Chapter 6
Sinus Headache and Rhinogenic Headache

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Sinus Headache and Rhinogenic Headache

Rhinogenic headache is a term that had been used interchangeably with "sinus headache" until recent studies showed that sinus headache complaints are likely to represent migraine and seldom represent sinusitis [1–3]. **Sinus Headache** should be thought of as *a patient complaint, with pain present in the sinus areas, or accompanied by nasal symptoms*. **Rhinogenic Headache**, conversely, is *a headache caused directly by pathology within the nose or paranasal sinuses* [4].

According to the 2013 *International Classification of Headache Disorders* by the International Headache Society (IHS) rhinogenic headaches are "secondary headaches" [5]. *Headache Attributed to Acute Rhinosinusitis* (see Table 6.1) is a headache with other signs and symptoms of acute sinusitis. *Chronic rhinosinusitis (CRS)* is also supported as a cause of headache (see Table 6.2). Finally, *Headache Attributed to Disorder of the Nasal mucosa, Turbinates or Septum* (Table 6.3) is described in the appendix of the *Classification*. The older term "mucosal contact point headache" was included in the appendix of the 2nd edition classification in 2004 and has now been abandoned. This term is still used extensively in the surgical literature but headaches of this nature are still considered controversial in the 2013 *Classification*.

Several recent publications have attempted to provide guidance differentiating rhinogenic headache in patients with sinus headache complaints [2, 6–8]. Perhaps the best place to start is to review the migraine diagnostic criteria, covered elsewhere in this book, and to remember that up to 88% of these patients will be found to have migraine [1].

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Table 6.1 Headache attributed to acute Rhinosinusitis [5]

Description
Headache caused by acute rhinosinusitis and associated with other symptoms and/or clinical signs of this disorder
Diagnostic criteria
A. Any headache fulfilling criterion C
B. Clinical, nasal endoscopic and/or imaging evidence of acute rhinosinusitis
C. Evidence of causation demonstrated by at least two of the following
1. headache has developed in temporal relation to the onset of the rhinosinusitis
2. either or both of the following
(a) headache has significantly worsened in parallel with worsening of the rhinosinusitis
(b) headache has significantly improved or resolved in parallel with improvement in or resolution of the rhinosinusitis
3. headache is exacerbated by pressure applied over the paranasal sinuses
4. in the case of a unilateral rhinosinusitis, headache is localized ipsilateral to it
D. Not better accounted for by another ICHD-3 diagnosis

Table 6.2 Headache attributed to chronic or recurring Rhinosinusitis [5]

Description
Headache caused by a chronic infectious or inflammatory disorder of the paranasal sinuses and associated with other symptoms and/or clinical signs of the disorder
Diagnostic criteria
A. Any headache fulfilling criterion C
B. Clinical, nasal endoscopic and/or imaging evidence of current or past infection or other inflammatory process within the paranasal sinuses
C. Evidence of causation demonstrated by at least two of the following
1. headache has developed in temporal relation to the onset of chronic rhinosinusitis
2. headache waxes and wanes in parallel with the degree of sinus congestion, drainage and other symptoms of chronic rhinosinusitis
3. headache is exacerbated by pressure applied over the paranasal sinuses
4. in the case of a unilateral rhinosinusitis, headache is localized ipsilateral to it
D. Not better accounted for by another ICHD-3 diagnosis

Table 6.3 Headache attributed to disorder of the nasal mucosa, turbinates or septum [5]

Diagnostic criteria
A. Any headache fulfilling criterion C
B. Clinical, nasal endoscopic and/or imaging evidence of a hypertrophic or inflammatory process within
the nasal cavity*
C. Evidence of causation demonstrated by at least two of the following
1. headache has developed in temporal relation to the onset of the intranasal lesion
2. headache has significantly improved or significantly worsened in parallel with improvement in (with or without treatment) or worsening of the nasal lesion
3. headache has significantly improved following local anaesthesia of the mucosa in the region of the lesion
4. headache is ipsilateral to the site of the lesion
D. Not better accounted for by another ICHD-3 diagnosis

**Note* Examples are concha bullosa and nasal septal spur

Nasal Anatomy

Branches of the trigeminal nerve provide sensation in the nose and paranasal sinuses. The maxillary (V-2) and ophthalmic (V-1) division afferents project via the trigeminal ganglion to the trigeminal brainstem sensory nuclear complex (VBSNC). Autonomic innervation of the nose is provided by sympathetic nerve fibers (originating at the superior cervical ganglion, to the deep petrosal nerve, to the vidian nerve, then through the sphenopalatine ganglion) and parasympathetic fibers (from the superior salivatory nucleus of VII, then to the greater superficial petrosal nerve, vidian nerve, and synapsing then in the sphenopalatine ganglion).

The trigeminal fibers (V-1, V-2) in the nose and paranasal sinuses terminate as bare nerve terminal endings (without specialized sensory organs) near the basal cells of the nasal epithelium, along with the parasympathetic nerves [9–11].

Nasal Neurophysiology

Nasal pain is mediated by Aδ fibers (fast responding, myelinated, primarily mechanoreceptive pain fibers) and C fibers (slower, unmyelinated fibers associated with a more dull pain from mechanothermal and chemosensory stimulation) [11, 12]. Recent studies have confirmed that the sinus ostia and the posterior-superior areas of the nasal cavity are more sensitive than other areas [13]. Referred pain remains controversial, with mixed reports after Wolff and coworkers first reported this in 1943 [14, 15].

Activation of the pain fibers is typified by the release of tachykinins (substance P, neurokinin A, neuropeptide K) and neuropeptides like calcitonin gene-related peptide (CGRP). Sympathetic neurons are associated with neuropeptide Y, in addition to norepinephrine, and the parasympathetic fibers release acetylcholine and vasoactive intestinal peptide (VIP) [11, 12, 16]. Recently serotonin (5-HT 1D) receptors have been found in nerve terminals around postganglionic cell bodies in the sphenopalatine ganglion, which may explain the reported improvement in some autonomic symptoms in migraineurs and cluster headache sufferers using triptan medications [8, 17]. Conversely, there may be local mechanisms (in addition to the expected brainstem reflexes) for nasal symptoms in "sinus headache" migraineurs.

The neurotransmitters and neurochemicals produced by the trigeminal nerves and autonomic nerves of the nose are non-specific markers of nerve activation and are associated with primary headache phenomena like migraine, as well as seemingly unrelated pathology such as allergic rhinitis, and rhinogenic pain [18–20]. None of these neurochemicals (including substance P) would be expected to confirm or refute contact point headache as a legitimate entity.

Neuroplasticity is also an established trigeminal phenomenon in which acute pain may become chronic or more easily triggered (hyperalgesia) or is temporarily *reduced*, with a temporary reduction of headache pain mediated by the VBSNC/trigeminal nucleus caudalis after any painful stimulation [11]. This may result in "false positive" results when painful stimuli are applied to validate "contact points" (see below) or may be a mechanism in which surgical pain in this area can reduce migraine headache pain, at least temporarily, even without a placebo effect being involved.

Migraine, Allodynia, and the Nose

Migraine headache is the underlying pathology in the vast majority of patients complaining of sinus headache [1–3, 21]. In addition to the pain in "sinus area" of V-2 and V-1, these patients frequently have nasal congestion, drainage, and even itching in the nose [1]. The pathophysiology of migraine is covered elsewhere in this volume, but remember that the early sensitization phase of migraine is commonly accompanied by allodynia (pain associated with ordinarily minor stimuli) in a majority of patients (80%), and typically in the distribution of V-1 and V-2 [22]. Although typically described as "cutaneous allodynia" this may include nasal stimuli, such as breathing cold air. Moreover, the migraine process itself will commonly include secondary nasal symptoms, likely from parasympathetic responses stimulated centrally at the level of the superior salivatory nucleus [1, 22, 23]. Nasal engorgement could then lead to "mucosal contact" in areas of nasal narrowing with or without allodynia-related pain. This has been suggested as supporting a potentially beneficial role for "contact point" surgery even in patients with underlying migraine [22]. This could also give a "false positive" contact point

test, where application of an anesthetic or induction of pain (injection) in the nose may down-regulate a migraine headache by interrupting a source of allodynia.

Diagnosing Rhinogenic Headaches

The diagnostic criteria for headaches related to acute or chronic sinusitis are presented in the accompanying tables, and are a very good place to start when reviewing patient symptoms and their relation to headache or facial pain. Recent evidence-based reviews have been published to assist the clinician in making the correct diagnosis [24].

Headache Attributed to Acute Rhinosinusitis (ARS)

The most common rhinogenic headache is the headache associated with acute rhinosinusitis, and the criteria for this diagnosis are presented in Table 6.1. It should be noted that the most recent (2016) ARS definitions published in the otolaryngology literature [24] are also symptom-based:

ARS is defined as sinonasal inflammation lasting less than 4 weeks with the following symptoms:

Nasal Blockage/Obstruction/Congestion or Nasal Discharge (Anterior/Posterior) and
Facial Pain/Pressure or Reduction/Loss of Smell.

They also suggest using a 10-day cutoff to differentiate a likely viral episode versus a bacterial one.

Recurrent ARS is defined as 4 or more episodes per year, and subacute rhinosinusitis is between 4 and 12 weeks duration, with the same symptoms.

Unfortunately the 2016 ARS diagnostic definition does little to eliminate migraine from the differential diagnosis—in the largest published series of "sinus headache" migraineurs, rhinorrhea was present in 40% of the migraineurs and 63% had nasal congestion [1]. In a series of other patients with primary headache disorders (mostly migraine) and no evidence of rhinosinusitis, the Sino-Nasal Outcome Test (SNOT-22) was administered, and 93.5% reported "need to blow nose" and a majority reported postnasal drainage, sneezing, nasal blockage/congestion and runny nose [25]. Other studies have confirmed an increase in congestion and nasal airway resistance during migraine attacks [23]. Clearly, many would satisfy the above definition of ARS symptomatically. The best way for the clinician to proceed would be to focus on the migraine diagnostic criteria, with particular attention being paid to the time frame of most migraine headaches—multiple episodes of 4–72 h being typical, and with substantial resolution between

episodes. Note that many of the migraineurs have pain in the distribution of V2, making the location of the pain of little value.

Chronic Rhinosinusitis (CRS)

The 2013 IHS Classification has validated chronic sinusitis as a cause of headache [5]. Several studies have looked at headache as a symptom of CRS. Unfortunately, the vast majority of these studies did not use the IHS migraine criteria in assessing these headaches, which may have led to more robust conclusions regarding the role of CRS in these headaches as a *cause* of pain as opposed to a comorbid condition. CRS is associated with a ninefold increased risk of chronic headache of any kind [26].

Regardless, the recent **CRS** definitions in the otolaryngology literature also focus on presenting symptoms [24]. The definition is sinonasal inflammation lasting more than 12 weeks, with 2 or more of the following symptoms:

Nasal Obstruction/Congestion/Blockage
Nasal Drainage
Facial Pain/Pressure/Fullness
Decrease or Loss of Sense of Smell

The authors stressed that these symptoms have a low specificity, and recommended supportive nasal endoscopic and/or imaging studies. One of these two objective findings must be present to complete the diagnosis.

CT Scanning in Diagnosing CRS, and in the "Sinus Headache" Workup

The most recent (2016) evidence-based review suggested that CT scanning is r*ecommended* in patients with CRS (by symptom-based criteria) in whom nasal endoscopic findings are lacking, or for presurgical planning. It is an *option* for confirming CRS instead of nasal endoscopy [24]. A similar review of "sinus headache" diagnosis recommended CT scanning in all patients presenting with that complaint, and recommended empirical migraine management in all patients who had negative CT scanning [6].

CT scan interpretation, on the other hand, can be wrought with difficulty. Jones [27] found a 30% incidence of incidental radiographic findings on sinus CT scans, regardless of clinical presentation. Shields et al. [28] reported no correlation between headache, facial pain, and radiographic abnormalities. Tarabichi [29] found no association between pain severity and mucosal disease in sinus headache patients and Kenny et al. [30] similarly found no correlation between headache,

facial pain, and CT disease severity. Bhattacharyya et al. [31] found no correlation between patient symptoms (SNOT-20) and CT findings, including facial pain. None of these studies addressed migraine symptoms in these patients.

Despite the difficulties correlating patient symptoms with CT findings, Anzai et al. [32] reported that CT findings considerably changed management, especially surgical management of these patients. Other studies have correlated CT scores with severity of rhinologic symptoms in chronic sinusitis patients [33]. Stankiewicz and Chow [34, 35] have presented recommendations regarding the incorporation of CT scanning in the management of the rhinology patient, as have recent consensus statements in the otolaryngology literature [24].

Finally, we must remember that migraine is a very common phenomenon, and doesn't exist in a vacuum. In one report 49 of 100 patients referred to an ENT office for sinus headache had migraine, but only 13% had migraine alone; 19 (of the migraineurs) had allergic rhinitis as well, 11 had rhinosinusitis, and 6 had both allergic rhinitis and rhinosinusitis [36]. Other studies have focused on migraineurs presenting with sinus headache complaints, finding extensive radiographic abnormalities. In one study the mean CT scan Lund-Mackay (L-M) score did not differ significantly between the migraine (2.1) and non-migraine cohort (2.7). Five of the migraine group had substantial sinus disease radiographically (with L-M scores of 5 or above), as did two of the non-migraineurs [21]. Other studies have found a history of headache in general to be more common in patients with chronic rhinosinusitis (CRS) than in non-CRS controls [37], although a second series found that facial pain (not facial pressure), headache, and photophobia were negatively predictive of the presence of radiographic evidence of CRS [38]. Finally, CRS has been reported to be a factor in the worsening of the course of migraine, potentially making it more refractory or chronic [39]. Thus, the association between CRS and migraine remains unclear.

Allergic rhinitis and migraine have been found to be comorbid as well, with some evidence suggesting that allergy management may have some headache benefits in patients with both disorders [18].

The Bottom Line—Making the Correct Diagnosis

Despite the complicated literature, there are some recommendations that can be made to guide the practitioner in making the correct diagnosis.

1. Remember that the history is the most important part of the sinus headache workup. The pattern of headache and the duration of the headache events are far more important than the treatment history, where misdiagnosis is common. ALWAYS include the diagnostic criteria for migraine in your discussion, remembering that some migraineurs may be missed but the majority will satisfy these criteria. In an otolaryngology clinic between 50 and 75% of the sinus headache sufferers will fall into the migraine category [21, 40]. Medication

history is also of great importance. Many patients will have a history of failed treatment with rhinitis medications and antibiotics. Others may have extensive use of over-the-counter (OTC) medications. The phenomenon of "chronic daily headache" may have an association with OTC analgesic overuse. Caffeine and OTC sympathomimetic decongestants like pseudoephedrine have been associated with exacerbating the course of migraine headaches [4]. Family history of migraine is important as well.

2. Proceed with a thorough rhinologic examination to look for confirmatory findings of sinusitis, as well as contact points, septal deviation, etc. Remember that sinusitis and migraine may both be present, and that the diagnosis of sinusitis does not eliminate migraine from the differential.
3. CT scanning early in the workup is recommended as a cost-effective and prudent choice, particularly in patients who have failed extensive management. These scans are crucial in making the diagnosis of rhinogenic headache, but cannot be used to exclude migraine. A negative CT scan may also guide the practitioner toward a diagnosis of mid-facial tension headache or temporomandibular joint (TMJ) syndrome if the symptomatic presentation fits these possibilities.
4. Empiric treatment for migraine is suggested in all patients who satisfy the migraine diagnostic criteria regardless of concomitant sinus disease. Some authors have suggested a trial of migraine therapy in any patient with sinus headache and a normal CT scan [6]. All diagnosed sinus disease (sinusitis, etc.) should be managed medically as well, as per published guidelines. Neurology referral at this point may be prudent as well, depending on the comfort level of the practitioner.
5. Surgery is considered a last option after *maximal medical therapy*, which includes appropriate sinonasal treatment as well as migraine management where appropriate.

Reviewing the Surgical Literature for Rhinogenic Headache

The Surgical Placebo Effect

Any discussion of surgical intervention for headache requires a review of the literature, and a careful consideration of the placebo effect in surgical studies. Surprisingly, the placebo effect has seldom been discussed in the otolaryngology literature despite its importance. A 2014 review [41] of the use of placebo controls in surgical studies found that in 74% of the 53 placebo-controlled trials reviewed, there was improvement in the sham surgical placebo arm, and that in 51% the placebo effect didn't differ from the actual surgical arm. The authors felt that this was evidence supporting the long-held belief that the placebo effect is stronger in invasive interventions as compared to non-invasive ones, particularly if

accompanied by the appearance of a confident diagnosis and a decisive approach from the treating surgeon [41–43]. Often, in studies the actual surgical effect was generally small compared to the placebo. The placebo arm may also show a surprisingly large effect, referred to as a "megaplacebo" with an effect size of >0.8. This megaplacebo response was found in greater than half of the placebo arms in a second review of minimally invasive surgical procedures [44]. This may reflect a response to the level and conviction of the surgeon's recommendations as well as the impression of a procedure as being "advanced". Ironically, these minimally invasive procedures are prime for problems with lowered thresholds for utilization or application to a wider series of complaints, referred to as "indication creep" [44]. *Indication creep* is a term that one may want to keep in mind as sinus surgery technology is expanded to include efforts to resolve "sinus headache" complaints.

In general terms, one must consider a "true" placebo effect along with other factors adding to an apparent placebo effect. These factors include the natural course of disease (e.g. improvement of migraine spontaneously over time), unidentified parallel interventions (e.g. patients in a surgery study using non-study medications), time effects (e.g. patient and investigator skill and expectations over time), and the phenomenon of *regression towards the mean* [45]. The latter phrase, although frequently misused, is essentially the concept of variability of intensity of a symptom (e.g. headache) over time. Natural fluctuations are expected to occur, and the patient may start at a "peak" symptom level at study entry, and a natural return to an "average or mean" symptom level will give the appearance of improvement. It is the natural tendency for patients to seek care when their symptoms are at their peak – a particular likelihood in surgical headache-oriented studies.

There is also the phenomenon of neuroplasticity, addressed earlier, where the pain of intervention may result in a down-regulation of headache, regardless if the intervention itself was responsible physiologically [11, 46].

As far as the "true" placebo effect is concerned, studies looking at headache are of particular concern. Researchers have found that the placebo effect on pain is greater than on other symptoms, and may even be associated with activation of central nervous system pain centers and release of endogenous neuropeptides including opioids and cannabinoids [47]. *Cognitive dissonance* is another contributing factor—the tendency for a patient who has subjected himself to a painful or inconvenient procedure to be subconsciously motivated to report benefit [48]. This will certainly contribute to the benefit reported in both the placebo and active treatment arms.

Unfortunately, when one reviews the sinus headache surgical literature, one rarely finds a sham surgical arm, and factors such as patient self-selection for surgery are common. The frequent reporting of mean results makes determination of an effect size nearly impossible, particularly when dealing with subjective measures such as pain. Thus, the results of surgical intervention for rhinogenic headache may indeed be "too good to be true" and need to be reviewed with scrutiny.

Surgical Intervention for CRS-Related Pain

Soler et al. [49] described headache as the "most disabling" symptom in 29% of their CRS patients undergoing FESS, but no evidence of post-operative headache improvement was found. Chester et al. [50] published a meta-analysis of published series of FESS patients with CRS, and found that among all of the symptoms analyzed (nasal obstruction, facial pain, postnasal discharge, hyposmia, headache) all of the scores improved postoperatively, but headache scores improved the least. Other studies have reported a more substantial improvement with surgical intervention, and several recent studies are presented in Table 6.4 [49–59]. Taken as a whole, the effect of appropriate sinus surgery on the headaches of a CRS patient can be expected to be variable, and somewhat unpredictable. As such, a few general recommendations can be made:

1. Patients need to be informed that their headache complaints are the least likely symptoms to be resolved by sinus surgery.
2. Headache alone should be considered a disincentive for sinus surgery unless other symptoms are present, and should be thought of as a last resort.
3. Further study is needed to determine whether headache resolution is an effect of surgery, or if this apparent improvement is the result of factors such as placebo effect, neuroplasticity or regression towards the mean (see above discussion).

Table 6.4 Surgical intervention for headache in CRS, using functional endoscopic sinus surgery (FESS)

First author	Year	Headache outcome
Chow	1994	82% improved
Clerico	1997	79% improved
Parsons	1998	91% improved
Ramadan	1999	60% improved
Tarabichi	2000	62% improved
Giacomini	2003	67% improved
Levine	2004	74% improved if other sinus symptoms present, 18% if headache was only symptom
Moretz	2006	Significant reduction in mean headache score
Phillips	2007	79% improved
Soler	2008	No significant headache reduction
Chester	2009	Meta-analysis, 21 sinus surgery studies, over 2000 patients, headache was the least likely symptom to improve after FESS

References [49–59]

Mucosal Contact Point Headache

Sluder (1908) described a syndrome of recurrent hemifacial/hemicranial pain with secondary parasympathetic symptoms (likely cluster headache in retrospect). This headache type was later coined "contact point" neuralgia, although the original description didn't stipulate mucosal contact of any kind [60].

In recent years, contact point headache has remained a contentious concept. Abu-Bakra and Jones, for example, found that neither local pressure in the nose nor the application of substance P to various points in the nose in 10 volunteers produced referred pain to the face or headache [15]. "Success" is also defined differently from study to study, with little standardization, often referring to frequency, intensity, duration of symptoms, or even reporting mean scores for groups of patients. As noted in the section on surgical placebos, the calculation of actual effect size, if any, is very difficult.

Radiographically, contact points are common on sinus CT scans but correlate poorly with facial pain or headache. In a study of 973 patients referred for a sinus CT scan, the incidence of radiographic contact points was 4%, and didn't differ among those patients with or without facial pain complains (42% of the patients) and had no correlation with sidedness in patients with unilateral discomfort [61]. Other studies have shown a much higher incidence of contact points (up to 55%), but no association with facial pain or headache has been proven [62]. Headache causality has little relation to the presence or nature of the contact when present.

There may be little correlation between CT findings and outcomes of minimally invasive endoscopic sinus surgeries conducted for "rhinogenic headaches." One study used radiographic criteria such as "contact points" and concha bullosa as inclusion criteria for surgery in 33 sinus headache patients and reported a surgical success rate (headache improvement or resolution) of 84.8% after a mean follow-up of over 18 months. Interestingly, all of their *failures* had clear septal spurs, and they noted no association between "contact points" and surgical outcomes [63]. Often, in these "positive" studies the patients still have some headaches, which would seem to refute the entire concept of "contact point" causation [46].

Despite poor anatomic and physiological correlation, contact points remain a surgical target for "sinus headache" complaints. Part of this support stems from the use of in-office anesthetic testing. In a study by Goldsmith et al. cocaine was used to anesthetize the apparent contact point. A "positive" response (i.e. resolution of an active headache) was used to support surgical intervention [64]. Similar testing has been suggested using injected lidocaine, or topical anesthetics of various kinds. Using a topical anesthetic, Ramadan found no correlation between a positive test in the office and improvement of headache after surgical contact point resection, citing an approximately 60% improvement either way [54]. Similarly, Abu-Samra et al. [65] (see below) found no correlation between a positive local anesthetic test and patient satisfaction after contact point surgery, although *complete* headache resolution was more common in anesthetic responders. The most recent IHS guidelines

for the diagnosis of *Headache Attributed to Disorder of the Nasal mucosa, Turbinates or Septum* support the use of this test, regardless of validity [5].

Abu-Samra reported 42 patients who underwent septoplasty with or without endoscopic partial turbinectomy for contact point headaches and chronic daily headache, in the presence of chronic migraine (20 patients) or chronic tension-type headache (22 patients) using IHS criteria. They reported a reduction of mean headache days per month from 22 to 7 [65]. Again, the use of average scores and lack of complete resolution makes interpretation of this sort of literature difficult.

Other studies have reported success despite primary headache disorders or using a combination of sinus surgery as well as contact point resection, again with reports of some benefit. A summary of recent studies is presented in Table 6.5 [65–74].

To summarize, the contact point studies may be supportive of a role for surgery for some patients, but all are evidence-based medicine (EBM) level 4 evidence [6]. Diagnostic/inclusion criteria, follow-up, surgical technique and comorbidity (primary headache or otherwise), are inconsistent. It should be remembered that issues like regression to the mean, neuroplasticity and cognitive dissonance may explain the improvement as well as a placebo effect [46]. Clearly randomized, controlled studies would be the best method to try to resolve this contentious issue, and surgery should be thought of as a last resort in these patients, many of whom may not have a truly rhinogenic headache.

Concha Bullosa–Related Headache, Middle Turbinate Headache

In addition to contact points, middle turbinate pneumatization (i.e. concha bullosa) has been incriminated in the etiology of headache. Concha bullosa may be found in up to 50% of middle turbinates [75]. Goldsmith et al. reported their experience with

Table 6.5 Surgical intervention for apparent nasal contact point Rhinogenic headache

First author	Year	Headache outcome
Novak	1992	78.5% Complete resolution (n = 299)
Tosun	2000	90% improved (n = 30)
Sindwani	2002	54% cured (n = 13)
Welge-Luessen	2003	65% improved (n = 20)
Behin	2005	>90% improved (n = 21)
Mokbel	2010	62% symptom free (n = 120)
Betkas	2010	57% complete relief (n = 36)
Moehebbi	2010	83% improved (n = 36)
Yazici	2010	Significant mean improvement (n = 38)
Abu-Samra	2011	62% improved (n = 42)

References [65–74]

middle turbinate headache syndrome, noting that contact with adjacent mucosa (with or without concha bullosa) was present in these patients. All patients had headaches lacking an aura, and no response to ergotamine therapy. They reported that 6 out of 6 subjects improved with middle turbinate surgery, which included FESS and septoplasty if they felt it was indicated. Two improved with medical management alone [64]. Like many studies on this topic, there was no randomization or control group, no screening for migraine headache, and follow-up was variable. Other studies have failed to find an association between concha bullosa and sidedness of headaches [21].

Despite this, there are many studies in the international rhinologic literature that express enthusiasm for middle turbinate or concha bullosa resection in headache patients. Roozbahany et al. [76] described concha bullosa in in almost 30% of their rhinogenic contact point headache patients, noting that it is the most common cause of this entity. Septations in the concha bullosa seem to be clinically irrelevant [77]. Cantone et al. [78] in 2014 randomized a series of 102 concha bullosa patients with headaches to receive surgical or medical management (fluticasone nasal spray), and demonstrated significant improvement in headache severity and discomfort scores using visual analog scales and the migraine disability score (MIDAS) in the surgical cohort as compared to those managed medically.

Kunachak [79] described in-office middle turbinate lateralization in 55 patients based on anatomic findings and response to topical lidocaine. All had "complete responses" although 7 of them (13%) required a second procedure. Randomization, medical management and primary headache disorders were not discussed [79]. A similarly enthusiastic study reported success in headache patients with partial resection of a pneumatized middle turbinate if they had pain on palpation of the superior and medial orbital rim (Ewing's and Grunwald's points, respectively) implying pain of a "secondary origin" [80]. Studies of this nature are common in the recent literature ([79–82] see Table 6.6) but are of questionable scientific validity due to the lack of controls, sham surgical options, lack of blinding, and frequently poor long-term follow-up.

Table 6.6 Surgical intervention for middle turbinate/or concha bullosa headaches

First author	Year	Headache outcome
Sanges	2011	100% improvement (n = 26)
Yarmohammadi	2012	Significant reduction of mean headache severity, duration and frequency compared to non-operated controls (n = 44)
Cantone	2014	Significant reduction of mean headache severity scores compared to non-operated controls (n = 102)

References [78, 80, 81]

Surgery for Migraine Relief?

Although "migraine surgery" is covered elsewhere in this volume, it is important to realize that reports have suggested rhinologic triggers in some migraineurs may benefit for surgical intervention. Behin [70] and Abu-Samra [65] have independently reported success with contact point resection in documented migraineurs. Guyuron and coworkers have also noted that intranasal surgery may provide a benefit to migraine sufferers unresponsive to medications, but all of these reports suffer from the same drawbacks mentioned for contact point surgery in general.

In the 2011 Guyuron migraine series (see Chap. 9 for detailed discussion) 69 surgical patients (88%) had a positive response (reduction of the frequency, duration, and intensity of headache). Fifty-two out of the 69 underwent septoplasty or partial turbinectomy in this series, but only 3 underwent nasal surgery alone [83]. It was later reported that in patients with "nasal triggers" alone only 3 out of 6 patients in their updated series [84] had a favorable response, a response rate far lower than the remainder of their patients.

Finally, Yazici et al. [74] reported rhinologic evaluations in 99 patients with primary headache, 70 of which had migraine. Seventy-three of the 99 were found to have rhinoscopic findings such as turbinate hypertrophy, contact points, or concha bullosa. Significant reduction of headache severity was reported in the 38 subjects who opted for surgery out of the 53 subjects who were described as "not responding to medical therapy" [74].

The Bottom Line: How to Interpret the Rhinogenic Headache Surgical Literature

The literature regarding sinus headache surgical interventions is rather contradictory. Some studies show tremendous success rates or enthusiastic endorsements for intervention, while other reports completely contradict these studies, or point out the extensive problems with study design, inclusion criteria and follow-up. As will be obvious reading this chapter, one should start with a review of the placebo effect in surgical studies, and the lack of a rigorous scientific approach in trying to elucidate the nature of the surgical response, if any. All practitioners are united in wanting to help these patients, who are frequently seeing a specialist after years of unsuccessful management. Perhaps the best things we can offer these patients are the following:

1. A correct diagnosis based on knowledge of migraine, medical headache, and sinusitis diagnostic criteria. We need to remember that a correct diagnosis follows these ***symptom-based*** criteria (according to both the neurology and the otolaryngology literature) and does ***not*** follow rhinoscopic or CT scan findings, where sinus thickening, contact points or concha bullosa may have no correlation with headache causality [85]. This may be the most difficult step for

young practitioners learning to manage these complex patients, particularly with our focus on technology in otolaryngology and allergy.

2. An emphasis on patient advocacy. Patients need to be fully and realistically informed about the yield in headache response with surgical intervention, and the importance of exhausting all reasonable medical options first. There is a tendency among all of us to desire an easy, quick fix to a problem, and we must remind ourselves to consider all alternatives appropriately. The literature surrounding sinus headache surgical intervention is enthusiastic but unscientific. We also must make every effort to avoid the "indication creep" that may occur when surgical intervention becomes more convenient or less painful. In-office sinus procedures are already being marketed directly to patients for headache relief, and we need to remain scientific and objective when dealing with these frustrated patients.
3. Finally, there is a need to push for a more scientific basis for the study of surgery for headache. The lack of randomization and controls in most of the available literature is understandable but this makes decision making much more difficult. There is a push internationally for the inclusion of surgical placebo arms in these studies, and the future may finally hold solid scientific evidence regarding intervention in these headache sufferers. As a specialty, we must insist that this actually happens.

Summary and Conclusions

In summary, "sinus headache" complaints and rhinogenic headache are two different entities: the former is a patient presentation which frequently is found to represent migraine, and the latter is a concept where nasal or paranasal sinus pathology are believed to be responsible for facial or head pain. Mucosal contact point as a source of headache remains contentious, despite an enthusiastic but largely unscientific body of literature supporting it. The association between sinonasal disease and migraine headache is also in need of elucidation. Diagnosis in these patients should be symptom-based, with rhinoscopic and radiographic evidence providing a supportive role. Intervention is primarily medical, with surgery used as a last option.

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