

# Silent sinus syndrome

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## ABSTRACT

Silent sinus syndrome is a rare clinical condition. In this report, we are presenting a 40-year-old male with chief complain of orbital asymmetry. Visual acuity was 6/6 and was normal. In magnetic resonance imaging (MRI) of paranasal sinuses, right maxillary sinus volume was decreased but he had no sinonasal or visual symptoms.

**Keywords:** Enophthalmos, maxillary sinus, silent sinus syndrome

## Introduction

Silent sinus syndrome (SSS) is a rare condition that can pose a diagnostic challenge.<sup>[1]</sup> The patient may present with unilateral ptosis or retraction, a deep superior sulcus or orbital asymmetry. The medical history is often non-contributory. This condition is characterized by unilateral spontaneous enophthalmos and hypoglobus due to increased orbital volume and retraction of the orbital floor.<sup>[2]</sup> This occurs because of atelectasis of the ipsilateral maxillary sinus and when the condition is left untreated, may result in complete obliteration of the sinus with worsening enophthalmos and hypoglobus.<sup>[1,2]</sup>

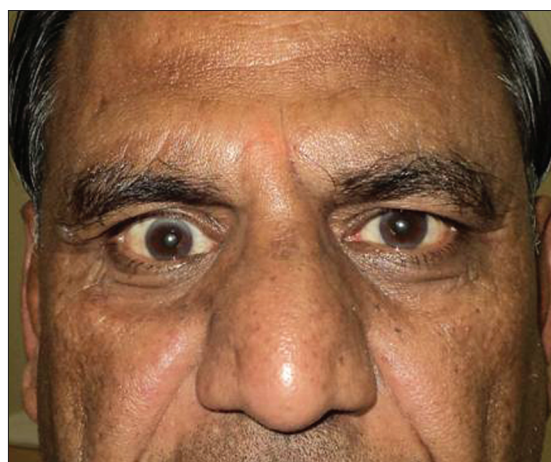
The first two cases were reported in 1964, but the term "SSS" was coined 30 years later by Soparkar *et al.*<sup>[3]</sup> Since that time, several case series have been published in both the ophthalmology and otolaryngology literature.

To our knowledge, a number of these case reports in radiology literature are less and many radiologists remain unfamiliar with the syndrome and its characteristic radiological findings. In this article, we discuss the presentation, diagnosis, pathogenesis, and treatment of SSS.

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## Case Report

We present a case of 40-year-old male who came with complaints of orbital asymmetry since 3 months [Figure 1]. In the ophthalmic exam, nothing was found except moderate enophthalmos of the right globe (Hertel exophthalmometer: right, 10 mm and left, 13 mm). Movements of the globe, visual acuity, slit lamp exam, and fundoscopy were all normal. The patient also had no recent history of sinusitis. Routine laboratory investigations were normal.



**Figure 1:** Clinical photo of the patient's frontal view showing typical facial asymmetry seen in silent sinus syndrome. Right globe is displaced downward (hypoglobus) with associated upper lid retraction and deepening of upper lid sulcus

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MRI of the patient was carried out for further evaluation and to rule out underlying mass lesion. The T1- and T2-weighted images [Figures 2-4] showed downward displacement of the right orbital floor with resulting increase in orbital volume. Right maxillary sinus was seen to be reduced in volume. However, it was completely opacified. There was also noted inward retraction of posterior and medial walls of maxillary sinus which was causing reduction in its volume [Figure 5]. So in view of clinical and imaging findings, diagnosis of SSS was given. Computed tomography (CT) was not performed as MRI was sufficient as a diagnostic tool. Patient did not have any other complaints other than orbital asymmetry, so he refused to undergo functional endoscopic sinus surgery (FESS) or other therapeutic procedures.

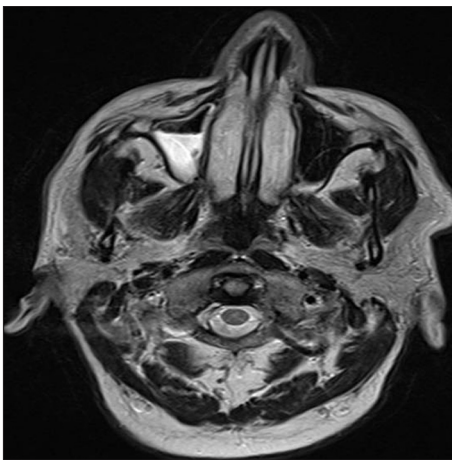
## Discussion

The term SSS was first described in 1994 by Soparkar *et al.*<sup>[3]</sup> He used it to describe painless enophthalmos associated with

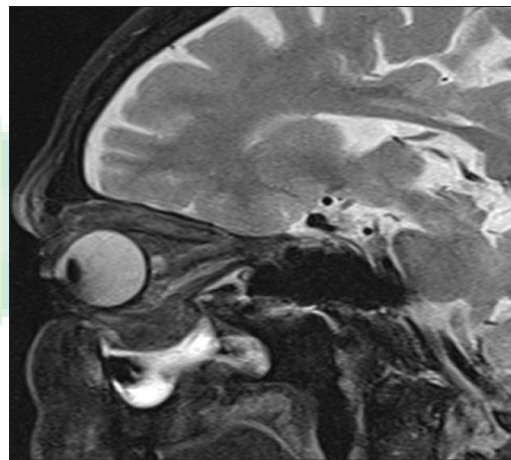
chronic maxillary sinus atelectasis. In 1964, Montgomery<sup>[4]</sup> also discussed similar clinical features.

Usual presenting symptoms include spontaneous, progressive, unilateral enophthalmos (posterior displacement of the eyeball).<sup>[5]</sup> The patient presents to the ophthalmologist complaining about orbital asymmetry. Occasional complaints of nose and sinuses symptoms can also be present.<sup>[6]</sup> CT/MRI scan of the orbit and sinuses is diagnostic in most of the cases.

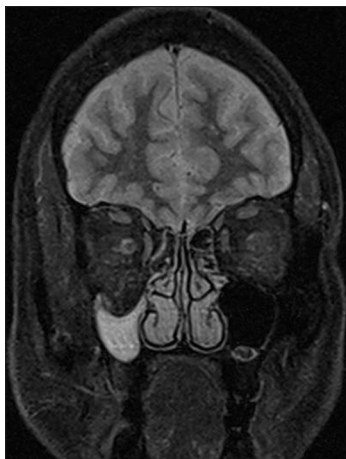
Before the management or imaging of SSS, one requires an understanding of the underlying pathophysiology. The most widely accepted theory is that an inciting event causes occlusion of the ostiomeatal complex through which the maxillary sinus drains into the middle meatus of the nasal antrum. This occlusion results in an accumulation of secretions that eventually are resorbed, causing a vacuum effect. The chronic sub-atmospheric pressure and hypoventilation of the sinus result in negative pressure, leading the sinus walls to



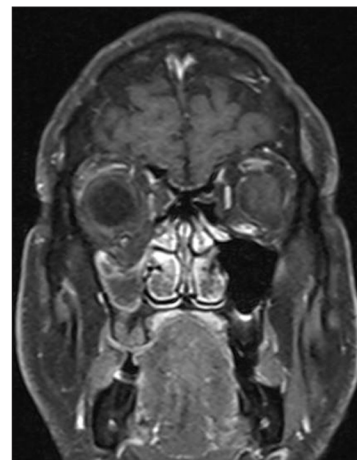
**Figure 2:** Axial T2-weighted images MRI image showing fluid level in right maxillary sinus with reduction in its volume



**Figure 3:** Sagittal T2-weighted images MRI image shows reduction in volume of right maxillary sinus with inward retraction of its walls



**Figure 4:** Coronal fluid attenuated inversion recovery (FLAIR) image showing reduction in volume of right maxillary sinus with inward retraction of its walls



**Figure 5:** T1-weighted fat-saturated post-contrast MR image obtained in coronal plane displays inward retraction of posterior and medial walls of right maxillary sinus. There is also downward retraction of orbital floor into sinus lumen

migrate inward.<sup>[4]</sup> In addition to the orbital floor being pulled downward, there may be bone remodeling and thinning due to increased osteoclast activity. Typically, the periosteum is not affected.<sup>[7-9]</sup>

Along with this, Vander Meer *et al.*<sup>[5]</sup> suggested some other possible etiological factors such as lateralized/hypermobility medial infundibular wall or lateralized middle turbinate, antral or ostium occlusion by a mucocele or nasal polyp, hypoplastic maxillary sinus which presents a narrow ostium with tendency of occlusion and narrow maxillary ostium due to the presence of infraorbital ethmoid Haller cells.

For imaging of the SSS, CT scan or MRI can be used. MRI imaging findings are typical which are fully formed, fully opacified maxillary sinus with reduction volume and inward bowing of all four walls. It is seen as inferior bowing of the roof (orbital floor), lateral bowing of the medial wall, posterior bowing of the anterior wall, and anteromedial bowing of the posterolateral wall. There are superior and lateral displacements of the uncinate process. The adjacent middle meatus is correspondingly enlarged with varying degrees of lateral retraction of the middle turbinate. On MRI, additional findings can also be seen like thickening and enhancement of the mucosa with variable intensity secretions.<sup>[9,10-12]</sup>

Plain radiographs are not useful in diagnosis. CT scan is performed as a volumetric acquisition with three-plane orthogonal reformats, which is able to demonstrate changes in the sinus and the adjacent structures. CT findings are also same as MRI.<sup>[10]</sup>

Treatment of SSS is FESS with an approach performing uncinectomy and enlargement of the maxillary ostium. It causes improvement in maxillary sinus aerations and also to a degree of enophthalmos.<sup>[1,13]</sup> Orbital floor reconstruction can be done concurrently. Orbital floor reconstruction alone is not adequate and will not prevent recurrent enophthalmos in SSS.<sup>[14]</sup> In recent study, non-surgical management such as use of hyaluronic acid gel can cause reduction in degree of enophthalmos.<sup>[15]</sup>

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