A, Li H, Wang X, Zhang J, Zhang Y, He J, Liu S. Preliminary comparison of the efficacy of several surgical treatments based on maxillomandibular advancement procedures in adult patients with obstructive sleep apnoea: a systematic review and network meta-analysis. *Eur Arch Otorhinolaryngol.* 2021 Feb;278(2):543-555.
- 41. Littner M, Kushida CA, Hartse K, et al. Practice parameters for the use of laser-assisted uvulopalatoplasty: an update for 2000. *Sleep.* 2001 Aug 1;24(5):603-19.
- MassHealth. MassHealth Guidelines for Medical Necessity Determination for Orthognathic Surgery. Policy Revision Effective Date: October 4, 2022. Available at: https://www.mass.gov/guides/masshealth-guidelines-for-medical-necessity-determination-fororthognathic-surgery. Accessed 07/22/2024.

Policy history

```
Origination date: 12/1995
Review/Approval(s): Utilization Management Committee: 06/2000, 09/2000, 10/2000,
06/2003; Technology Assessment Committee: 08/28/2013, 09/24/2014
(updated template, coding, specified MMA procedure, and references)
09/23/2015 (updated references), 09/15/2016 (updated references),
09/27/2017 (updated references), 08/22/2018 (updated references),
09/10/2019 (updated references), 10/23/2019 (added criteria for
Hypoglossal Nerve Stimulation), 02/09/2022 (added clarifying language
related to Medicare Advantage, NaviCare and PACE under Policy
section; updated coding for hypoglossal nerve stimulation), 07/23/2024
(annual review, removed hypoglossal nerve Stimulation, added new
```

sections for Summary of Evidence and Analysis of Evidence, updated Coding section). Not all services mentioned in this policy are covered for all products or employer groups. Coverage is based upon the terms of a member's particular benefit plan which may contain its own specific provisions for coverage and exclusions regardless of medical necessity. Please consult the product's Evidence of Coverage for exclusions or other benefit limitations applicable to this service or supply. If there is any discrepancy between this policy and a member's benefit plan, the provisions of the benefit plan will govern. However, applicable state mandates take precedence with respect to fully-insured plans and self-funded non-ERISA (e.g., government, school boards, church) plans. Unless otherwise specifically excluded, federal mandates will apply to all plans.