Medical Coverage Policy

Effective Date..... 4/15/2021
Next Review Date..... 4/15/2022
Coverage Policy Number 0481

Drug-Eluting Devices for Use Following Endoscopic Sinus Surgery

Table of Contents

Related Coverage Resources

Balloon Sinus Ostial Dilation for Chronic Sinusitis and Eustachian Tube Dilation
Rhinoplasty, Vestibular Stenosis Repair and Septoplasty

INSTRUCTIONS FOR USE
The following Coverage Policy applies to health benefit plans administered by Cigna Companies. Certain Cigna Companies and/or lines of business only provide utilization review services to clients and do not make coverage determinations. References to standard benefit plan language and coverage determinations do not apply to those clients. Coverage Policies are intended to provide guidance in interpreting certain standard benefit plans administered by Cigna Companies. Please note, the terms of a customer's particular benefit plan document [Group Service Agreement, Evidence of Coverage, Certificate of Coverage, Summary Plan Description (SPD) or similar plan document] may differ significantly from the standard benefit plans upon which these Coverage Policies are based. For example, a customer's benefit plan document may contain a specific exclusion related to a topic addressed in a Coverage Policy. In the event of a conflict, a customer's benefit plan document always supersedes the information in the Coverage Policies. In the absence of a controlling federal or state coverage mandate, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of 1) the terms of the applicable benefit plan document in effect on the date of service; 2) any applicable laws/regulations; 3) any relevant collateral source materials including Coverage Policies and; 4) the specific facts of the particular situation. Each coverage request should be reviewed on its own merits. Medical directors are expected to exercise clinical judgement and have discretion in making individual coverage determinations. Coverage Policies relate exclusively to the administration of health benefit plans. Coverage Policies are not recommendations for treatment and should never be used as treatment guidelines. In certain markets, delegated vendor guidelines may be used to support medical necessity and other coverage determinations.

Overview

This Coverage Policy addresses drug-eluting devices proposed for maintaining postoperative sinus ostial patency following endoscopic sinus surgery and for the treatment of nasal polyps following ethmoid sinus surgery.

Coverage Policy

A drug-eluting device for maintaining postoperative sinus ostial patency following endoscopic sinus surgery (e.g., Propel™ Steroid-Releasing Implant, Sinu-Foam Spacer) or for the treatment of nasal polyps following ethmoid sinus surgery (e.g., Sinuva) is considered experimental, investigational or unproven.

General Background

Functional endoscopic sinus surgery (FESS) is typically performed for chronic rhinosinusitis (CRS) unresponsive to medical management. FESS involves the removal of small pieces of bone, polyps and debridement of tissues within the sinus cavity. Postoperative treatment may include saline irrigation, nasal packs, foam dressings, topical steroids, systemic steroids, topical decongestants, oral antibiotics, and/or sinus cavity debridement. A variety of adjunctive devices have been applied to the sinuses during FESS to keep the middle meatus open, with varying degrees of success. These devices have included packing materials, injectable space-filling gels or structured stents. In some instances packing materials have been soaked with a drug, but the uncontrolled and inconsistent release of the drug resulted in erratic outcomes. Therefore, drug-eluting stents, implants or spacers have been proposed to help maintain postoperative sinus ostial patency by reducing scarring and adhesions following FESS. A stent/spacer is a device that is placed into a sinus cavity temporarily to keep it open, promote wound healing and relieve an obstruction. Stents/spacers are used temporarily and removed after a period of time (e.g., 14-30 days). Some middle meatal drug-infused spacers have been attempted by the treating surgeon who determines the type and dosage of steroid. There is unknown drug release with these spacers, and they are not FDA approved (Parikh, 2014; Catalano, et al., 2011).

Drug-eluting stents (DESs) or implants are surgically inserted scaffolds that are proposed to aid in healing the affected tissue by locally and continuously releasing a loaded drug or saline in a controlled manner for the desired period of time. Some drug-eluting stents are made of a biodegradable material and are absorbed by the body. Commonly used drugs for nasal stents include corticosteroids (e.g., dexamethasone, fluticasone and mometasone) and antibiotics. Proposed advantages of these devices include removing the issues of noncompliance and adequate drug delivery seen with traditional topical medical therapy techniques. However, there is a risk of inducing inflammation from a foreign material and the potential of unintended systemic absorption of medication when an implant is used. The Propel™ (Intersect ENT, Palo Alto, CA), a mometasone-eluting biodegradable implant, is an example of a drug-eluting stent. A smaller version of the drug delivery system, Propel™ Mini, is also available (Intersect ENT, 2019; Parikh, 2014; Rudmik, 2012; Catalino, et al., 2011).

Outcomes from the published, peer-reviewed literature show varying degrees of success in the use of drug-eluting implants following FESS. Studies primarily report short-term follow-ups and include small patient populations. Data showed variability in the outcomes including maintaining sinus patency. The impact of these foreign materials implanted in the body is unknown. Reported complications include implant blockage and granulation build-up. The effects of the drug released onto the sinus mucosa are unclear. There is insufficient evidence to support the safety and effectiveness of these devices.

In 2017, Sinuva™ (Intersect ENT, Palo Alto, CA) was FDA approved as a drug for implantation for the treatment of nasal polyps in patients who have had ethmoid sinus surgery and have recurrent polyposis. Sinuva contains 1350 mcg of mometasone furoate and is proposed for implantation in the physician's office. The implant is loaded into a delivery system and placed in the ethmoid sinus under endoscopic visualization. It may be left in the sinus for up to 90 days to allow gradual release of the corticosteroid. It is removed at day 90 or earlier at the physician's discretion. There is insufficient evidence to support the safety and effectiveness of Sinuva for the treatment of recurrent polyposis.

US Food and Drug Administration (FDA)

The Relieva Stratus MicoFlow Spacer was FDA 510(k) approved in 2009 as a Class I frontal sinus spacer. The MicroFlow Spacer is indicated "for use as a postoperative spacer to maintain an opening to the frontal sinuses within the first 14 days following surgery". The device is also approved to prevent obstruction, and it maintains its position by a self-retention mechanism. The spacer is a balloon-based device that acts as a reservoir to allow bathing of the ethmoid sinus. A second surgical procedure is needed to remove the device. The 2011 FDA 510(k) approval for the Relieva Stratus Pro MicroFlow Spacer (Frontal) was approved for "use as a postoperative spacer to maintain an opening to the frontal sinuses within the first 14 days following surgery. The MicroFlow Spacer also helps to prevent obstruction". The FDA summary noted that the safety and effectiveness of injecting solutions other than saline solution in the catheter have not been established.

The Propel® implant (Intersect ENT, Palo Alto, CA) was approved through the premarket approval application (PMA) process. The implant is intended "for use in patients >18 years of age following ethmoid sinus surgery to maintain patency, thereby reducing the need for post-operative intervention such as surgical adhesion lysis

and/or use of oral steroids. The Propel separates mucosal tissues, provides stabilization of the middle turbinate, prevents obstruction by adhesions, and reduces edema." The implant is manufactured from a synthetic bioabsorbable copolymer, poly (L-lactideco-glycolide) (PLG) and contains 370 µg mometasone furoate (active ingredient), a synthetic corticosteroid with anti-inflammatory activity. The implant is designed to accommodate the size and variability of the post-surgical ethmoid sinus anatomy. The device is dissolvable over a period of several weeks, and thereby does not require removal (FDA, 2011). The Propel Mini was FDA PMA approved in 2012 as a shortened version of the Propel and is indicated for use in a patient ≥ 18 years of age following ethmoid sinus surgery to maintain patency, thereby reducing the need for post-operative intervention such as surgical adhesion lysis and/or use of oral steroids. The Mini also contains 370 µg mometasone furoate (FDA, 2012). In 2016, The Propel Mini FDA indication was expanded to include treatment of the frontal sinus. The Propel Contour Sinus Implant was FDA PMA approved in February 2017 as a supplement to the Propel FDA PMA approval. This device is indicated for use in patients ≥ 18 years of age to maintain patency of the frontal and maxillary sinus ostia following sinus surgery. Per Intersect (2017), the Contour has an hourglass shape and is proposed to conform to sinus ostia, propping the sinuses open while delivering the medication. Like the other Propel devices, the Contour releases 370 µg mometasone furoate.

Sinu Foam (Arthrocare Corp., Austin, TX) is an FDA approved carboxymethylcellulose polysaccharide material that forms a gel when hydrated. The gel is placed within the ethmoid cavity at the completion of an FESS procedure. The dexamethasone Sinu-Foam™ spacer has been evaluated following FESS for CRS without polyps (Parikh, et al., 2014; Rudmik, et al., 2012). The spacer is currently not FDA approved (Rudmik, et al., 2012).

Sinuva is a corticosteroid-eluting implant that was FDA approved as a drug for the "treatment of nasal polyps in patients ≥ 18 years of age who have had ethmoid sinus surgery". One Sinuva implant system contains 1350 mcg of mometasone furoate and a sterile delivery system. The implant is made of bioabsorbable polymers designed to gradually soften over time, must be implanted under endoscopic visualization, and can be removed 90 days following insertion. The FDA decided that the drug had more of an effect than the device and approved Sinuva as a drug as opposed to a drug/device system (e.g. Propel). Clinical studies did not include sufficient numbers of subjects age ≥ 65 years to determine if they responded differently from subjects ages 18–64 years. Repeat administration has not been studied (FDA, 2018).

Literature Review

All Devices: In a Cochrane review, Huang et al. (2015) conducted a systematic review of randomized controlled trials (RCTs) to evaluate the effectiveness of steroid-eluting sinus stents for improving symptoms of CRS following functional endoscopic sinus surgery (FESS). The search included all RCTs comparing steroid-eluting sinus stents with non-steroid-eluting sinus stents, nasal packing, or no treatment in adult CRS patients undergoing FESS. A total of 159 records were retrieved. Twenty-one had the potential to be included given that they had tested sinus stents, spacers and packing materials for patients with CRS undergoing FESS. However, the trials did not meet all of the inclusion criteria. Inclusion criteria included adult patients with CRS, with or without nasal polyps, undergoing FESS. CRS was diagnosed based on the presence of symptoms for 12 weeks, including nasal obstruction, nasal discharge, and either endoscopic signs or CT images showing mucosal changes within the ostiomeatal complex, sinuses, or both. Randomized controlled trials that were within patient control design were excluded. Studies did not report subjective measurements of sinonasal symptoms. The primary outcome measure was improvement in symptom scores per visual analogue scale or Sino-Nasal Outcome Test-22 (SNOT-22). Secondary outcomes included improvement in quality of life, adverse events, endoscopic score, and Lund-Mackay radiographic scores.

Propel (Mometasone Furoate) Sinus Implants: There are three sinus implants in the "Propel family" of dissolvable implants made by Intersect for the treatment of CRS: the Propel, Propel Mini and Propel Contour.

Luong et al. (2017) conducted a randomized intrapatient controlled (n=80) trial to assess the safety and efficacy of the Propel Contour sinus implant in improving postoperative outcomes when placed in the frontal sinus ostia (FSO) following endoscopic sinus surgery (ESS) in adult patients with chronic rhinosinusitis (CRS). Patients were scheduled to undergo primary or revision bilateral ESS and had evidence on CT scan of bilateral frontal sinus disease with a Lund-Mackay (L-M) score of ≥ 1 on each side. Fourteen days following implant, intranasal steroids were allowed. Oral steroids were prescribed as needed, and inhaled steroids were allowed for asthma

control. The primary outcome measure was the reduction in need for postoperative interventions 30 days following surgery based on video endoscopic evaluation by a blinded sinus surgeon reviewer. Implants were removed at day 21 to allow blinded assessment of 30 day video endoscopies. Patients needing postoperative interventions (surgical, oral steroids) by independent reviewer were lower in the implant group (7/61) vs. controls (20/61). Based on clinical investigators at day 30, 12/75 implant patients vs. 25/75 controls required postoperative interventions. Based on clinical investigators at day 90, implant patients had less inflammation (26/76 vs. 32/77) and occlusion/restenosis (16/69 vs. 28/69), larger diameter of frontal sinus ostial (mean 5.7 mm vs. mean 4.7 mm), and improvement in frontal opacification as seen by a reduction in the total Lund-Mackay CT score (mean 0.7 vs. mean 0.9) compared to baseline. There were three adverse events that may have been related to the implant (i.e., headache, epistaxis, acute sinusitis). Limitations of the study include the intrapatient study design, small patient population, removal of implant at day 21, patients lost to follow-up and short-term follow-up.

Smith et al. (2016) conducted a multicenter randomized controlled trial (N=80) to assess the safety and efficacy of the Propel mini steroid-releasing implant following endoscopic sinus surgery (ESS). Each patient was their own control with one side receiving propel and the contralateral side receiving no implant. Subjects were age ≥ 18 years, diagnosed with CRS, scheduled to undergo primary or revision bilateral ESS, and had evidence of frontal sinus disease based on computed tomography. The primary outcome measure was the reduction in need for postoperative interventions 30 days post-ESS based on video-endoscopic evaluation by an independent, blinded reviewer. Postoperative intervention was defined as either surgical intervention to debride obstructive adhesions or scar tissue formation in the frontal recess/frontal sinus opening (FSO) and/or oral steroid intervention needed to resolve recurrent inflammation or polypoid edema in the frontal recess/FSO. The implants were removed at day 21 to maintain blinding of the independent reviewer. Following ESS, a 10-day course of antibiotics was required. Intranasal steroid sprays were allowed starting 14 days post-ESS, and oral steroids were prescribed, if warranted, based on the investigator's discretion. Orally inhaled steroids for control of asthma were prescribed as needed. Patients were encouraged to use saline sprays or irrigation as needed. If oral steroids or surgical intervention was warranted at day 7 or day 21 and received, the grading was revised by the clinical investigator. At the 30-day follow-up, based on clinical investigator judgment, the need for postoperative intervention in the FSO was significantly lower in the implant side vs. the control side (p=0.0070) which remained true when analysis was adjusted for three patients who received postoperative interventions (p=0.0107). The reduction in postoperative interventions remained true at the 90-day follow-up (p=0.0129). Significant differences in favor of the implant group were also seen in oral steroid intervention (p=0.0015), relative reduction (75.0%) in need for surgical intervention (p=0.0225), inflammation scores (p<0.0001), lower number of restenosed or occluded sinuses (p=0.0002), and a greater FSO diameter (p<0.0001). Endoscopic assessments showed that the implant sides had a significantly lower frequency of adhesion and scarring warranting surgical interventions (p=0.0225) and a significant reduction in expanded polypoid edema at day 30 (p=0.0226) by clinical investigators. Five adverse events including headache, left upper eyelid swelling, epistaxis, recurrent chronic sinusitis, and increased sinus pressure were judged by the clinical investigators to have an indeterminate relationship to the implant. Limitations of the study include the small patient population, short-term follow-up and heterogeneity of postoperative treatment regimen. Author-noted limitation includes the intrapatient design which precluded evaluation of the effect of treatment on patient symptoms and other quality-of-life assessments, and removal of the implant at day 21 may have caused additional mucosal trauma hindering normal healing on the treatment sides.

Han et al. (2012) conducted a meta-analysis of two multicenter, randomized controlled trials (n=143) (Murr, et al., 2011 and Marple, et al., 2011). The treatment arm of both studies utilized versions of the Propel implant which were not FDA approved at the time of the studies. Both trials were FDA-regulated trials. Patients served as their own control with subjects receiving the drug-releasing implant on one side and a placebo control implant on the contralateral side. Both studies enrolled patients with similar baseline characteristics and enrolled subjects who were adults (mean age 48) with a diagnosis of CRS with and without polyps who were scheduled to undergo primary or revision FESS with bilateral ethmoidectomy, and were candidates for implants. CRS was defined as inflammation of the mucosa of the nose and paranasal sinuses for at least eight consecutive weeks' duration with presence of bilateral ethmoid disease. All implants were successfully inserted. Significantly fewer adhesions were seen postoperatively in the implant group (4.2% vs. 14.1%) (p=0.0013). The need for postoperative intervention (e.g., lysis of adhesion, need for oral steroid) was 50.8% on control sides compared to 32.8% on treatment sides (p=0.0008). Significantly fewer implant patients required surgical intervention for adhesions (13.2

vs. 29.1%) (p=0.0016) and oral steroids (22.1% vs. 37.25%) (p=0.0023). The rate of frank polyposis was significantly fewer in the implant group as well (19.8% vs. 36.9%) (p<0.0001). Author-noted limitations of the analysis included: some patients could not be evaluated for some of the endpoints when one or both sinus sides was unable to be graded due to inadequate imaging of relevant anatomy or suboptimal video quality; the required intervention decisions (e.g., oral steroids) were made by the independent panel without consideration of individual clinical factors impacting the patient or recovery process; and since both the sinuses had implants there was no comparison without any implant. Another limitation is the small patient population.

Forwith et al. (2011) conducted a prospective case series (n=50 patients/90 sinuses) of patients with CRS who underwent FESS using bilateral and unilateral drug-eluting implants (Propel). Subjects were adult patients, with or without nasal polyps, scheduled to undergo primary or revision FESS, and in whom placement of the sinus stents was feasible and medically appropriate. Oral and topical steroids were withheld for 60 days postoperatively. Endoscopic follow-ups were performed for up to 60 days, and patient questionnaire scores (the Sino-Nasal Outcome Test-22 Questionnaire, Rhinosinusitis Disability Index) were collected for up to six months. Outcomes were assessed by inflammation grading, polyp formation, adhesions, and middle turbinate position. Safety assessment included ocular exams at baseline and 30 days. All devices were successfully implanted. At the one-month follow-up, the prevalence of polypoid edema was 10.0%, significant adhesions were 1.1%, and middle turbinate lateralization was 4.4%. Improved changes from baseline in patient-reported outcomes were statistically significant (p<0001). No clinically significant changes from baseline in intraocular pressure occurred. Limitations of the study include the lack of a comparator, the small patient population and the short-term follow-ups.

Hayes Inc. published two Prognosis Overview reports (2016) for bioabsorbable steroid-releasing sinus implants including Propel, Propel Mini and the Propel Contour. Regarding Propel and Propel Mini, Hayes concluded that there is insufficient evidence to draw firm conclusion on whether the Propel implants improve clinical outcomes following ESS compared to conventional postoperative regimens. Available studies preclude firm conclusions on the clinical benefits of these devices relative to standard postoperative ESS treatment. Currently, there are no published studies supporting the safety and efficacy of the Propel Contour. According to Hayes, the Relieva Stratus MicroFlow Spacer (Acclarent Inc.) is no longer marketed in the US.

Hayes (2017; updated 2019) conducted a technology assessment brief to assess the safety and efficacy of the Propel and Propel Mini sinus stent for the treatment of chronic rhinosinusitis in adults. Three randomized controlled trials and two prospective case series met inclusion criteria. The eligible studies included both primary and revision endoscopic sinus surgery and patients with CRS without nasal polyps as well as high-risk patients with nasal polyps. Revision results were limited by the short-term follow-up periods (i.e., thirty days to six months) which prevented conclusions regarding the durability of effect and long-term adverse events. Due to the intrapatient nondrug-eluting stent control used in two studies, measurement of patient-reported reduction of symptoms related to the study group did not allow for an evaluation of the potential therapeutic contribution of the expandable polymer (L-lactide-co-glycolide) (PLG) scaffold used in the Propel devices. No comparative study was designed to adequately assess patient-reported alleviation of symptoms. Individual study quality ranged from poor to good. The outcomes suggested that patient-reported symptoms improved with the use of the drug-eluting stent and the short-term safety results did not identify any safety signals. However, the studies were limited by: the observational study designs in two studies; small, heterogeneous patient populations and short-term follow-ups. Very limited evidence was available with respect to patient selection criteria for the use of the Propel and Propel Mini stent. Additional randomized controlled trials with large patient populations and long-term follow-ups are needed to support the safety and efficacy of these drug eluting stents. Hayes updated the technology assessment in 2019 with no change in recommendation.

Sinuva (Mometasone Furoate) Sinus Implant: Kern et al. (2018) conducted a phase 3 randomized controlled trial (n=300), RESOLVE II, to evaluate the safety and efficacy of the Sinuva sinus implant. Patients were randomized (2:1) to Sinuva (n=201) or sham (n=99) and participated in a 14-day run-in screening period using topical intranasal corticosteroid sprays (INCS) prior to the procedure. Included patients met the following criteria: age ≥ 18 years, confirmed diagnosis of refractory chronic rhinosinusitis with nasal polyps (CRSwNP), previously endoscopic sinus surgery (ESS) including bilateral total ethmoidectomy and a candidate for repeat ESS. Candidates for repeat ESS had been using INCS daily for ≥ 14 days; received ≥ 1 course of high-dose steroids or refused therapy due to side effects within the past year; had moderate-to-severe symptoms of nasal

obstruction/congestion; and had endoscopic evidence of bilateral ethmoid sinus obstruction due to polyposis. Exclusion criteria included: patients with grade 4 nasal polyps, extensive adhesions/synechiae that would interfere with access to either ethmoid sinus, allergy or intolerance to corticosteroids, or clinical evidence of acute bacterial sinusitis or invasive fungal sinusitis. Leading up to the baseline procedure, there was a 30-day restriction for use of parenteral injection of steroids and a 14-day restriction for use of oral steroids, budesonide drops/irrigations and nebulized steroids. Primary outcomes included changes from baseline to post-operative day 30 in nasal obstruction/congestion score via self-assessment and degree of change from baseline in bilateral polyp grade at post-operative day 90 determined by an independent, blinded panel. During 90-day follow-up, both treatment and control groups were required to self-administer mometasone furoate nasal spray (MFNS) 200 *µ*g once daily (Nasonex Nasal Spray; Merck & Co., Inc., Whitehouse Station, NJ). Pre-existing asthma and allergy regimens, including inhaled corticosteroids, leukotriene receptor antagonists, and immunotherapies were maintained throughout the 90 day trial. Patients who received prohibited steroids or surgery were allowed to continue in the study and were analyzed according to their assigned treatment group, and their most recent scores and videos prior to intervention were used for analysis of subsequent time points. The Sinuva implants were removed at day 60 following implantation to provide blinded grading of the polyps. At day 30, implant patients reported significant reduction in nasal obstruction/congestion (p=0.0074) and had improved polyp grade (p=0.0073). At the 90-day follow-up, significantly fewer patients receiving Sinuva were still eligible for repeat ESS (p=0.0004), had a significantly greater decrease in the percent of ethmoid sinus obstruction (p=0.0007), and experienced sustained symptomatic improvements in nasal obstruction/congestion (p=0.0248) and sense of smell (p=0.0470). There was no significant difference between the groups in facial pain/pressure (p=0.9130). Following the procedure, oral steroids for ethmoid sinus obstruction were used by 13.9% of Sinuva patients compared to 18.2% of controls. Based on the clinical investigator scoring, 72% of patients who received implants achieved at least a 1.0-grade polyp reduction and 48% at least 2.0-grade polyp reduction by day 90, compared to 37% and 16% of sham, respectively. The authors noted that the magnitude of polyp shrinkage was greater when evaluated by the unblinded investigators than by the independent, blinded panel. The overall incidence of adverse events was similar in both groups, and the most common was sinusitis. Author noted limitations of the study included: absence of a defined medical regimen prior to enrollment; clinical investigators performing endoscopic grading and assessment of indication for repeat ESS at day 90 were not blinded to the treatment assignment; and the length of the trial was short at 90 days reflecting the time course of drug release from the implant. An additional limitation of the study includes the unequal allocation (2:1) of subjects.

Forwith et al. (2016) reported outcomes of the Han et al. (2014) randomized controlled trial (n=100) on the steroid-eluting sinus implant for in-office treatment of recurrent ethmoid sinus obstruction after ESS. Three sinus surgeons (the panel) graded the baseline and three-month video-endoscopies in order to independently corroborate the findings reported by the clinical investigators. Implants were removed at day 60 to ensure the panel was blinded to the treatment assignment. Six-month clinical outcomes were also reported. The original study was a multi-center randomized controlled trial that assessed the safety and efficacy of office-based steroid-eluting sinus implants. The control group (n=43) underwent sham procedure. Patients, age ≥ 18 years, had CRS and were candidates for revision ESS based on recurrent symptoms and bilateral polyposis (minimum grade 2 on one side). Within six months of study enrollment, the polyposis had been treated with ongoing topical intranasal steroid irrigation or spray and repeated courses of treatment with oral steroids and/or sinus steroid irrigations. Patients were required to use topical steroid sprays up to the time of the baseline in-office procedure. Following the implant, both groups were required to take mometasone furoate nasal spray (Nasonex® 100 µg/nostril once daily) and encouraged to use saline sprays or irrigations, as needed. Patients were permitted to continue regimens of orally-inhaled steroids and sinus-related medical therapy (e.g., immunotherapy, leukotriene antagonists) during the 90-day follow-up. Antibiotics were used as needed for sinus infection. Follow-up occurred for six months. At six months, the study group experienced a significantly greater reduction in bilateral polyp grade (p=0.018) and percent ethmoid obstruction on 100-mm visual analog scale (p<0.001) compared to the control group according to clinical investigator judgment. These results were corroborated by the independent panel at three months. The study group reported a significant improvement in the Nasal Obstruction Symptom Evaluation (NOSE) score (p=0.021) and a two-fold reduction in nasal obstruction and congestion score (p=0.124; not statistically significant). Also, at six months 31% (16/52) of the study group patients were no longer indicated for repeat ESS vs. 11% (5/46) of controls. Adverse events included sinusitis, upper respiratory tract infection, epistaxis, nasopharyngitis, asthma, headache, and presyncope and were similar between the two groups. An author-noted limitation is the fact that the clinical investigators performing endoscopic grading were not blinded to the treatment assignment. Also, the study entry criteria required patients to be surgical revision candidates

while concurrently allowing for one sinus side to have only grade 1 polyposis which may have resulted in enrollment of patients with less opportunity for improvement from baseline. Other limitations are the small patient population and short-term follow-up. This device was not been FDA approved at the time of the study.

Han et al. (2014) conducted a multicenter, randomized controlled trial (n=100) to evaluate the safety and efficacy of a bioabsorbable steroid-eluting implant with 1350 μg of mometasone furoate (Intersect ENT, Menlo Park, CA). Subjects were age 18 years or older, had CRS, and had undergone bilateral total ethmoidectomy more than three months earlier. Patients were randomized to the implant group or to the placebo group following FESS and underwent in-office bilateral implants. Three months post procedure, compared to the control group, the implant group experienced a significant reduction in bilateral polyp grade (p=0.0269), ethmoid sinus obstruction (p=0.0001), and a 2-fold improvement in the mean nasal obstruction/congestion score. Also, 53% of treated patients compared to 23% of controls were no longer indicated for repeat FESS. The mean percentages of implants remaining at days 30, 45, and 60 were 92.5, 86.5, and 56.7, respectively. All implant remnants remaining at 60 days were removed. A total of 34 (64%) patients in the implant group and 35 (75%) in the control group experienced an adverse event including: sinusitis, nasopharyngitis, epistaxis, headache, upper respiratory infection and nasal congestion. No patient experienced a significant increase in intraocular pressure or any type of cataract. According to the authors limitations of the study included: there was not a defined medical treatment regimen prior to enrollment; there was no control over patient prior treatment regimens and compliance; clinical investigators performing endoscopic grading were not blinded to the treatment (implant vs. placebo); and the study entry criteria required patients to be surgical revision candidates while concurrently allowing for one sinus side to have only grade one polyposis which may have impacted the outcomes and lessened the opportunity of generalizing these outcomes to other patients. Another limitation is the small patient population.

Relieva Stratus MicroFlow Spacer: Studies are primarily in the form of case series with small patient populations (n=23) and short-term follow-ups (six months) (Catalano, et al., 2011).

Sinu-Foam Spacer: Rudmik et al. (2012) conducted a randomized controlled trial (n=36) to evaluate the safety and efficacy of the off-label use of dexamethasone Sinu-Foam spacer following FESS for CRS without nasal polyposis. Subjects were age 18 years or older who had failed medical management (i.e., nasal saline irrigations, topical nasal steroids spray for three months, course of systemic steroids with a broad spectrum oral antibiotic), were eligible for minimum bilateral FESS procedure consisting of maxillary antrostomy and ethmoidectomy, and were able to adhere to the follow-up schedule. Patients were randomized to the treatment arm (n=18) or the placebo control arm (n=18). Follow-ups occurred for up to three months and included sinonasal endoscopy and Lund-Kennedy scoring. Postoperatively, patients were treated with nasal saline irrigations and systemic steroids. Both groups showed significant improvement in endoscopic grading (p<0.001) following FESS, but there was no significant difference between the groups (p>0.489). Sinu-Foam did not improve outcomes following FESS.

Professional Societies/Organizations
American Rhinologic Society (ARS): The ARS position statement (2016) on drug-eluting implants stated that studies investigating drug-eluting implants have demonstrated improvement in outcomes by reducing inflammation, decreasing scarring and middle turbinate lateralization, and limiting the need for oral steroids. ARS "feels strongly that drug-eluting implants are not investigational and should be available to our patients, when selected by the physician, in order to maximize outcomes".

American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS): In a position statement regarding FDA-approved biomaterials, AAO-HNS (2015) stated that these materials can be utilized in sinonasal procedures to improve patient outcomes and reduce complications. These devices include implants, stents, and packing materials and have functions including, but not limited to, local drug delivery, stenting, and hemostasis. According to AAO-HNS FDA-approved biomaterials for rhinologic application are not investigational, and the final decision regarding use of these biomaterials should be determined by the treating physician, factoring in best available scientific evidence, surgeon experience, the clinical situation, and individual patient preference.

Use Outside of the US
The Relieva Stratus MicroFlow Spacer has a CE Mark approval for use in Europe and includes the delivery of triamcinolone acetonide. A randomized controlled trial (Taulu, et al., 2017) compared adult patients treated with

Relieva (n=34) compared to the control group treated with triamcinolone acetonide nasal spray (n=29) for the treatment of ethmoiditis. Patients, age 19–64 years, had chronic rhinosinusitis of the ethmoid sinus without satisfactory results from three months of medical treatment. The nasal spray was used twice a day for six months. Relieva was removed after four weeks. At the six-month's follow-up there were no significant differences in the Sino Nasal Outcome Test-22 Quality of Life Questionnaire (SNOT22), Visual Analogue Scale (VAS), rhinomanometry (RMM), endoscopic, and Lund-Mackay (LM) scores or the use of antibiotics between the groups. The total nasal volumes in the nasal spray group was significantly more than the implant group (p=0.016). There were no significant adverse events. Upon removal of Relieva patients experienced minor crusting, purulent discharge, and minor nose bleeds. Limitations of the study include the small patient population, short-term follow-up and loss of six patients to follow-up.

In an interventional procedure guidance (2016), the National Institute for Health and Care Excellence (NICE), United Kingdom, stated that current evidence on the safety of corticosteroid-eluting bioabsorbable stent or spacer insertion during endoscopic sinus surgery raises no major concerns but the evidence for efficacy is limited. Reported improvement of sinus patency is short term and there is inadequate evidence on patient reported outcomes and quality of life. The procedure should only be used with special arrangements for clinical governance, consent, and audit or research.

Medicare Coverage Determinations

	Contractor	Policy Name/Number	Revision Effective Date
NCD		No National Coverage Determination found	
LCD		No Local Coverage Determination found	

Note: Please review the current Medicare Policy for the most up-to-date information.

Coding/Billing Information

Note: 1) This list of codes may not be all-inclusive.
2) Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement.

Considered Experimental/Investigational/Unproven:

CPT®* Codes	Description
31299	Unlisted procedure, accessory sinuses

HCPCS Codes	Description
C9122	Mometasone furoate sinus implant, 10 micrograms (sinuva) (Code deleted 03/31/2021)
J7401	Mometasone furoate sinus implant, 10 micrograms (Code deleted 03/31/2021)
J7402	Mometasone furoate sinus implant, (sinuva), 10 micrograms (Code effective 04/01/2021)
S1091	Stent, non-coronary, temporary, with delivery system (propel) (Code effective 04/01/2021)

Considered Experimental/Investigational/Unproven when used to report a drug-eluting device for maintaining postoperative sinus ostial patency following endoscopic sinus surgery:

HCPCS Codes	Description
C1874	Stent, coated/covered, with delivery system
C1875	Stent, coated/covered, without delivery system
C1876	Stent, non-coated/non-covered, with delivery system
C1877	Stent, non-coated/non-covered, without delivery system

HCPCS Codes	Description
C2617	Stent, non-coronary, temporary, without delivery system
C2625	Stent, non-coronary, temporary, with delivery system

ICD-10-CM Diagnosis Codes	Description
D14.0	Benign neoplasm of middle ear, nasal cavity and accessory sinuses
J01.00	Acute maxillary sinusitis, unspecified
J01.01	Acute recurrent maxillary sinusitis
J01.10	Acute frontal sinusitis, unspecified
J01.11	Acute recurrent frontal sinusitis
J01.20	Acute ethmoidal sinusitis, unspecified
J01.21	Acute recurrent ethmoidal sinusitis
J01.30	Acute sphenoidal sinusitis, unspecified
J01.31	Acute recurrent sphenoidal sinusitis
J01.40	Acute pansinusitis, unspecified
J01.41	Acute recurrent pansinusitis
J01.80	Other acute sinusitis
J01.81	Other acute recurrent sinusitis
J01.90	Acute sinusitis, unspecified
J01.91	Acute recurrent sinusitis, unspecified
J31.0	Chronic rhinitis
J32.0	Chronic maxillary sinusitis
J32.1	Chronic frontal sinusitis
J32.2	Chronic ethmoidal sinusitis
J32.3	Chronic sphenoidal sinusitis
J32.4	Chronic pansinusitis
J32.8	Other chronic sinusitis
J32.9	Chronic sinusitis, unspecified
J33.0	Polyp of nasal cavity
J33.1	Polypoid sinus degeneration
J33.8	Other polyp of sinus
J33.9	Nasal polyp, unspecified
J34.1	Cyst and mucocele of nose and nasal sinus
J34.2	Deviated nasal septum
J34.3	Hypertrophy of nasal turbinates
J34.89	Other specified disorders of nose and nasal sinuses
J34.9	Unspecified disorder of nose and nasal sinuses
T70.1XXA	Sinus barotrauma, initial encounter
T70.1XXD	Sinus barotrauma, subsequent encounter
T70.1XXS	Sinus barotrauma, sequela

References

1. American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS). Position Statement: The use of biomaterials in sinonasal procedures. Sept 2015. Accessed Jan 26, 2021. Available at URL address: http://www.entnet.org/content/position-statement-use-biomaterials-sinonasal-procedures

2. American Rhinologic Society (ARS). Drug-eluting implants. Sept 14, 2016. Accessed Jan 26, 2021. Available at URL address: https://www.american-

rhinologic.org/index.php?option=com_content&view=article&id=32:drug-eluting-implants&catid=26:position-statements&Itemid=197

3. Baguley CJ, Stow NW, Weitzel EK, Douglas RG. Silastic splints reduce middle meatal adhesions after endoscopic sinus surgery. Am J Rhinol Allergy. 2012 Sep-Oct;26(5):414-7.

4. Bury S, Singh A. Evaluation of a steroid releasing sinus implant for the treatment of patients undergoing frontal sinus surgery for chronic rhinosinusitis. Expert Rev Med Devices. 2017 Feb;14(2):93-101.

5. Catalano PJ, Thong M, Weiss R, Rimash T. The MicroFlow Spacer: A Drug-Eluting Stent for the Ethmoid Sinus. Indian J Otolaryngol Head Neck Surg. 2011 Jul;63(3):279-84.

6. Centers for Medicare and Medicaid Services (CMS). Local Coverage Determinations (LCDs) alphabetical index. Accessed Jan 26, 2021. Available at URL address: https://www.cms.gov/medicare-coverage-database/indexes/lcd-alphabetical-index.aspx?Cntrctr=373&ContrVer=1&CntrctrSelected=373*1&DocType=Active%7cFuture&s=All&bc=AggAAAQAAAAA&

7. Centers for Medicare and Medicaid Services (CMS). National Coverage Determinations (NCDs) alphabetical index. Accessed Jan 26, 2021. Available at URL address: https://www.cms.gov/medicare-coverage-database/indexes/ncd-alphabetical-index.aspx.

8. Cote, DW, Wright, ED. Triamcinolone-impregnated nasal dressing following endoscopic sinus surgery: a randomized, double-blind, placebo-controlled study. The Laryngoscope. 2010 Jun;120(6):1269-73.

9. Forwith KD, Chandra RK, Yun PT, et al. ADVANCE: a multisite trial of bioabsorbable steroid-eluting sinus implants. Laryngoscope. 2011; 121(11):2473-2480.

10. Forwith KD, Han JK, Stolovitzky JP, Yen DM, Chandra RK, Karanfilov B, Matheny KE, Stambaugh JW, Gawlicka AK. RESOLVE: bioabsorbable steroid-eluting sinus implants for in-office treatment of recurrent sinonasal polyposis after sinus surgery: 6-month outcomes from a randomized, controlled, blinded study. Int Forum Allergy Rhinol. 2016 Jun;6(6):573-81.

11. Han JK, Forwith KD, Smith TL, Kern RC, Brown WJ, Miller SK, Ow RA, Poetker DM, Karanfilov B, Matheny KE, Stambaugh J, Gawlicka AK. RESOLVE: a randomized, controlled, blinded study of bioabsorbable steroid-eluting sinus implants for in-office treatment of recurrent sinonasal polyposis. Int Forum Allergy Rhinol. 2014 Nov;4(11):861-70.

12. Han, J. K., & Kern, R. C. (2019). Topical therapies for management of chronic rhinosinusitis: steroid implants. International forum of allergy & rhinology, 9(S1), S22–S26. https://doi.org/10.1002/alr.22344

13. Han JK, Marple BF, Smith TL, Murr AH, Lanier BJ, Stambaugh JW, Mugglin AS. Effect of steroid-releasing sinus implants on postoperative medical and surgical interventions: an efficacy meta-analysis. Int Forum Allergy Rhinol. 2012 Jul-Aug;2(4):271-9.

14. Hayes Inc. Prognosis overview. Propel and Propel Mini bioabsorbable steroid-releasing sinus implants. Lansdale, PA: Hayes, Inc.; Mar 2017. Archived Aug 24, 2017.

15. Hayes Inc. Prognosis overview. Propel Contour bioabsorbable steroid-releasing sinus implant. Lansdale, PA: Hayes, Inc.; Mar 2017. Archived Jan 16, 2019.

16. Hayes Inc. Prognosis overview. Resolve bioabsorbable steroid-releasing sinus implant. Lansdale, PA: Hayes, Inc.; Mar 2017. Archived.

17. Hayes Inc. Search and summary. Sinuva (Intersect ENT Inc.) bioabsorbable steroid-releasing sinus implant for the treatment of nasal polyps after ethmoid sinus surgery. Lansdale, PA: Hayes, Inc.; Feb 26, 2019. Archived Dec 31, 2020.

18. Hayes Inc. Technology brief. Propel and Propel Mini bioabsorbable steroid-releasing sinus implants for treatment of chronic rhinosinusitis in adults. Lansdale, PA: Hayes, Inc.; Aug 2017. Archived Sep 24, 2020.

19. Huang Z, Hwang P, Sun Y, Zhou B. Steroid-eluting sinus stents for improving symptoms in chronic rhinosinusitis patients undergoing functional endoscopic sinus surgery. Cochrane Database Syst Rev. 2015 Jun 10;6:CD010436. doi: 10.1002/14651858.CD010436.pub2.

20. Intersect ENT. Propel® Mini. 2019. Accessed Jan 26, 2021. Available at URL address: https://propelopens.com/propel-overview/

21. Intersect ENT. Propel Contour. Feb 2017. Accessed Jan 26, 2021. Available at URL address: http://www.intersectent.com/wp-content/uploads/Contour-FDA-FINAL.pdf

22. Kennedy DW. The PROPEL™ steroid-releasing bioabsorbable implant to improve outcomes of sinus surgery. Expert Rev Respir Med. 2012 Nov;6(5):493-8.

23. Kern RC, Stolovitzky JP, Silvers SL, Singh A, Lee JT, Yen DM, Iloreta AMC Jr., Langford FPJ, Karanfilov B, Matheny KE, Stambaugh JW, Gawlicka AK. RESOLVE II study investigators. A phase 3 trial of mometasone furoate sinus implants for chronic sinusitis with recurrent nasal polyps. Int Forum Allergy Rhinol. 2018 Jan 19. doi: 10.1002/alr.22084. [Epub ahead of print]

24. Lavigne F, Miller SK, Gould AR, Lanier BJ, Romett JL. Steroid-eluting sinus implant for in-office treatment of recurrent nasal polyposis: a prospective, multicenter study. Int Forum Allergy Rhinol. 2014 May;4(5):381-9.

25. Lee JT, Han JK. Sinus implants for chronic rhinosinusitis: technology evaluation. Expert Opin Drug Deliv. 2013 Dec;10(12):1735-48.

26. Luong A, Ow RA, Singh A, Weiss RL, Han JK, Gerencer R, Stolovitzky JP, Stambaugh JW, Raman A. Safety and Effectiveness of a Bioabsorbable Steroid-Releasing Implant for the Paranasal Sinus Ostia: A Randomized Clinical Trial. JAMA Otolaryngol Head Neck Surg. 2017 Nov 2. doi: 10.1001/jamaoto.2017.1859. [Epub ahead of print].

27. Marple BF, Smith TL, Han JK, Gould AR, Jampel HD, Stambaugh JW, Mugglin AS. Advance II: a prospective, randomized study assessing safety and efficacy of bioabsorbable steroid-releasing sinus implants. Otolaryngol Head Neck Surg. 2012 Jun;146(6):1004-11.

28. Massey CJ, Suh JD, Tessema B, Gray ST, Singh A. Biomaterials in Rhinology. Otolaryngol Head Neck Surg. 2016 Feb 23.

29. Matheny KE, Carter KB Jr, Tseng EY, Fong KJ. Safety, feasibility, and efficacy of placement of steroid-eluting bioabsorbable sinus implants in the office setting: a prospective case series. Int Forum Allergy Rhinol. 2014 Oct;4(10):808-15.

30. Murr AH, Smith TL, Hwang PH, Bhattacharyya N, Lanier BJ, Stambaugh JW, Mugglin AS. Safety and efficacy of a novel bioabsorbable, steroid-eluting sinus stent. Int Forum Allergy Rhinol. 2011 Jan-Feb;1(1):23-32.

31. National Institute for Health and Care Excellence (NICE). IPG 551. Corticosteroid-eluting bioabsorbable stent or spacer insertion during endoscopic sinus surgery to treat chronic rhinosinusitis. Mar 2016. Accessed Jan 26, 2021. Available at URL address: https://www.nice.org.uk/guidance/ipg551

32. Parikh A, Anand U, Ugwu MC, Feridooni T, Massoud E, Agu RU. Drug-eluting nasal implants: formulation, characterization, clinical applications and challenges. Pharmaceutics. 2014 May 27;6(2):249-67.

33. Rizan C, Elhassan HA. Post-sinus surgery insertion of steroid-eluting bioabsorbable intranasal devices: A systematic review. Laryngoscope. 2016 Jan;126(1):86-92.

34. Rudmik L, Mace J, Mechor B. Effect of a dexamethasone Sinu-Foam™ middle meatal spacer on endoscopic sinus surgery outcomes: a randomized, double-blind, placebo-controlled trial. Int Forum Allergy Rhinol. 2012 May-Jun;2(3):248-51.

35. Smith TL, Singh A, Luong A, Ow RA, Shotts SD, Sautter NB, Han JK, Stambaugh J, Raman A. Randomized controlled trial of a bioabsorbable steroid-releasing implant in the frontal sinus opening. Laryngoscope. 2016 Dec;126(12):2659-2664.

36. Taulu R, Bizaki AJ, Numminen J, Rautiainen M. A prospective, randomized clinical study comparing drug eluting stent therapy and intranasal corticoid steroid therapy in the treatment of patients with chronic rhinosinusitis. Rhinology. 2017 Sep 1;55(3):218-226. doi: 10.4193/Rhin16.070.

37. Taulu R, Numminen J, Bizaki A, Rautiainen M. Image-guided, navigation-assisted Relieva Stratus MicroFlow Spacer insertion into the ethmoid sinus. Eur Arch Otorhinolaryngol. 2015 Sep;272(9):2335-40.

38. U.S. Food and Drug Administration (FDA). 510(k) premarket notification database. Product code KAM. Accessed Jan 26, 2021. Available at URL address: http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMN/pmn.cfm

39. U.S. Food and Drug Administration (FDA). Premarket approval database. Accessed Jan 26, 2021. Available at URL address: http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMA/pma.cfm

40. U.S. Food and Drug Administration (FDA). Propel Contour Sinus Implant. Feb 2017. Accessed Jan 26, 2021. Available at URL address: http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpma/pma_template.cfm?id=p100044s023

41. U.S. Food and Drug Administration (FDA). Sinuva sinus implant. Dec 2017. Accessed Jan 26, 2021. Available at URL address: https://www.accessdata.fda.gov/drugsatfda_docs/label/2017/209310lbl.pdf

42. Wei CC, Kennedy DW. Mometasone implant for chronic rhinosinusitis. Med Devices (Auckl). 2012;5:75-80.

43. Zhao X, Grewal A, Briel M, Lee JM. A systematic review of nonabsorbable, absorbable, and steroid-impregnated spacers following endoscopic sinus surgery. Int Forum Allergy Rhinol. 2013 Nov;3(11):896-904.