

Functional Endoscopic Sinus Surgery (FESS)

ACG: A-0185 (AC)

[Link to Codes](#)

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Clinical Indications

- Functional endoscopic sinus surgery (FESS) may be indicated for **1 or more** of the following(1)(2)(3)(4):
 - Chronic rhinosinusitis with nasal polyposis that has not responded adequately to 1 or more months of medical treatment (eg, nasal steroids, antibiotics)(6)(8)(9)(10)(11)[N](#)
 - Complication of sinusitis (eg, brain abscess, cavernous sinus thrombosis, subperiosteal abscess)(14)(15)(16)[N](#)
 - Cystic fibrosis, and chronic rhinosinusitis unresponsive to medical therapy (eg, nasal saline irrigation)(20)(21)[N](#)
- ☐ Fungal sinusitis, as indicated by **1 or more** of the following(6)(8)(23)(24)(25)(26):[N](#)
 - Allergic fungal sinusitis and **ALL** of the following(27):
 - Eosinophilic mucus
 - Evidence of IgE-mediated hypersensitivity, as indicated by **1 or more** of the following:
 - Elevated total IgE level
 - Sensitivity to fungus evident on allergen skin test or in vitro test
 - Nasal airway obstruction symptoms

- Positive findings on CT scan (eg, bony erosion or thinning, partial or complete opacification)(33)(34)
- Positive fungal smear or culture of sinus drainage
 - Fungus ball, sinonasal, with nasal airway obstruction symptoms
 - Invasive fungal sinusitis(35)(36)
- Mucocele[A](41)(42)(43)(44)[N](#)
- Odontogenic sinusitis[B](47)(48)(49)(50)[N](#)
- Recurrent sinusitis that triggers or aggravates pulmonary disease (eg, asthma, cystic fibrosis)(8)(52)(53)[N](#)
- Symptomatic retention cyst(58)[N](#)
- Symptomatic sinus osteoma, as seen on imaging[C][D](42)(59)(60)(61)(63)(64)[N](#)
- Tumor, known or suspected, as seen on imaging, physical examination, or endoscopy(44)(66)(67)(68)(69)(70)[N](#)
- ☐ Uncomplicated chronic rhinosinusitis and **ALL** of the following(8)(76)(77):[N](#)
 - Abnormal findings from diagnostic evaluation, including **1 or more** of the following:
 - Mucocele
 - Negative CT scan but significant disease found on nasal endoscopy or anterior rhinoscopy
 - Obstruction or active infection on CT scan(34)(84)
 - Obstructive symptoms due to polypsis
 - Inadequate response to appropriate medical therapy that included **ALL** of the following(6)(85)(86)(87):
 - Nasal corticosteroids[E]
 - Nasal saline irrigation
 - Significant rhinosinusitis, as indicated by **1 or more** of the following:
 - Chronic rhinosinusitis that interferes with work or limits social interaction(6)
 - Four or more documented episodes of acute rhinosinusitis in 1 year

Alternatives

- Alternatives include:
 - For pediatric patient with chronic rhinosinusitis: adenoidectomy. See Adenoidectomy [AC](#) for further information.(6)(89)
 - Medical management of sinusitis (eg, allergy assessment, intranasal corticosteroids)(6)(8)(10)(77)(88)(90)
 - Septoplasty. See Septoplasty [AC](#) for further information.
 - Turbinate resection. See Turbinate Resection [AC](#) for further information.

Evidence Summary

Background

FESS is a minimally invasive technique in which sinus air cells and sinus ostia are opened using a rigid fiberoptic endoscope.(5)(6) **(EG 2)** Three factors are crucial in the normal physiologic functioning of the sinuses: a patent ostiomeatal complex, normal mucociliary transport, and normal quantity and quality of secretions. Disruption of at least one of these factors can predispose a patient to inflammation and infection of the sinuses. FESS attempts to address the patency issue in patients with medically refractory chronic rhinosinusitis.(5)(6)(7) **(EG 2)**

Criteria

The evidence for the clinical indications found in this guideline includes 81 published peer reviewed articles, 1 specialty society or other evidence-based guideline, 2 Cochrane systematic reviews, and 4 book sections.

For chronic rhinosinusitis with nasal polyposis, evidence demonstrates at least moderate certainty of at least moderate net benefit. **(RG A1)** A comparative literature review of medical (eg, steroids, antibiotics) and surgical (eg, endoscopic surgery, polypectomy) interventions for chronic sinusitis with nasal polyps found similar outcomes for medical and surgical management; the authors concluded that there is sufficient evidence to support surgery once symptoms have failed to respond to medical therapy but recommended additional research regarding the optimal timing and extent of surgery.(10) **(EG 2)** An observational study of 363 patients with medically refractory chronic rhinosinusitis with nasal polyposis who underwent endoscopic sinus surgery (and continued on medications postoperatively) found, at 6-month and 18-month follow-up, recurrence of polyposis in 35% and 40% of patients, respectively.(12) **(EG 2)** A clinical review article recommends intranasal or systemic glucocorticoids, depending upon symptom severity. Functional endoscopic surgery should be considered in patients who have contraindications to or whose symptoms are not well controlled by medical management.(9) **(EG 2)** A literature review of nasal polyps noted that endoscopic sinus surgery improves nasal obstruction, nasal discharge, and quality of life in patients with severe symptoms, recurrent sinusitis, or who are refractory to medical treatment.(13) **(EG 2)**

For complications of sinusitis, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. **(RG A2)** A systematic review of 48 studies (710 patients) evaluating endoscopic sinus surgery, external sinus surgery, open neurosurgical procedures, or a combination of surgical approaches in pediatric patients with intracranial infectious complications of sinusitis (eg, subdural empyema, epidural abscess) found that patients treated with endoscopic sinus surgery alone had a nonsignificantly lower risk of revision surgery than those treated with open neurosurgical procedures alone. However, the authors noted that the available evidence was limited to retrospective case series with heterogeneity in the patient populations, types of surgeries, and outcomes of interest.(14) **(EG 1)** A retrospective review of 22 children with medial orbital subperiosteal abscess noted that none of the 6 patients who were treated with endoscopic sinus surgery developed complications, whereas various complications (eg, delayed wound healing, unresolved diplopia, recurrent periorbital cellulitis) occurred in the 16 patients treated with external ethmoidectomy, several of whom required surgical intervention.(15) **(EG 2)** A retrospective review of 21 pediatric patients with intracranial complications of sinusitis reported that 48% of patients underwent endoscopic sinus surgery as part of their acute surgical management.(16) **(EG 2)** Endoscopic sinus surgery may be indicated for treatment of sinusitis that is associated with cavernous sinus thrombosis.(17)(18)(19) **(EG 2)**

For cystic fibrosis and chronic rhinosinusitis, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. **(RG A2)** Cystic fibrosis is associated with changes in the sinonasal mucosa that predispose patients to chronic rhinosinusitis, with or without nasal polyposis.(21)(22) **(EG 1)** A systematic review of 24 studies evaluating surgical therapy for patients with cystic fibrosis and chronic rhinosinusitis, including 22 studies evaluating endoscopic sinus surgery, found that the majority of studies reported improvements in sinonasal symptoms following surgery.(22) **(EG 1)** Expert consensus guidelines recommend endoscopic sinus surgery for patients with cystic fibrosis with symptomatic chronic rhinosinusitis that is refractory to medical therapy (eg, nasal saline irrigation, intranasal corticosteroids for patients with concurrent allergic rhinitis).(20)(21) **(EG 2)**

For fungal sinusitis, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. **(RG A2)** Allergic fungal rhinosinusitis, a type of noninvasive fungal sinusitis that has clinical overlap with chronic rhinosinusitis with nasal polyposis, is managed with surgical debridement followed by adjuvant medical therapy (eg, topical corticosteroids).(27)(28)(29)(30) **(EG 2)** Review articles note that surgical goals for allergic fungal rhinosinusitis include eradicating all allergic mucin and improving ventilation and drainage in affected sinuses.(7)(28)(30) **(EG 2)** A systematic review and meta-analysis of 14 studies (671 patients) evaluating the efficacy of endoscopic sinus surgery to treat paranasal sinus fungus balls found that endoscopic sinus surgery was associated with a 98% pooled mean treatment success rate.(25) **(EG 1)** A retrospective review of 100 adults followed for a median of 32 months after endoscopic sinus surgery for maxillary sinus fungus ball removal reported a clinical success rate of 97%, a recurrence rate of 3%, and no complications.(31) **(EG 2)** A retrospective review of 532 patients with sinonasal fungus balls treated with endoscopic sinus surgery reported persistent inflammation of a previously infected sinus in 1.5% of patients and a recurrence rate of 1.1% at a median follow-up of 11 months.(32) **(EG 2)**

For mucocele, evidence demonstrates at least moderate certainty of at least moderate net benefit. **(RG A1)** A meta-analysis identified a contemporary cohort of 20 studies (with a total of 542 patients) and demonstrated comparable rates of recurrence and major complications between endoscopic and open techniques for the treatment of frontal and frontoethmoidal mucocele. However, the endoscopic approach had a significantly lower rate of minor complications as compared with the

open technique (1.0% vs 20.8%, respectively). The authors concluded that endoscopic sinus surgery should be used preferentially for frontal mucocoele.(45) **(EG 1)** A retrospective chart review reported that 114 of 133 mucocoeles were treated with endoscopic sinus surgery, with a recurrence rate of 9%.(37) **(EG 2)** A retrospective study of 68 adults with mucocoele noted that 84% were treated with endoscopic sinus surgery alone. Recurrence or a second mucocoele was detected in 24% of cases during a mean follow-up of 7 years.(39) **(EG 2)**

For odontogenic sinusitis, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. **(RG A2)** A retrospective study of 257 patients with odontogenic sinusitis treated with FESS found that all patients had resolution of infection, and only 3 patients required repeat surgery. Patients were successfully treated for a variety of sinonasal complications from dental treatments, including dental implant complications, maxillary sinus lift, and bacterial or fungal sinus infections.(51) **(EG 2)** A retrospective study of 55 patients with odontogenic sinusitis related to dental implants evaluated the efficacy of endoscopic sinus surgery as compared with transoral surgery and found, at a mean follow-up of 2 years, that the endoscopic sinus surgery group had complete resolution of symptoms and fewer postoperative complications. Other studies that evaluated the use of FESS for odontogenic pathology reported success rates of 80% to 100%. The authors concluded that endoscopic sinus surgery should be recommended for the management of oral surgery complications of the maxillary sinus.(48) **(EG 2)**

For recurrent sinusitis that triggers or aggravates pulmonary disease, evidence demonstrates at least moderate certainty of at least moderate net benefit. **(RG A1)** A systematic review of 22 observational studies (891 patients) evaluating asthma outcomes after endoscopic sinus surgery for chronic rhinosinusitis noted improvements in patient-reported asthma control and frequency of exacerbations and hospitalizations, and a decreased need for asthma medication despite a lack of change in pulmonary function test results. Given the limitations in study design, the authors recommended that further studies be performed.(54) **(EG 1)** A systematic review and meta-analysis of 10 case series and 3 randomized controlled trials (421 patients) evaluating the impact of endoscopic sinus surgery on pulmonary function in patients with chronic rhinosinusitis and asthma found that, compared with preoperative values, endoscopic sinus surgery was associated with improvement in forced expiratory flow at 25% to 75%, FEV₁, and peak expiratory flow. The authors cautioned that the included studies were generally of low quality, were uncontrolled, and reported heterogeneous outcomes.(55) **(EG 1)** A meta-analysis of 12 studies (570 patients) evaluating the effect of endoscopic surgery on pulmonary function in patients with cystic fibrosis and chronic rhinosinusitis found no improvement in FEV₁, FVC, or FEV₁/FVC ratio. However, the authors noted that the small number of included studies and patients and significant heterogeneity among the included studies limited the results, and larger prospective trials were recommended.(56) **(EG 1)** A systematic review evaluating surgery for nasal polyposis in cystic fibrosis patients with recurrent sinusitis identified only one randomized trial of 28 patients that compared medical treatment either alone or combined with endoscopic sinus surgery and found, at 6-month follow-up, that treatment with surgery in combination with medical therapy was associated with greater improvements in nasal obstruction and smell acuity (as measured by the Sino-Nasal Outcome Test-20 (SNOT-20)) compared with medical therapy alone. The group treated with surgery also had fewer pulmonary exacerbations in the 12 months after surgery compared with the year prior but no change from baseline in overall pulmonary function (as measured by FEV₁ percent predicted and FVC).(57) **(EG 2)**

For symptomatic sinus retention cysts, evidence demonstrates at least moderate certainty of at least moderate net benefit. **(RG A1)** A prospective randomized trial evaluated the effect of endoscopic sinus surgery and excision of cysts on 80 patients with maxillary sinus retention cysts that filled at least 50% of the sinus. A majority of patients in the 2 treatment groups (ethmoidectomy and antrostomy with and without cyst excision) reported symptomatic improvement during the follow-up period.(58) **(EG 1)**

For symptomatic sinus osteoma, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. **(RG A2)** Conservative management is recommended for symptomatic sinus osteoma, although removal of an asymptomatic sphenoid osteoma may be considered due to the risk of growth causing compression of the visual pathways.(61)(65) **(EG 2)** A retrospective study of paranasal sinus osteoma in 29 patients treated with endoscopic sinus surgery reported that almost all patients noted improved symptom scores; no postoperative complications occurred, and there were no recurrences during a mean follow-up of 52 months.(65) **(EG 2)** A literature review of frontal sinus osteoma notes that grade III and IV osteomas are technically challenging for an endoscopic approach and may require an open approach.(64) **(EG 2)**

For tumors, evidence demonstrates at least moderate certainty of at least moderate net benefit. **(RG A1)** A systematic review and pooled data analysis comparing endoscopic with open resection of sinonasal malignancies found that, for low-stage (T1-2, Kadish A-B) malignancies, there were no significant differences in overall

survival, disease-specific survival, and locoregional control rates.(66) **(EG 1)** A systematic review and meta-analysis of 14 retrospective studies (1140 patients) evaluating the recurrence of inverted papilloma following surgical resection found that endoscopic surgery reduced the risk of recurrence by 44% compared with an open approach. Prospective studies were recommended to determine which patients benefit most from endoscopic surgery.(71) **(EG 1)** An analysis of a national registry of 1874 patients with sinonasal mucosal melanoma (62% of whom had surgical intervention) found no survival difference between patients treated with an endoscopic or an open surgical approach.(72) **(EG 2)** An analysis of a national registry of 1595 patients with sinonasal nonsquamous cell malignancies treated with surgical resection (42.2% of whom were treated endoscopically) found that, while endoscopic surgery resulted in decreased hospital length of stay, no difference in survival was seen between patients treated with an endoscopic or an open surgical approach.(73) **(EG 2)** An observational study of a nationwide cohort of 1483 patients with sinonasal squamous cell carcinoma comparing treatment with endoscopic vs open resection found no difference in 5-year overall survival between the 2 approaches.(74) **(EG 2)** A retrospective study of sinonasal adenocarcinoma in 159 patients treated with endoscopic sinus surgery found, during a mean follow-up of 32.5 months, a lower surgical complication rate as compared with craniofacial resection and lateral rhinotomy, as well as comparable disease-free and overall survival rates. The endoscopic sinus surgery group had overall survival rates of 91% at 1 year, 74% at 3 years, and 62% at 5 years.(75) **(EG 2)**

For uncomplicated chronic rhinosinusitis, evidence demonstrates at least moderate certainty of at least moderate net benefit. **(RG A1)** Randomized trials and systematic reviews have found that both medical treatment and FESS result in significant and comparable improvements for adult patients with chronic rhinosinusitis.(78)(79) **(EG 1)** A systematic review and meta-analysis evaluating the impact of endoscopic sinus surgery on quality of life in patients with chronic rhinosinusitis found significant improvement in sleep quality as measured by the Epworth Sleepiness Scale (3 studies with 109 patients), Pittsburgh Sleep Quality Index (2 studies with 272 patients), and apnea-hypopnea index (3 studies with 112 patients). The authors identified the paucity of experimental studies and heterogeneous outcomes as limitations of the review.(80) **(EG 1)** A systematic review and meta-analysis of 7 randomized controlled trials and 33 observational studies evaluating quality of life (as measured by the Sino-Nasal Outcome Test-22 (SNOT-22)) after endoscopic sinus surgery for chronic rhinosinusitis found a significant improvement in scores at 11-month follow-up. The authors cautioned that the magnitude of improvement was variable and may have been influenced by baseline scores, asthma prevalence, and length of follow-up.(81) **(EG 1)** A systematic review and meta-analysis of 2 studies (44 children) evaluating the quality-of-life impact of treating pediatric chronic rhinosinusitis patients with endoscopic sinus surgery found significant improvement in Sinus and Nasal Quality of Life Survey scores after surgery. The authors recommended further studies in this population.(82) **(EG 1)** A prospective study of 121 children (age 9 to 17 years) with chronic rhinosinusitis compared treatment with either FESS or open Caldwell-Luc surgery and found, at 6-month follow-up, that both approaches were associated with decreased mucosal edema on endoscopic evaluation and improvement in SNOT-20 scores; endoscopic surgery was associated with less local pain and psychological discomfort when compared with open surgery.(83) **(EG 2)**

Rationale

Use of this MCG care guideline helps the clinician determine if a particular treatment, medication, or service might be appropriate for a specific patient, taking into account their unique health complexities.

Use of these evidence-based clinical criteria to support decision making benefits the patient by identifying patient-specific complex clinical factors and conditions, promoting personalized treatment. Utilizing evidence-based clinical criteria promotes patient safety by helping ensure that potential patient benefits outweigh the risks. In addition, the use of evidence-based guidelines can increase consistency in treatment thresholds, leading to less variation in care and promoting equitable treatment among patients.

Related CMS Coverage Guidance

This guideline supplements but does not replace, modify, or supersede existing Medicare regulations or applicable National Coverage Determinations (NCDs) or Local Coverage Determinations (LCDs).

Code of Federal Regulations (CFR): 42 CFR 419.22(91); 42 CFR 422.101(92)

Internet-Only Manual (IOM) Citations: CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 14 - Medical Devices(93); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 15 - Covered Medical and Other Health Services(94); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 16 - General Exclusions from Coverage(95)

Medicare Coverage Determinations: Medicare Coverage Database(96)

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Footnotes

[A] Symptoms may include facial pain; nasal obstruction; pressure on surrounding structures resulting in visual loss from compression of the optic nerve; third, fourth, and sixth nerve palsies; and increased intracranial pressure.(37)(38)(39)(40) [A in Context Link 1]

[B] Maxillary sinusitis can result from penetration of dental infection into the sinus cavity; as a complication of periapical cyst or jaw pathology; or from iatrogenic causes, including endodontic and dental implant procedures.(46) [B in Context Link 1]

[C] The most common presenting symptoms of sinus osteoma are facial pain and headache; however, growth toward the orbit may cause proptosis, diplopia, periorbital pain, ptosis, or restricted ocular mobility. Osteomas may also erode the skull base, causing cerebrospinal fluid leak, pneumatocele, meningitis, or cerebral abscess.(42)(59)(60)(61)(62) [C in Context Link 1]

[D] A CT scan is the preferred diagnostic tool to determine the presence and location of osteomas.(42)(59)(61) [D in Context Link 1]

[E] Nasal corticosteroids are first-line medical treatment for chronic rhinosinusitis.(8)(88) [E in Context Link 1]

Codes

CPT®: 31237, 31240, 31253, 31254, 31255, 31256, 31257, 31259, 31267, 31276, 31287, 31288

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