Sinusitis and Sinus Pain

Primary Author: Steven E. Oliver, BS, DC
Contributing Author: Ronald LeFebvre, MA, DC

Other Contributing Authors:
Joel Agresta, DC; Laura Baffes, DC, CCSP; Daniel DeLapp, DC, DABCO, ND, LAc; Beverly Harger, DC, DACBR; Owen T. Lynch, DC; John Taylor, DC, DACBRI Wendy Callander, MD

Radiology Section: Bill Adams, DC; Reviewed by John Taylor, DC; Beverly Harger, DC, DACBR; Tim Stecher, DC; Lisa Hoffman, DC

Pharmaceutical Section: Wendy Callander, MD; Reviewed by Martin Lipsky, MD

Clinical Standards, Protocols, and Education (CSPE) Committee:
Laura Baffes, DC, CCSP; Daniel DeLapp, DC, DABCO, ND, LAc; Tom Dobson, DC; Elizabeth Dunlop, DC; Kathleen Galligan, DC; Lorraine Ginter, DC; Ronald LeFebvre, DC; Owen T. Lynch, DC; Bruce Marks, DC, DABCO; Charles Novak, DC; Steve Oliver, DC; Karen E. Petzing, DC; Ravid Raphael, DC, DABCO; Lisa Revell, DC; Anita Roberts, DC

Limitations

The WSCC Care Pathways provide a standardized context for clinical decision making as well as a menu of possible interventions. These pathways are not intended to replace the clinical judgment of the individual physician. The needs of the individual patient may make it necessary to deviate from the recommendations contained in any given pathway.

WSCC pathways are intended for use within our clinic system. They may be useful as a seed for regional guidelines or guidelines with wider application, but caution must be exercised. The following limitations would have to be addressed. 1) The literature searches employed would need to be more exhaustive; 2) inclusion criteria for published studies would need to be more stringent; 3) a wider pool of subject-matter experts must be tapped; 4) the participants of the consensus panel would need to be drawn from a broader cross-section of the profession and perhaps other healthcare providers as well. Although individual procedures and decision-making points within the Care Pathways have established validity or reliability, the pathways as a whole are untested.

Copyright © 2000 Western States Chiropractic College.
Do not reprint without permission.
ICD-9 CODES

461 = Acute Sinusitis
This includes acute abscess, empyema, infection, inflammation, suppuration of sinus. It excludes chronic or unspecified sinusitis.

461.0 = Maxillary (acute antritis)
461.1 = Frontal
461.2 = Ethmoidal
461.3 = Sphenoidal
461.9 = Acute sinusitis, unspecified (acute sinusitis NOS)

473 = Chronic Sinusitis
This includes chronic abscess, empyema, infection, suppuration of sinus. It excludes acute sinusitis.

473.0 = Maxillary (chronic antritis)
473.1 = Frontal
473.2 = Ethmoidal
473.3 = Sphenoidal
473.8 = Other chronic sinusitis (chronic pansinusitis)
473.9 = Unspecified chronic sinusitis (chronic sinusitis NOS)

This Care Pathway is designed for use with patients presenting to the WSCC clinic system with pain over the sinuses and/or other symptoms of rhinitis, upper respiratory infection, sinusitis, or headache pain in which sinusitis is a reasonable differential.

Search Strategy

Multiple terms were combined and a standardized search strategy was employed in the areas of therapy, diagnosis, etiology and prognosis to be sure to include and identify articles that represent evidence-based clinically relevant studies. WSCC librarians used published strategies that have been developed by librarians and researchers associated with various evidence-based medical centers, including the Cochrane Collaboration. The searches used at WSCC are either based on or identical to strategies that have been published by these professionals and in some cases validated by hand searches of the medical literature.

The following data bases were searched from 1996 to early 1999: MEDLINE, CINAHL, MANTIS, and the Index to Chiropractic Literature. ECRI, the US Agency for Health Care Policy and Research, and appropriate professional organizations were used to search for published guidelines.

Citations were downloaded into reference management software and sorted by probable relevance, divided into groupings of high sensitivity, high specificity, and published guidelines. The primary authors reviewed the citations and abstracts, selected sources that appeared to be useful and relevant, and reviewed the original papers. More articles were requested and reviewed as well as focused searches performed on specific issues identified by the CSPE consensus committee during the entire review process.

---

# Table of Contents

**BACKGROUND** ................................................................. 5
  Epidemiology ................................................................. 5
  Natural History ............................................................... 5

**EVALUATION: KEY FINDINGS** ........................................... 6
  Key Signs and Symptoms .................................................. 6
  Bacterial Sinusitis ........................................................... 7
  Allergic sinusitis ............................................................ 7
  Key Ancillary Studies ....................................................... 9
  Imaging ............................................................................ 9
  Physical Evaluation ......................................................... 10
  Red Flags: Poorer Prognosis For Conservative Care ............. 13

**MANAGEMENT STRATEGY** ................................................ 14
  Strategy Based on Patient Profile ...................................... 14
  Affect Drainage .............................................................. 15
  Promote Decongestion .................................................... 15
  Support the Immune System ............................................. 15
  Restore Proper Biomechanics .......................................... 15
  Remove or Control Known Allergens ............................... 15

**MANAGEMENT: SPECIFIC PROCEDURES** ....................... 16
  Nasal Specific ............................................................... 16
  Endonasal Procedure ..................................................... 17
  Percussion ....................................................................... 17
  Facial Massage and Lymphatic Drainage Techniques .......... 18
  Adjusting/Joint Mobilization .......................................... 18
  Ancillary Procedures ....................................................... 19
  Nasal Lavage ................................................................... 19
  Argyrol Nasal Applications ............................................. 19
  Physiotherapeutic Modalities .......................................... 19
  Microcurrent (Myomatic) ................................................. 19
  Dietary and Nutritional Considerations ............................ 19
  Vitamin and Botanical Considerations ............................. 20
  Over-the-Counter Medications ......................................... 20
  Decongestants ................................................................ 20
  Antihistamines ................................................................ 20
  General Self-Care Advice ............................................... 20

**OTHER ASPECTS OF MANAGEMENT** ................................. 21
  Outcome Measurements .................................................. 21
  Prognosis ........................................................................ 21
  Pharmaceutical Therapeutics .......................................... 22

**APPENDICES** .................................................................. 24
  Appendix I: Radiologic Considerations ............................. 24
  Appendix II: PARQ Conference Considerations ................. 25
  Appendix III: Vitamins, Supplements and Botanicals .......... 26
  Appendix IV: Acupressure Points for Sinusitis .................. 29

**REFERENCES** ................................................................. 30
Notes
Sinusitis can be classified into two main categories: **acute** and **chronic**. Both acute and chronic sinusitis can be bacterial or nonbacterial. Chronic sinusitis includes chronic recurrent and “acute on chronic,” which indicates that a patient with chronic sinusitis is having an acute flare-up.

Symptoms and signs of acute and chronic sinusitis are often very similar. Severity and duration may be the only distinguishing characteristics. However, even with duration, there is not a clear line of distinction.

To be considered acute, sinusitis symptoms must be present from seven days to three weeks. Symptoms lasting less than seven days may be characterized as a common cold.

Chronic sinusitis is defined as more than two episodes over a six-month period or a single episode lasting eight weeks or more without response to therapy.

The origin of the condition may be bacterial, viral, fungal, allergic or environmental. Up to 30-50% of patients with clinically or radiographically suspected sinusitis have sterile aspirates from antral punctures.

Predisposing factors may include small sinuses, birth defects, polyps, deviated septum, tumors and previous trauma. Sinusitis is often preceded by an upper respiratory infection, most often the common cold. In addition, irritation by dust, molds, chemicals or other pollutants may lead to the development of sinusitis. The ethmoid and maxillary sinuses appear to be most often affected; the frontal sinuses less so. Isolated sphenoid involvement is rare but quite serious.

**Epidemiology**

Sinusitis is one of the most common health conditions in the United States.

Sinus pain is often referred from other sources and some authors feel that sinusitis may be an over-diagnosed condition.

**NATURAL HISTORY**

Few studies have been devoted to the natural history of sinusitis. It has been estimated that the overall rate of spontaneous clinical recovery from acute sinusitis is as high as 40-45%. Many cases do not require treatment.

Viral infections mimicking or causing sinusitis rarely last longer than a week. However, those that do not resolve require a thorough investigation to make the proper diagnosis.

The lack of information about the natural history of sinusitis makes it difficult to evaluate the efficacy or cost-effectiveness of intervention.

Only three randomized placebo-controlled clinical trials of antibiotics in acute
maxillary sinusitis have been published before 1997. More recently, there has been increased interest in this subject and several new studies have been published. The new studies caution against the over-prescription of antibiotics in the treatment of sinusitis for the following reasons: the disease is usually self-limiting, antibiotics are often ineffective, and there is a rising trend toward the development of resistant strains of bacterial infection.9-13

Many environmental factors influence the course of sinusitis. Some climates are worse than others for people with chronic sinusitis. The damp weather of the northern temperate zones is usually the most problematic. Atmospheric inversions and drops in barometric pressure seem to cause sinus difficulties. Pollutants, including smoking and secondary smoke, clearly have an impact on chronic sinusitis. Nasal irritation induces turbinate swelling and causes ciliary dysfunction. Some patients report that the building they work in causes sinus problems (Sick Building Syndrome).3,14

EVALUATION: KEY FINDINGS

Key Signs and Symptoms

Sinusitis most often follows an upper respiratory tract infection or allergic rhinitis that has lingered for more than 7 days.15

Keep in mind that the primary difference between acute and chronic sinusitis is that chronic sinusitis is of longer duration and its symptoms are more subtle. Symptoms of sinusitis have been divided into major and minor criteria. In preparing the list of these, the authors found that some symptoms are considered major by one author and minor by another. Therefore, the same symptom may appear in both categories. The following lists are based on a combination of sources.2,5

MAJOR CRITERIA

- Significant craniofacial pain/pressure, commonly over the sinuses. This is often the dominant symptom.5,16

MINOR CRITERIA

- Headache
- Nasal congestion with mucopurulent discharge
- Purulent pharyngeal discharge
- Coughing, more common in children
- Olfactory disturbance
- Foul breath (fetor oris)
- Sore throat
- Earache
- Increased wheeze
- Fever, more common in acute cases and in children
- Nasal speech
- Irritability, more common in children
- Periorbital edema, more common in children
- Maxillary toothache
ADDITIONAL FINDINGS

- Rhinoscopic evaluation may reveal irregularly bright red appearance, edema, crusts, purulence and/or polyps.
- Facial pain and pressure less likely primary complaint in chronic versus acute sinusitis.
- Nasal congestion and obstruction with production of thickened secretions primary complaint in chronic sinusitis.

BACTERIAL SINUSITIS

- The probability of the sinusitis being bacterial is increased if the symptoms occurred after flying, diving, swimming, nasal packing, nasal intubation, or upper molar dental work.2
- If purulent discharge is present, it is usually yellow, brown or green in color.

ALLERGIC SINUSITIS

- A thin watery discharge, (lasting more than seven days) especially if associated with intermittent sneezing and a runny itchy nose, suggests a possible allergic sinusitis.
- Patients usually have a history of allergic response (e.g., may have a seasonal trigger).17
- Usually an absence of fever, chills, myalgia, lymphadenopathy, productive cough, and sore throat.17

Commentary

Since acute rhinitis often precedes true sinus involvement, it is often difficult to know if the patient is suffering from rhinitis alone or is somewhere on a continuum of a developing sinusitis.

A clear bimodal presentation would suggest the evolution of a sinusitis: upper respiratory symptoms followed by a period of improvement, and then replaced by more severe sinus pain and discharge. Even this sequence of presentation does not assure a definitive diagnosis. During the late phase of an uncomplicated rhinitis, there may be a day or two that the secretions become thicker. This leads to a productive cough, creating the suspicion of a sinusitis even when there is no significant sinus involvement.17

Any cold or upper respiratory infection lasting longer than 7 days or prolonged nasal congestion (12-14 days) can suggest the appropriateness of a work up for sinusitis.

Sinus headaches and facial pain, often stabbing or aching in quality, may get worse in the late morning and then improve in the afternoon as the patient is upright more.

Location of the pain can suggest which sinus might be involved. Lying down may actually reduce the pain in maxillary sinusitis. Conversely, ethmoid involvement may be aggravated by forward bending or lying down.2,5

Most common symptoms. According to one study, the following six symptoms were significantly (P<0.01) more common in patients with abnormal roentgenograms (standard four view sinus series): preceding upper respiratory infection, any nasal discharge or purulent nasal discharge, painful mastication, malaise, cough, and hyposmia. Note: No single finding was highly accurate.18
Discharge. Purulent discharge suggests a bacterial infection (72% sensitivity; 52% specificity). However, the absence of a discharge does not completely rule out a bacterial infection.

When the discharge is primarily nasal, frontal or maxillary sinuses can be suspected; pharyngeal discharge implicates the ethmoid or, far less common, sphenoid sinuses.

As stated, in allergic sinusitis, a thin watery discharge is present.

Cough. Cough has a 70% sensitivity and 44% specificity (when combined with other symptoms) according to one report.

It is more common in the pediatric presentation and can be confused with asthma. When a cough is present, it may be worse at night.

Congestion. Nasal congestion can be associated with obstruction either due to inflammation or physical causes such as polyps. Loss of the sense of smell may suggest the severity of the obstruction.

Percussion/palpation. Some authors recommend these procedures; others feel that they are not useful. Percussion of sinuses may cause pain in patients with sinusitis (48-50% sensitivity, 62-65% specificity).

Transillumination. The most studied but least agreed upon physical examination maneuver is paranasal sinus transillumination. Since first being described in 1899 by Voltolini, its value as a diagnostic test has been hotly debated.

Several authors have described transillumination as “highly predictive of disease.” A 90% sensitivity for frontal sinuses has been reported. While another author has described the use of transillumination as an act of “methodological limitation.” Although two of the better studies had differing results, both studies suggest that transillumination may be more useful for diagnosing sinusitis when performed by otolaryngologists.

In another study of 113 patients with nasal symptoms and abnormal sinus roentgenograms, transillumination was highly useful for those patients examined by an otolaryngologist, when the sinus was either completely opaque (LR=∞) or completely normal (LR=+0.04). The procedure was less useful, however, when the finding was dull transillumination (LR=+0.41). In contrast to the previous study, opaque transillumination ruled in sinusitis and normal transillumination ruled it out.

Toothache. The presence of maxillary toothache and/or sensitivity to tapping on the teeth during the physical exam implicates the maxillary sinus. This finding is uncommon (11% sensitivity) but is considered to be very specific (93% specificity).

Combination of signs. Considered in combination, maxillary toothache, poor response to nasal decongestants, abnormal transillumination, and colored nasal discharge by history or by examination are the most useful clinical findings in primary care populations. When none of these findings were present, sinusitis could be ruled out (LR +0.1), and when four or more were present, the LR was +6.4.

* The higher the positive Likelihood Ratio (LR), the greater the power at ruling in a condition, and the lower the negative LR, the greater the power at ruling it out.
Key Ancillary Studies

The diagnostic value of a positive clinical examination and of a positive ultrasound or radiograph are comparable. A negative radiograph is of more diagnostic value than a negative clinical exam or ultrasound.\textsuperscript{20}

**IMAGING**

In most circumstances, imaging will not be ordered by the treating chiropractor. Imaging of the sinuses is appropriate for the patient who does not respond to antibiotic therapy, or the patient who has an unusual presentation of sinusitis. In either case, an allopathic physician will be the likely agent arranging for radiographs or advanced imaging.

For uncomplicated acute cases that do not respond to care (about three weeks based on the WSCC management found in this care pathway), the practitioner may refer to a medical physician for possible antibiotics. Failure to respond to antibiotics may prompt plain film radiography. Patients with initial red flags for complications should be referred immediately for CT, without initial radiographs.

Chronic cases may be treated for 2 to 3 months (based on management found in this care pathway). Treatment failure at this time should result in a referral for CT without first performing plain film radiography.

Magnetic Resonance Imaging (MRI) usually is reserved for differential diagnoses of more serious conditions already identified by CT, such as intracranial and intraorbital complications of sinusitis, neoplasms, and fungal disease. This imaging, too, will almost always be post-referral. See Appendix I: Radiologic Considerations, for further discussion of these imaging procedures.

**CULTURE OF ASPIRATE**

Referral for this procedure should be reserved for the patient who does not respond to treatment or has an unusual presentation of sinusitis. The aspirate may become contaminated with other pathogens from the nasopharynx, so bacteria purely from the sinuses may be difficult to obtain.

In rare cases it may be necessary to refer the patient to an otolaryngologist for sinus puncture.\textsuperscript{3} This would only be recommended in cases where antibiotic therapy was used and the patient did not respond and/or after conservative therapies were thoroughly exhausted.

A culture will verify a suspected bacterial infection and identify the specific bacteria for possible antibiotic therapy.

**ESR AND CRP**

Erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) are blood tests that together have a sensitivity of 82\% and specificity of 57\% for acute maxillary sinusitis. This is better than for most other clinical signs and symptoms; however, these tests are not generally done as part of a routine examination.\textsuperscript{6}

**CBC**

Complete blood count (CBC) is considered only when systemic involvement is suspected.

**Evaluation Strategy**

The strategy is to assess the patient for signs of infection and look for indirect evidence of sinus involvement. Other structures in the face and neck should also be evaluated for possible causes of
referred pain over the sinuses. Finally, at the clinician’s discretion, signs of complications can be sought. It is important to get the frequency and duration of episodes to use for measuring success of treatment.

Physical Evaluation

**Key Aspects**
- Take temperature
- Percuss/transilluminate sinuses
- Examine nasal passage and pharynx
- Tap maxillary teeth
- Palpate lymph nodes
- Examine cervical muscles and joints
- Screen TMJ
- Perform otoscopic exam (in children)
- Lung auscultation (if indicated)
- Cranial nerves II to V (if indicated)

**Evaluate Sinuses and Look for Possible Signs of Infection**

The following risk factors can give rise to sinusitis:

- Nasal polyps, septal deviation, trauma/surgery to the nose.

- Factors increasing the risk for infection, such as frequent participation in swimming and diving, and immuno-suppressive therapy, as well as chronic diseases such as diabetes or renal disease.

- Recurrent allergic rhinitis or a history of uncontrolled allergies.\footnote{17}

- Identify the immediate circumstances of the current episode. These would include recent upper respiratory infection (include the length of time of the symptoms and whether there is a bimodal pattern), dental procedures, exposure to smoke, physical or chemical irritants, and forceful nose blowing.

- Find out what OTCs, if any, the patient is using, a failure to respond to decongestants, or a history of asthma attacks.

**Percussion and/or Transillumination**

Percuss the sinuses for tenderness. The pain may be more severe in acute than in chronic conditions. Percuss maxillary teeth for pain. Transillumination may be useful for detecting consolidation and confirming a suspected case of sinusitis, especially in frontal sinusitis.\footnote{21} (See Transillumination, Page 8.)

**Visual Inspection**

Visual inspection of the nasal passageways should be done with a rhinoscope; the pharynx, with a penlight.

If polyps are seen and the patient is under the age of 16, arrange for a sweat test to rule out cystic fibrosis. If the patient is an adult, consider referral for an ENT evaluation.\footnote{22}

If there are crusty patches on the nasal mucosa that do not bleed, are painless when picked away, and leave a pale white lining at the site, fungal infection should be highly suspected.\footnote{22}

If the patient has nasal discharge that is watery without pus, suspect allergic or vasomotor rhinitis. If discharge is yellow or greenish in color, suspect chronic bacterial sinusitis. A nasal culture may be indicated, and/or the patient may be referred for antibiotic therapy, especially if symptoms include a fever of 102°F or higher. If
discharge is cloudy but colorless, suspect nonbacterial or viral sinusitis.

If there is drainage of pus from ostia of the nasal meatus, suspect acute sinusitis. This suspicion is strengthened if the drainage is unilateral or if the patient has facial or head pain that increases when lying down, bending, or straining (as in Valsalva’s maneuver).

If there is no discharge, but the patient is experiencing chronic congestion, the patient may have an upper respiratory infection.

If there is no discharge and no congestion, other causes of sinus pain should be more closely investigated.

Temperature

If the patient has a fever, suspect a bacterial infection. The degree of fever may be used as an indicator for referral. Fevers over 102°F indicate an acute infection that may warrant referral for antibiotic therapy.

Patients with low-grade fever or no fever may best be treated with other conservative therapies and should be watched closely and referred if they are not responding to care.

IDENTIFY INVOLVED SINUSES

Although it is often subtle, pain patterns may differ depending on which sinuses are involved.

- Maxillary sinusitis causes pain in the maxillary area, toothache and frontal headache.
- Frontal sinusitis produces pain over the sinuses or frontal headache, and can project severe pain to the temple or sometimes to the occiput.
- Ethmoid sinusitis causes pain behind and between the eyes, and a frontal headache that is often described as “splitting.”
- Isolated sphenoid sinusitis is rare. Pain is less well localized and is referred to the frontal or occipital area. Diverse pain may be present throughout the head and neck, including the vertex of the skull and occiput, mimicking a mild meningitis.

Laboratory Tests

Although acute sinusitis from a bacterial origin can be proven only by sinus aspiration and bacterial cultures of the aspirate, the patient history and physical should provide enough information to make a presumptive diagnosis. A history of fever and purulent nasal discharge accompanied by facial pain over the maxillary sinus is highly suggestive.

Testing for food and environmental allergens (e.g., ELISA IgG4, RAST IgE) can be ordered if allergy is the suspected cause of the sinus pain, especially in chronic cases.

ESR and/or CRP can be ordered to help confirm cases of suspected bacterial infection, but this is usually not necessary.

EVALUATE OTHER CAUSES OF REFERRED PAIN

Sinusitis is only one cause of sinus pain complaints. Other considerations include the following:
Obstruction Due to Foreign Object

Simple rhinoscopic examination of the nasal meatuses along with a thorough history should reveal this as a cause of nasal pain. Remove obstruction or refer for removal.

Acute Rhinitis (URI)

In addition to sinus pain, acute rhinitis usually is accompanied by aches and pains all over the body, malaise, itchy and watery eyes, and profuse nasal discharge. It is usually self-limiting and the patient fully recovers within a few days.23

Periodontal Abscess

With sinusitis, tapping of the teeth may cause pain. If the pain is severe, periodontal abscess should be suspected. If so, refer to a dentist.

Soft Tissue and Joint Lesions

Trigger Points. In the absence of evidence of sinusitis, examine the muscles of the neck and upper thorax for the presence of trigger points. Palpating trigger points may aggravate or reproduce the sinus pain. Treat appropriately.24

Cervical Spine. Palpation of the cervical spine should be done to determine joint dysfunctions that may be contributing to the sinus pain or may be the result of a viscerosomatic reflex.25

TMD. In the absence of evidence of sinusitis, consider evaluating the temporomandibular joint (TMJ). Temporomandibular disorder (TMD) may mimic sinus pain.24 A functional examination of the joint should reveal dysfunction and may recreate or aggravate the symptoms.

Lung Exam. If cough is part of the presentation, lung auscultation may be useful to investigate the possibility of asthma.

Cranial Nerves II to V. The practitioner may choose to test these cranial nerves. Neurological deficits would suggest a serious complication of sinusitis and should result in an immediate referral.

Special Considerations: Pediatrics

• Rhinitis and cough may predominate rather than pain or pressure.

• Symptoms may be more insidious in children.18 History may not be as reliable in children as in adults in formulating diagnostic conclusions.22

• Children who present with fever, headache, and facial pain may already be suffering from complications.2 Consider referring these children for further evaluation.

• Perform an otoscopic examination. Tympanic membrane changes (sensitivity 68%) are the most common physical examination findings associated with sinusitis in children.20

• A fever of 102°F or higher suggests a medical referral.20

• Transillumination may be less reliable in children than in adults.18

• Periorbital edema and irritability are more common in children.
Red Flags: Poorer Prognosis for Conservative Care

- Fever of 102°F and/or chills may indicate an extension of the infection beyond the sinuses and would warrant further investigation and/or referral.

- Yellow, brown or green discharge, positive culture, or positive ESR/CRP may indicate bacterial infection and may warrant referral for possible antibiotic therapy if the patient fails to respond to conservative care in a reasonable therapeutic trial. Again, because many cases of sinusitis do not respond well to antibiotic therapy, conservative care should not be abandoned too early.10-13

- Stiff neck and/or disorientation are signs of extension of infection to the central nervous system. Immediate referral is indicated.21

- Changes in visual acuity or deficits in cranial nerve III (such as abnormal extraocular motion, proptosis), IV, or V could suggest an infection of the sphenoid. Although rare, this would constitute a medical emergency.4

Other signs of complications resulting in immediate referral for antibiotic therapy include orbital pain, periorbital swelling/erythema, or facial swelling/erythema.4
MANAGEMENT STRATEGY

Acute and chronic sinusitis may benefit from a therapeutic trial of conservative, non-antibiotic intervention. Recent studies have shown that treatment of sinusitis with antibiotics is not as effective as previously thought.\textsuperscript{10-13} In addition, over prescribing of antibiotics carries with it the threat of increased bacterial resistance.

Referral for antibiotics should be reserved for those cases where the symptoms are particularly severe, systemic involvement is suspected, or when the patient fails to respond to conservative care in a reasonable period of time. Nonetheless, during the PARQ conference, the patient should be thoroughly informed of the procedures, alternatives, risks and benefits of conservative care as well as those of a standard medical approach (see Appendix II: PARQ Conference Considerations).

Patients with chronic sinusitis may particularly benefit from the treatment options in this care pathway, especially if they have already experienced relative treatment failure with antibiotic therapy.\textsuperscript{†}

**Specific Therapeutic Objectives**

- Control infection
- Improve drainage and promote decongestion
- Improve immune status
- Restore normal biomechanics of associated neck structures
- Remove potential allergens

\textsuperscript{†} Opinion of the CSPE Committee.

**Strategy Based on Patient Profile**

**Presentation:** The patient has symptoms of recent onset of cold, congestion, even a headache/sinus "pressure".

**Strategy:** Offer advice and reassure the patient that the condition is benign and usually self-limiting. In the first week or so (from the time of onset), treat like a cold (e.g., rest, fluids, adjust, lymphatic massage, etc.).

**Presentation:** The patient has symptoms that last longer than a week and are consistent with a nonspecific sinusitis or an acute bacterial infection (specifically: purulent discharge, facial pain/headache, and failure to respond to decongestants), but without any red flags or complications.

**Strategy:** If symptoms are relatively mild or very recent, watchful waiting along with the conservative care outlined above, perhaps including argyrol. If the episode appears to be part of a longer trend, nasal specific may also be considered at this time. If the patient fails to respond within two weeks to treatment, consider referring for antibiotics.

**Presentation:** The patient presents with symptoms lasting more than 8 weeks or has had more than 2 episodes over a 6 month period, with or without previous medical evaluation or management.

**Strategy:** If any red flags or complicating factors are present, consider immediate referral for antibiotic therapy. In the uncomplicated case, follow the conservative pathway outlined above including nasal specific or argyrol applications to promote adequate drainage. If there is no improvement in 4-6
weeks of treatment, consider referral for further evaluation, CT, and/or possible antibiotic therapy.

**Affect Drainage**

The clinician and patient may decide on either direct, indirect, or a combination of methods for promoting drainage.

"Direct" methods may be more effective than indirect. By consensus of the CSPE committee, nasal specific is likely to be the most effective modality for the treatment of chronic sinusitis. However, many patients may find this procedure undesirable due to the discomfort involved. If that is the case, argyrol nasal applications would be the preferable modality. The supervising clinician should discuss the pros and cons of each of these modalities with the patient. Together, they should decide which course of treatment is best suited to the patient’s condition and circumstances. Nasal lavage, both in office and as a home care modality is also useful.3,14

By consensus opinion of the CSPE committee, endonasal technique is effective for the treatment of ear complications that often accompany sinusitis.

"Indirect" methods may also be employed in addition to or in place of the direct procedures cited above. Percussion techniques may offer symptomatic relief as well as have some effect on drainage.

Physiotherapeutic modalities have been employed by chiropractic physicians for the treatment of chronic sinusitis for many years. There is no consensus as to whether one is better than another.

Lymphatic massage can be used as an adjunct to either direct or indirect methods of drainage.

**Promote Decongestion**

Consider advising patient to do steam inhalation, sinus lavage, or use natural or over-the-counter decongestants. Drink sufficient water.

**Support the Immune System**

Consider advising patient to take supplements that may support the immune system, especially in chronic sinusitis. (See Appendix III, Vitamins, Supplements and Botanicals.)

**Restore Proper Biomechanics**

If joint restrictions or soft tissue lesions are detected, treat as needed.

**Remove or Control Known Allergens**

Dietary considerations should be explored in all patients with chronic sinusitis. Consider further investigation for other possible allergens. Recurrent cases should consider air filtration systems for the home to remove allergens and purify the air.
Nasal Specific

Two or three finger cots are unraveled within each other and tied to the end of a sphygmomanometer bulb. The cots are lubricated with a water-soluble lubricating gel and guided into the nasal passage ways. The nose is lightly compressed around the valve of the sphygmomanometer bulb. The patient is asked to take a deep breath in and hold it. The practitioner then inflates the sphygmomanometer bulb and quickly releases the air valve. This procedure is repeated for each of the six nasal meatuses.²⁶

Significant reduction in symptoms is expected within one to three treatments. If no improvement is achieved after three treatments, this modality should be discontinued. Generally two to five treatments over a two-week period achieve maximum benefit. Yearly or seasonal repeat treatment may be necessary. (See CSPE videotape, “Sinusitis.”)

Complications and side effects.
Complications from the nasal specific procedure appear to be uncommon. Epistaxis can result from this procedure and there is the possibility of hemorrhage of ruptured veins, but this is very rare.²⁶ Patients with a history of epistaxis may be more likely to get a nose bleed from this procedure than other patients. Furthermore, patients who experience a nose bleed during the nasal specific procedure may not get a nose bleed with subsequent treatments.

Patients with bleeding disorders or patients who are taking anticoagulant medications should be considered high risk patients and therefore may not be good candidates for this procedure.

Patients with prior nasal surgery, especially with modification of the turbinates, are not good candidates for nasal specific because the integrity of the structures is unpredictable. At least one post-surgical case has been reported of a possible fracture of the cribiform plate with CSF leakage due to the nasal specific procedure.†

Patients with recent (under two years) nasal or facial bone fracture may not be good candidates for the nasal specific treatment because the integrity of the structures is unpredictable.

Minor soreness in the face and teeth for a couple of days following the procedure is the only known side effect.²⁶ However, some patients find nasal specific to be painful enough that they do not want to continue treatment.

There has been at least one case reported where an asthma attack was initiated by the nasal specific procedure.†† Therefore, as a precaution, the clinician should be sure that patients with a history of asthma have their inhaler with them when they are going to undergo this therapy.

There has been one documented case of asphyxiation in an infant from the finger cot breaking and blocking the airway.²⁶ When deciding whether to use nasal specific technique on children under two

‡ Reported to the author by NCMIC (National Chiropractic Mutual Insurance Company).
†† Author reported this case from private practice experience.
years of age, the practitioner needs to balance the possible benefits of treatment with the inherent discomfort of the procedure and the possible self-limiting nature of the condition.

**Rationale:** Nasal specific procedure is believed to increase the opening to the sinuses and therefore allow for better drainage. It also may allow better circulation of the air within the sinuses promoting healing of infected tissues.

**Endonasal Procedure**

Many cases of sinusitis are accompanied by eustachian tube dysfunction resulting in plugged ears. This may lead to the development of a complicating otitis media. Endonasal technique is effective in treating this eustachian tube blockage.

Introduce the gloved finger, palmar surface upward, into the mouth. Proceed past the uvula, without touching it, into the nasopharynx and laterally outward and upward to the Fossa of Rosenmüller. A sweep of the fossa is made and a tractional tug of the inferior tissues is applied as the finger is withdrawn. Some practitioners employ a very firm pressure on the opening to the eustachian tube to stretch this opening. However, recent clinical experience and the consensus of the CSPE committee suggests that a gentle downward tug is sufficient to gain results. Occasionally, patients will report an immediate relief from pressure or a crackling sound in the ears.

A mild astringent may be used on the gloved finger. The patient should gargle with a mild antiseptic mouthwash or warm salt water after the procedure to decrease the risk of spreading infection to the throat.

Endonasal procedure should be done once a week for three weeks as a therapeutic trial for the treatment of eustachian tube dysfunction. If a reduction of symptoms is not achieved after three treatments, it is unlikely that further applications will result in a positive response. (See CSPE videotape, “Sinusitis.”)

**Contraindications.** Endonasal procedure should not be done when there is evidence of an acute throat infection as exudates may be transported from the nasopharynx to the inner ear.

**Complications and side effects.** There are no known complications to the endonasal procedure. Side effects are also rare but the patient may experience minor swelling and/or slight bleeding from capillary rupture in the nasopharynx.

When deciding whether to use endonasal technique on children under two years of age, the practitioner should balance the possible benefits of treatment with the inherent discomfort of the procedure and possible self-limiting nature of the condition.

**Rationale:** Endonasal procedure is thought to remove a mucous plug from the end of the eustachian tube. This allows for better drainage from the middle ear. Furthermore, the procedure appears to stimulates the production of mucus in the posterior nasopharynx, which improves drainage from the nasal cavities.

**Percussion**

Place the patient in the supine position. Warm towels are placed over the sinuses for 5-10 minutes before beginning the percussion. This, along with facial massage, helps to relax the patient and promote drainage. Gently percuss above the frontal and maxillary sinuses for 5-10 minutes.
Complications and side effects. There are no known risks to this procedure.

Rationale: Percussion is thought to mechanically stimulate the sinuses to promote drainage.

Facial Massage and Lymphatic Drainage Techniques

Place the patient in the supine position. A slow, gentle stroking massage is performed using both thumbs or thenar eminences, one on either side of the face. Begin at the center of the forehead and sweep along the frontal area around the orbital region and down to the front of the ears. Continue with these sweeps in a superior widening pattern.

To massage along the maxillary region, begin at the top of the bridge of the nose and sweep along the inferior orbital ridges, continuing along the TMJ and down along the mandible. Continue with these sweeps in an inferior widening pattern to include the entire maxillary region.

Acupressure points in this area include GB14, UB2, ST2, LI20, and multiple points along the orbital ridges. These points may be gently held with thumb or finger pressure for 5-10 seconds throughout the massage.7 (See Appendix IV, Acupressure Points for Sinusitis.)

To facilitate lymphatic and sinus drainage, elevate the patient's head. Turn the patient's head to one side and massage down the neck along the anterior and posterior SCM lymphatic chains.

Turn the patient's head to the opposite side and repeat this procedure. Following the massage and lymphatic drainage, place warm towels along the sinuses and neck for 5-10 minutes. (See CSPE videotape, “Sinusitis.”)

Mechanical massage and vibration devices (e.g., G5) may be employed to assist in facial massage and/or lymphatic drainage.

Complications and side effects. There are no known risks to these procedures.

Rationale: Facial massage is believed to stimulate the skin over the sinuses to promote drainage of the sinuses. Lymphatic drainage techniques stimulate the flow of lymphatic fluids which may encourage infection fighting processes.

Adjusting/Joint Mobilization

It is the consensus opinion of the CSPE Committee that the frequency of spinal manipulation recommended is two to three times per week during the early stages of treatment. A two-week therapeutic trial should be sufficient to yield results.

If the patient is improving, manipulation should be continued on a schedule appropriate to the individual case. If, however, there is no improvement within two weeks of therapy, further use of this modality is unlikely to yield further therapeutic effect.

Complications and side effects. Spinal manipulation of sinusitis patients carries no additional risks beyond those rare side-effects associated with the procedure itself.

Rationale: Based upon clinical experience, it appears that spinal manipulation, particularly of the upper cervical spine, helps to reduce the symptoms of sinusitis. The mechanism of this phenomenon is unclear. In addition, joint dysfunction may be present as a viscerosomatic response to sinus irritation.25
Ancillary Procedures

Nasal Lavage

Nasal lavage using lukewarm salt water has been found to be a useful home-care modality for the treatment of sinusitis. The solution can be prepared by mixing one-fourth teaspoon of sea salt with 7 ounces of warm water. Narial Nasal Cups are available to assist in introducing the saline into the nasal passages. It is recommended that lavage be performed on a daily basis during active infections.14

**Rationale:** Saline nasal irrigation provides a means by which the paranasal mucosa is hydrated, purulent discharge is flushed from the recesses of the nasal passages, and crusted nasal discharge is cleared, thus promoting adequate drainage. In addition, irrigation offsets the potential rebound mucosal swelling common with the use of topical vasoconstricting decongestants.28

Artyrol Nasal Applications

Long, cotton-tipped applicators are saturated in a 10% mild silver protein solution (artyrol) and inserted into the middle nasal meatus.

The applicators remain in the nose for approximately 60 minutes. The patient sits with head bent so that nasal mucus can flow down the end of the applicator and into an emesis basin.

Repeat this procedure for two consecutive days, skip a day, and repeat on the fourth day. On rare occasions, a fourth application is added if it appears the patient would derive some benefit.

**Complications and side effects.** There are no known risks to this procedure.

**Rationale:** Artyrol nasal applications irritate the nasal mucosa causing the production of copious amounts of mucus. This flow of mucus promotes drainage of the sinuses and causes infective agents to be carried out of the nasal cavities.

Physiotherapeutic Modalities

**Microcurrent (Myomatic)**29

**Common Acupressure Points Used**7

GB14, UB2, LI20, LI14 (See Appendix IV)

**Parameters:** Tsunami wave (alt. Current), 10-50 µamps, 0.3 H2 to 30 H2

**Probe Method:** 10 seconds each point, three times

**Pad Method:**
- 2 pads placed, one on each frontal sinus (above eyes)
- 2 pads placed, one on each maxillary sinus (lateral to nose)
- 20-30 minute treatment

**Rationale:** Microcurrent stimulates reflex points that affect the sinuses through the nervous system. This effect promotes drainage of the sinuses through shrinkage of the mucous membranes.

Dietary and Nutritional Considerations

Dietary and nutritional interventions are usually reserved for the treatment of chronic or chronic recurrent sinusitis.

**Trial allergen elimination diet.** The most common food allergens are milk, eggs, wheat, rye, corn, sugar, chocolate, cola,
Vitamin and Botanical Considerations

Little has been published regarding the vitamin and botanical treatment of sinusitis specifically. Although Bromelain is the best documented supplement for sinusitis, neither the literature nor current practice profiles in WSCC clinics allowed the CSPE panel to arrive at a sufficient consensus to make specific recommendations. Should a practitioner choose to give a supplement, he or she can consult Appendix III: Vitamins, Supplements and Botanicals. When recommending a botanical or other supplement, the clinician should be familiar with the indications, contraindications, toxicity levels, and interactions of the particular substance before prescribing its use.

Over-the-Counter Medications

DECONGESTANTS

Decongestants are often prescribed as adjunctive therapy for bacterial sinusitis, but their efficacy remains unproved. They shrink nasal mucous membranes, perhaps thereby facilitating sinus drainage when the sinus ostia are obstructed by mucosal swelling. However, decongestants may also impede important bacterial clearance mechanisms by inhibiting mucosal ciliary action.

If decongestants are used, topical sprays may be preferable to oral agents but they should always be discontinued after 72 hours to prevent the complication of rhinitis medicamentosus.

Decongestants do have many possible adverse effects and should be used cautiously. Their use should be especially cautious among elderly or hypertensive patients.

ANTIHISTAMINES

Unless prominent allergic symptoms are also present, antihistamines are probably of little value in the management of acute sinusitis. They may dry nasal mucosa excessively and thus impede sinus drainage.

General Self-Care Advice

Note: Patients should be instructed to call back if symptoms worsen or do not improve within 1 week of home therapy.

- Patients suffering from sinusitis should drink at least six to eight 8-oz. glasses of water per day.
- Chronic cases may be aided by moderate exercise.
- Using a humidifier may be beneficial.
- Recurrent cases should consider air filtration systems for the home to remove allergens and purify the air.
- Steam inhalation effectively produces nasal vasoconstriction and promotes drainage. One to two 15-minute treatments are recommended daily. Eucalyptus or camphor can be added to the water to enhance the effects of the steam.
- Smokers with recurrent and/or chronic sinusitis should be encouraged to quit smoking.
- Daily nasal lavage may help to promote drainage and reduce the healing time.
- Avoid exposure to possible allergens/irritants (e.g., smoke, abrupt change in temperature, dust).

*Consensus of the CSPE Committee.
OUTER ASPECTS OF MANAGEMENT

Outcome Measurements

- Reduction or cessation of symptoms.4
- In recurrent sinusitis, alleviating the number or intensity of episodes.
- Use appropriate CSPE questionnaires.

Prognosis

The following reflects a loose consensus of the clinical experiences of the CSPE Committee members. All figures are estimates or impressions based on a heterogeneous pool of patients, some of whom may have had sinus pain due to other causes.

- Patients with acute bacterial sinusitis generally respond to antibiotic therapy within 3 to 5 days.
- In the opinion of a small focus group, approximately 70% of patients with uncomplicated acute sinusitis seem to respond to conservative care including nutritional support, spinal manipulation, and soft tissue techniques within 3 to 10 days. It is unclear if this is just the natural course of the condition or if therapy actually makes a significant difference.
- Most clinicians surveyed report a greater than 50% success rate in treating patients with chronic sinusitis. A recent survey of 36 patients who presented to the WSCC Outpatient Clinic with signs and symptoms of sinusitis and were treated with the conservative protocols outlined in this paper, found that 85% reported a positive response to therapy.
- Most clinicians surveyed expect a significant improvement in their patients with chronic sinusitis within 3 to 4 weeks in order to justify continued therapy.

Considerations For Referral/Consultation

Patients suspected of having a significant bacterial infection as evidenced by a fever over 102°F, purulent green or yellow discharge, facial pain and/or malaise warrant consideration for referral. Minor bacterial infections may best be treated with the conservative care procedures outlined here. In any case, if the patient fails to respond to treatment, or the condition worsens after 7 to 10 days, then referral is indicated.

Patients who do not have evidence of bacterial infection but have failed to respond to conservative care could be referred to licensed practitioners for consideration of acupuncture.34-36

Acute sinusitis in young children, especially of the frontal sinus may best be treated by antibiotics rather than acupuncture because of the danger of osteomyelitis and meningitis.36
**Pharmaceutical Therapeutics**

**ANTIBIOTIC THERAPY** 9-12,37,38

Many cases of mild bacterial sinusitis resolve without specific treatment. Antibiotic therapy for acute or acute on chronic sinusitis is commonly practiced.

Recent studies have shown that antibiotic therapy is less effective for the treatment of sinusitis than previously thought. Furthermore, recent evidence shows that because of the over-prescription of antibiotics, resistant strains are developing. Therefore, judicious use of antibiotics is always recommended.9-13

Considerable debate remains in deciding who should be treated with antibiotics at all. Most allopathic physicians agree with employing an antibiotic treatment for patients with facial pain and purulent drainage or with air-fluid levels in the sinuses on CT scan or x-ray.

The most common organisms found in cases of acute sinusitis in children and adults consistently include Streptococcus pneumoniae and Hemophilus influenzae. These two organisms combined are responsible for about 50% of the cases. Moraxella catarrhalis and anaerobic bacteria fill out the list of the most common offenders with M. catarrhalis being more common in children than adults. In acute and chronic sinusitis, the bacteria tend to shift toward mixed anaerobe and aerobe infections, gram negative bacteria and organisms with antimicrobial resistance.

**PENICILLIN**

Amoxicillin is a popular first choice of antibiotic for acute sinus infections. It is effective against S. pneumoniae and most strains of H. influenzae. Due to beta-lactamase resistance, it is not effective against M. catarrhalis and some H. influenzae. In addition, S. pneumoniae is showing increasing resistance to amoxicillin due to alteration of penicillin binding portions rather than beta-lactamase production.

The use of augmented penicillin, amoxicillin with clavulanate potassium, is now available as Augmentin. The clavulanate moiety is a beta-lactamase inhibitor and effectively extends the antimicrobial coverage to those resistant organisms. It also covers anaerobic bacteria broadly and so is a good choice in acute on chronic sinusitis.

**SULFA DRUGS**

Trimethoprim-sulfamethoxazole (TMP-SMZ) is also frequently used in acute sinusitis, but there are resistant strains of S. pneumoniae and H. influenzae as well as limited coverage of anaerobes. This drug is often combined with erythromycin and called Pediazole, as a drug used for pediatric populations. Again broad coverage due to developing resistance is limiting the effectiveness of this drug.

**MACROLIDES**

Erythromycin is deficient in coverage for H. influenzae and M. catarrhalis. It also is associated with frequent side effects of GI distress, rash and drug interactions with digoxin, warfarin, Seldane and Hismanal.

Clarithromycin and Azithromycin are newly developed drugs, which show good activity against all the most common organisms. These are very good choices for the patients who are penicillin and sulfa allergic.
CEPHALOSPORINS

Second-generation cephalosporins, Cefprozil and Cefuroxime, as well as third-generation Cefpodoxime, all show broad coverage for the common pathogens of acute and acute on chronic sinusitis. Because of the extended coverage it is tempting to use these as first time agents in acute sinusitis, but these agents should be held in reserve and used only for those particularly difficult infections which have not responded to the traditional first line therapies of penicillins, macrolides or sulfa drugs.

LENGTH OF THERAPY

The symptoms of acute bacterial sinusitis typically improve within 48 to 72 hours of initiating antibiotic therapy. Many physicians prefer a 10-14 day course of antibiotics. The fact that up to 20% of adults with acute sinusitis remain culture-positive after 7 days of treatment provides some rationale for that practice.

Acute on chronic sinusitis is typically treated with 3 weeks of therapy along with ancillary treatment of steroid nasal sprays, which reduce inflammation around the sinus ostia to promote drainage of the sinus cavities.

Patients who are taking antibiotics for the treatment of sinusitis can also be co-treated with conservative therapies. Acidophilus tablets or liquid may be given to patients who have completed antibiotic therapy to restore intestinal flora. As with all respiratory infections patients should be encouraged to quit smoking and limit their exposure to second-hand smoke.
Appendix I: Radiologic Considerations

Plain Film Radiography

If sinusitis is the only concern, the minimal diagnostic series for the sinuses include Caldwell, Waters, lateral and submentovertex (SMV or base) views. This examination is relatively cost effective; however, soft tissue and bone abnormalities can easily remain unidentified.

A normal sinus radiographic series has a negative predictive value of 90-100% for the maxillary and frontal sinuses. However, the ethmoid sinus which is commonly involved, cannot be adequately evaluated with plain films. Thus, a negative study does not rule out the possibility of sinusitis.

Air fluid levels and complete opacification of the sinus, although relatively uncommon (60% sensitivity), are useful radiographic features when present, with positive predictive values of 80-100% in most studies. Sinus mucosal thickening is the most sensitive finding in sinusitis, with a sensitivity of more than 90%, but is nonspecific in symptomatic patients.

High Resolution Computed Tomography Scanning (CT)

This examination is usually reserved for unusual presentations of sinusitis or for patients who have not responded to care for 3 months. Sinus screening CTs utilize the coronal plane and produce several images through the paranasal sinuses. This series of scans is relatively inexpensive and demonstrates the pertinent drainage pathways of the ostiomeatal complex. If more serious pathology is discovered (described earlier), then a more thorough complete sinus CT is performed incorporating both coronal and axial images. This study is approximately double the cost of the screening exam.

Magnetic Resonance Imaging (MRI)

MRI is often used in complicated studies, such as in patients with suspected neoplasms and infections extending outside the nasal cavity. The findings in such cases are correlated with the CT findings to render a complete diagnosis.

Because the distinction between aerated sinus and completely obstructed sinus may be clinically important, the opportunity for error with MRI is too great to warrant its sole use. Furthermore, underestimation of the presence of chronic secretions and the severity of sinus disease may also occur if MRI is the only imaging examination used.
Appendix II: PARQ Conference Considerations

Nasal Specific and Endonasal procedures may create unique risks or considerations for patients. Therefore, a more extensive PARQ conference is necessary to address these considerations. The following are some suggested statements designed to assist the physician in delivering an appropriate PARQ conference when utilizing these procedures.

A thorough description of the Nasal Specific and Endonasal techniques as outlined in the text of this care pathway should be explained to the patient prior to treatment.

Complications or Risks with Nasal Specific Technique

Every patient who experiences the Nasal Specific technique has a unique reaction to it. Some patients find there is no particular discomfort with the procedure while others find it very uncomfortable. Most say they experience a sensation of pressure, much like diving to the bottom of the deep end of a swimming pool. Each inflation and deflation of the bulb is so quick that the discomfort only lasts for seconds. There may be a cracking or popping sound as the sinus area expands with each inflation. Generally, patients do not find this experience too unpleasant, especially when they immediately experience improvement in their symptoms. However, occasionally patients will report that they experience significant pain and say they would not undergo the procedure again.

Side effects or complications of Nasal Specific are rare. Occasionally, patients will experience a nose bleed from the Nasal Specific, especially if they tend to get nose bleeds at other times. Like other nose bleeds, the one that occasionally accompanies this procedure stops after a few minutes. Another occasional side effect is a soreness between the two front teeth. If this does happen, the discomfort is relatively minor and only lasts for about 24 hours. In addition, occasionally patients will experience a temporary stuffiness due to swelling of membranes of the nose. This only lasts for a period of about 24 hours. Throat irritation due to increased drainage from the sinuses may also happen following Nasal Specifics. Again, this is temporary and goes away in a short time.

Complications or Risks with Endonasal Technique

There are no special or additional complications or risks with Endonasal technique beyond minor throat discomfort. Many patients fear that they will gag from this procedure. However, it is done so quickly that slight gagging may happen but no one ever vomits. Some patients report that it actually hurts to have the Endonasal technique performed but that pain is only momentary.
Appendix III: Vitamins, Supplements and Botanicals

Little has been published regarding the vitamin and botanical treatment of sinusitis specifically. Although Bromelain is the best documented supplement for sinusitis, there is both insufficient evidence and consensus to support or refute the following options (each of which are found in the literature or actual practice).

**BROMELAIN**

**Dose:** Controlled research supports the use of bromelain for the treatment of sinusitis. Therapeutic doses based on this research are difficult to discern because pharmaceutical units used to describe these doses are no longer in use and equivalencies in modern units are unknown. Nonetheless, current clinical authorities suggest at least 2000 MCU of bromelain per day up to as much as 9000 MCU per day.42,43

Bromelain potency is measured in enzyme units, typically MCU (milk-clotting units) or GDU (gelatin digesting units). One GDU is equivalent to 1.5 MCU. Product labels indicate enzyme activity per gram of bromelain concentrate and total weight of concentrate per tablet. These numbers must be multiplied together to arrive at total enzyme activity per tablet. For example, a product containing 200 mg tablets of 1800 MCU/gram bromelain provides 360 MCU per tablet.

**Contraindication/Adverse reactions:** Occasional gastric disturbances or diarrhea. Potential allergic reactions.

**Efficacy:** Several studies have suggested that bromelain may have a beneficial effect on sinusitis.

In one double-blind study comparing the use of bromelain with placebo, 87% of those patients who took bromelain reported good to excellent results compared with 68% of the placebo group.44 Two other double-blind studies also reported a reduction in sinusitis symptoms.45,46

**URTICA DIOCIA (STinging NEttle)**

**Dose:** For treatment of allergic rhinitis, a freeze-dried preparation of 300 mg b.i.d. or t.i.d. for a one week trial has been recommended.31 If effective, use as needed to alleviate allergic rhinitis component of sinusitis.

**Contraindication/Adverse Reaction:** None known.

**Efficacy:** Stinging Nettle has historically been used to alleviate symptoms of allergic rhinitis. To date only one small double-blind study has been done to substantiate this claim. It reported “moderate effectiveness” in controlling symptoms.47
**PANTOTHENIC ACID**

In a small preliminary trial, supplementation with 250 mg of pantothenic acid two times a day was demonstrated to help most patients suffering from allergic rhinitis, a significant predisposing factor for sinusitis.\(^{48}\)

**VITAMIN C**

The rationale for oral supplementation is speculative. Histamine is associated with increased nasal and sinus congestion. In one study, vitamin C supplementation (1,000 mg three times per day) reduced histamine levels in people with either high histamine levels or low blood levels of vitamin C.\(^{49}\) Although preliminary evidence supports the use of vitamin C when injected into the sinuses of people suffering with acute sinusitis, the effect of oral vitamin C on symptoms of sinusitis has yet to be formally studied.\(^{50}\)

**ECHINACEA AUGUSTIFOLIA AND ECHINACEA PURPUREA (PURPLE CONEFLOWER)**

The role of Echinacea in treating *sinusitis* has not been studied. There is evidence suggesting that it is useful in treating the symptoms of rhinitis\(^{51-54}\) although it appears to have little to no effect in preventing upper respiratory infections.\(^{55,56}\)

**Dose:** For immune stimulation, the dose is generally given t.i.d. in any of the following forms:

- Dried root (or as tea): 0.5 to 1 g
- Freeze-dried plant: 325 to 650 mg
- Juice of aerial portion of E. purpurea in 22% ethanol: 1 to 2 ml
- Tincture (1:5): 2 to 4 ml (1 to 2 tsp)
- Fluid extract (1:1): 1 to 2 ml (0.5 to 1 tsp)
- Solid (dry powdered) extract (6.5:1 or 3.5% echinacoside): 100 to 250 mg

**Contraindications/Adverse Reactions:**

Echinacea should not be used in patients with autoimmune disease. Otherwise, Echinacea is reported as an extremely safe herb with no reports of toxicity.\(^{31}\)

**Rationale:** Echinacea has historically been used to support and promote the natural powers of resistance of the body, especially in infectious conditions in the nose and throat.\(^{57}\) Numerous studies have shown that Echinacea has profound immunostimulatory effects resulting in enhanced T-cell mitogenesis, macrophage phagocytosis, antibody binding, and natural killer cell activity, as well as increased levels of circulatory neutrophils.\(^{31}\)

**N-ACETYLCYSTEINE (NAC)**

Several members of the CSPE Committee report that NAC (600 mg twice daily) shortens the
duration of a given episode of sinusitis. While there have been no studies testing the effect of NAC on patients with sinusitis, several studies have looked at NAC as a treatment for other respiratory illnesses. NAC has historically been used as a mucolytic agent in a variety of respiratory illnesses; however, clinical results are equivocal.\textsuperscript{58} Parr et al. gave either NAC or placebo to 526 patients suffering from chronic bronchitis for a six-month period. No statistically significant difference was found between the two groups in the number of acute exacerbations, but patients taking NAC showed a significant reduction in the number of days they were incapacitated.\textsuperscript{59}

NAC appears to reduce symptomatology associated with influenza and influenza-like episodes. A total of 262 subjects were given either placebo or NAC (600mg) orally twice daily for six months. Although frequency of seroconversion towards A/HINI Singapore 6/86 influenza virus was similar in the two groups, NAC treatment decreased both the frequency and severity of influenza-like episodes, and the length of time confined to bed.\textsuperscript{60}

**PREPARED FORMULAS**

Members of the CSPE committee who employ botanicals-supplements in treating upper respiratory infections or sinusitis often use prepared formulas. These formulas contain various combinations of the following substances.

- Bromelain
- *Echinacea augustifolia* and *purpurea* (purple coneflower)
- Vitamin C
Appendix IV: Acupressure Points for Sinusitis

Points are located bilaterally on the face and hands.

- **GB 14**: Approx. 1" above midpoint of eyebrow
- **UB 2**: In the depression proximal to the medial end of the eyebrow, directly above the inner canthus
- **ST 2**: In the depression at the infraorbital foramen
- **LI 20**: Between the naso labial groove and the midpoint of the outer border of the nasal ala

**LI 4**
References

38. Stoloff S, Prenner B. The Diagnosis and Treatment of Sinusitis. The American Academy of Family Physicians, CME Production Department; 1996.