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The relevance of imaging diagnosis in nasal myiasis mimicking a toothache

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ABSTRACT

Nasal myiasis is an infestation by dipterous larvae within the nasal cavity, where they feed on both living tissue and fluid. This condition predominantly occurs in rural areas of tropical countries, where inadequate sanitation and a hot, humid climate create an ideal environment for larvae development. A 57-year-old, otherwise healthy male rural worker presented with a toothache in the region of the maxillary incisors. Imaging studies identified a punctiform radiopaque/hyperdense area near the nasal septum in the left nasal fossa. The larva was surgically excised and sent for histopathological analysis. Histologic sections confirmed the clinical diagnosis, and the patient remained asymptomatic after a 2-month follow-up. Nasal myiasis can mimic the symptoms of a toothache in the anterior region of the maxilla. This condition can affect even immunocompetent patients, and complementary imaging studies may be decisive in diagnosing it. ***(Imaging Sci Dent 2025; 55: 90-5)***

KEY WORDS: Myiasis; Nasal Cavity; Radiography, Panoramic; Cone-Beam Computed Tomography; Toothache

Myiasis, a noun derived from Greek (*mya*, or fly), refers to the infestation of live vertebrates (humans and/or animals) with dipterous larvae,[1-3] and it is classified as either primary or secondary. Primary myiasis occurs when larvae that feed on living tissue (biophagous) infest the host; this condition is commonly found in cattle but rare in humans. It is caused by *Cochliomyia hominivorax* (the "*varejeira*" fly), which lays 20-400 eggs on exposed wounds, with larvae hatching within 24 hours. Secondary myiasis is caused by flies that feed on dead tissue (necrobiophagous), and it is the most common type found in patients with lesions containing necrotic cavities.[4]

The prevalence of myiasis is influenced by latitude and the lifecycle of various fly species. Incidence rates are higher in the tropical and subtropical regions of Africa and the Americas, where flies thrive in warm, humid environments. Consequently, myiasis is typically confined to the summer months in temperate zones, whereas it occurs year-round in tropical areas.[5] With increased travel to exotic destinations, physicians are encountering this condition more frequently.[6] Nasal myiasis predominantly affects individuals over the age of 50 and occurs with equal frequency in both sexes.[7] Oral and maxillofacial myiasis generally impacts people with comorbidities in underdeveloped and developing countries, highlighting the social determinants of this disease.[8] Antunes et al.[4] and Hassona et al.[9] reported a higher prevalence of this condition in regions with tropical and subtropical climates, with India and Brazil being the most affected countries.

The sites most commonly affected by myiasis in the head and neck region are the ears, eyes, oral cavity, nose, paranasal sinuses, lymph nodes, mastoid region, and tracheostomy wounds.[10,11] Predisposing factors include advanced age, low socioeconomic status, and medical comorbidities, such as a history of craniomaxillofacial trauma and malig-

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nant tumors.[10]

Nasal myiasis occurs when flies deposit eggs either directly in the nasal cavity or nearby while the patient is asleep.[3] The larvae that hatch can proliferate in the nasal cavities and paranasal sinuses, feeding on secretions from lesions and destroying the mucous membrane, cartilage, and bone. If not addressed, the larvae may eventually invade the meninges and skull, potentially leading to death.[7] Certain conditions can increase the risk of nasal myiasis. These include atrophic rhinitis, which diminishes the sneezing reflex and enlarges the nasal cavity; leprosy, characterized by a lack of sneezing reflex, painless ulceration, and difficulty in nasal cleaning due to hand deformities; and other diseases like tuberculosis and rhinoscleroma.[3] The nasal cavity is generally more susceptible than the ear to such infestations due to its easier accessibility, larger space, and less sensitive mucosa.[12]

The presence of nasal myiasis reduces sensation, enlarges the nasal cavity, and leads to the production of foul-smelling crusts and thick, purulent discharge. Clinically, this condition may present with an edematous, ulcerated mucous membrane filled with necrotic material and crawling maggots, causing severe discomfort to the patient. Additionally, the maggots can cause bone destruction and subsequent infection, leading to osteomyelitis. This may further result in extensive damage to the face and eyes.[13] Therefore, diagnosis and immediate treatment are necessary to interrupt the progression of the disease and to prevent more devastating sequelae.[10,14]

Complementary diagnostic methods include nasal endoscopy, which reveals maggots crawling inside the nasal cavity, along with changes in the mucous membrane, secretions, and necrotic tissue. Additionally, imaging techniques such as CT scans of the nose and sinuses are valuable for determining the extent of the infestation and assessing whether the maggots have spread beyond the nasosinal area.[7]

The primary treatment for myiasis involves the physical removal of maggots using appropriate instruments and a thorough inspection of deeper tissues. Certain medicinal agents can also encourage maggots to emerge, including topical applications of turpentine oil, mineral oil, chloroform, larvicidal drugs, ether, ethyl chloride, mercuric chloride, creosote, saline, phenol, calomel, olive oil, or iodoform.[2,14] Currently, there is no consensus on the treatment of nasal myiasis, with only a few cases reported in the literature. Endoscopes are beneficial for extracting larvae.[15] More recently, the most common medical approach has involved the use of ivermectin or other anthelmintics, combined with endoscopic removal and saline irrigation. This method is equally effective and associated with fewer side effects.[14]

The purpose of this case report is to describe an unusual instance of nasal myiasis that presented with symptoms resembling a toothache in the anterior region of the maxilla in an immunocompetent patient. It emphasizes the significance of supplementary imaging tests in confirming the diagnosis.

Case Report

All procedures reported herein comply with the ethical standards of the institutional and/or national research committee involved, as well as the 1964 Helsinki Declaration and its subsequent amendments or comparable ethical standards. The patient provided free and informed consent.

A 57-year-old otherwise healthy male rural worker presented at the authors' facility complaining of a toothache in the anterior region of the maxilla. He reported that he had previously sought care at a medical emergency service, where a dentist evaluated him. The dentist was unable to identify any odontogenic origin for the pain, leading to a referral to the authors' service. During the physical examination, no significant extraoral manifestations were observed. Intraorally, the oral mucosa appeared intact, and no obvious dental abnormalities that could explain the toothache were detected. Consequently, a comprehensive radiographic examination was performed to explore both odontogenic and non-odontogenic sources of the pain. Additionally, the blood test revealed no abnormalities.

A panoramic radiograph indicated potential odontogenic sources for the pain in the region of the maxillary incisors. These included an extensively restored maxillary right lateral incisor with moderate horizontal bone loss and periapical radiolucency; a maxillary right central incisor with endodontic treatment, crown restoration, and moderate bone loss; a maxillary left central incisor prepared for a total prosthetic crown with moderate bone loss; and a maxillary left lateral incisor with crown destruction and inadequate endodontic treatment, accompanied by partially defined periapical radiolucency. However, the presence of multiple punctiform radiopaque images near the nasal septum in the left nasal fossa suggested a foreign body, prompting further investigation into a potential non-odontogenic cause of the pain (Fig. 1).

To accurately determine the location of the suspected foreign body, the patient was referred for cone-beam comput-

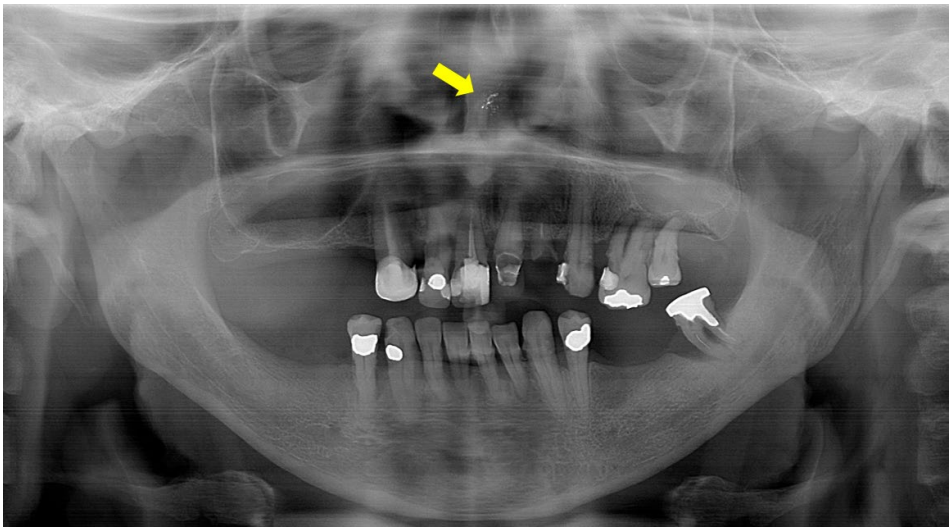

Fig. 1. Panoramic radiograph shows multiple punctiform radiopaque images over the left nasal fossa near the nasal septum.

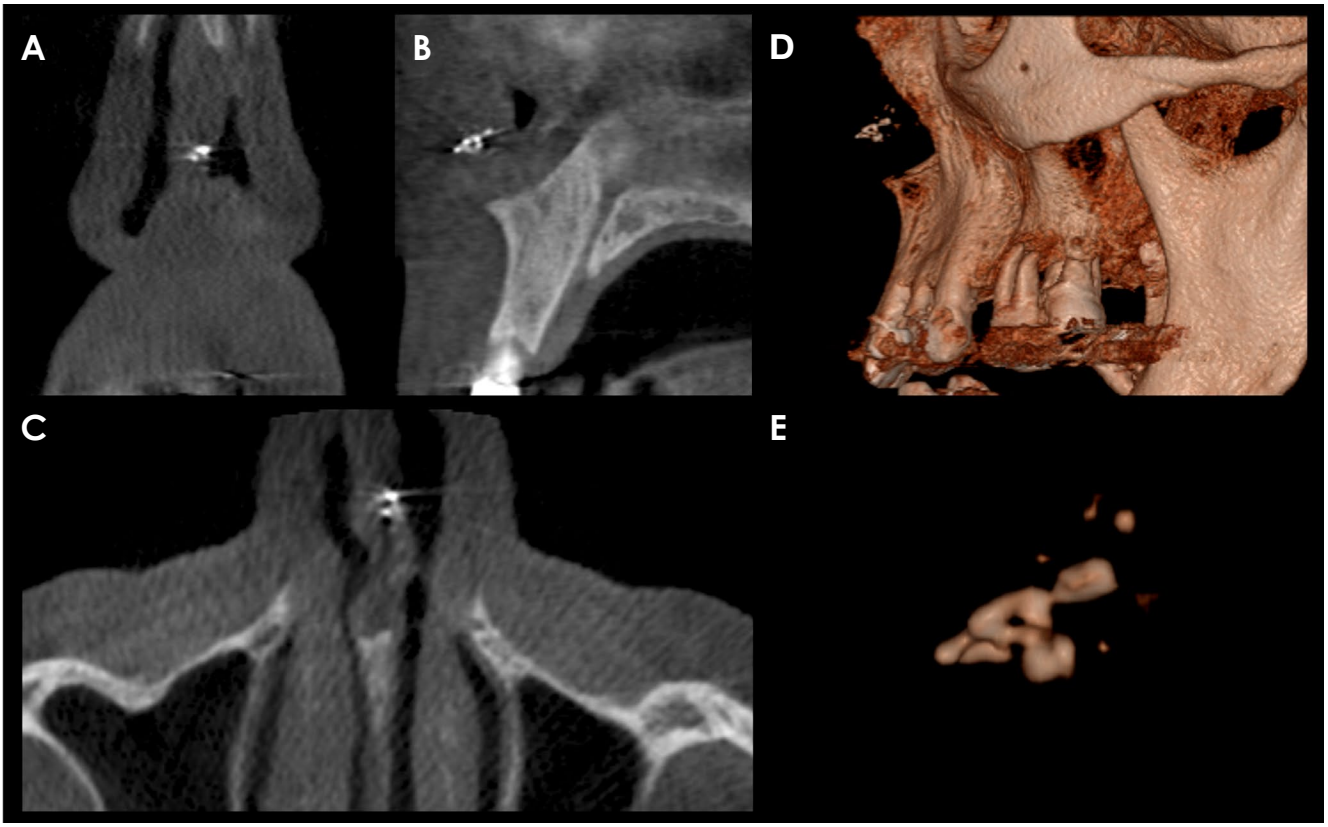

Fig. 2. Cone-beam computed tomographic images of the case, display the tomographic aspect and location of multiple punctiform hyperdense images near the nasal septum, slightly shifted to the left nasal cavity in coronal (A), sagittal (B), and axial (C) views, as well as in lateral (D) and larva (E) views of the 3D reconstruction.

ed tomography (CBCT) scanning. The tomographic findings, observed in axial, coronal, and sagittal slices, were consistent with the radiographic findings, displaying multiple punctiform hyperdense images with a metal-like density, measuring approximately 11 × 5 mm. The tomographic assessment confirmed that the foreign body was confined to the nasal septum, located superior to the anterior nasal spine and slightly shifted to the left nasal fossa (Fig. 2). The examination of the nasal cavity and maxillary sinuses revealed a normal tomographic appearance. The imaging

features from both the radiographic and tomographic examinations suggested the presence of a foreign body in the left nasal fossa. Consequently, an inspection of the nasal cavity was conducted, revealing a moving larva on the mucosal surface (Fig. 3). Thus, nasal myiasis was considered as a diagnostic hypothesis.

Local surgical excision of the larva was performed under local anesthesia, and the specimen was submitted for histopathological analysis. Macroscopic analysis (Fig. 4A) and histologic sections (Fig. 4B) revealed the typical morphological pattern of a *Dermatobia hominis* larva.[16] The regions marked with asterisks in Fig. 4 show the larva's intestine, which likely accounts for the radiopaque/hyperdense images observed in the imaging exams, along with the spines encircling the thorax and cephalic region.[17] After a follow-up period of 2 months, the patient remained asymptomatic with no evidence of recurrence. A new panoramic radiograph was acquired, showing no radiopaque images in the nasal region (Fig. 5).

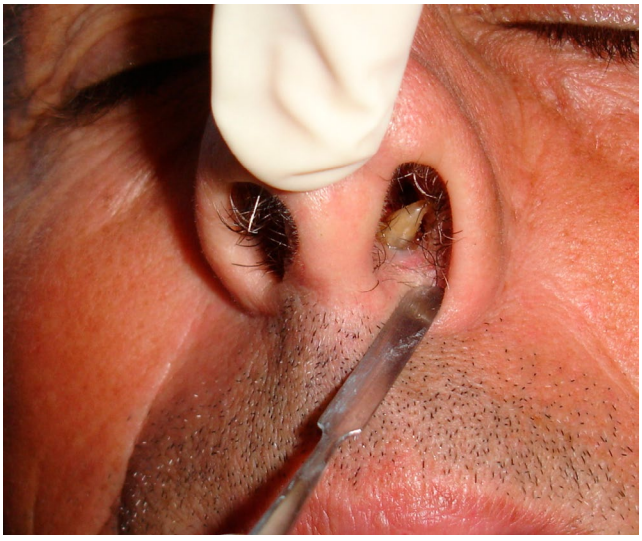

Fig. 3. A nasal cavity inspection reveals a larva at the mucosal surface.

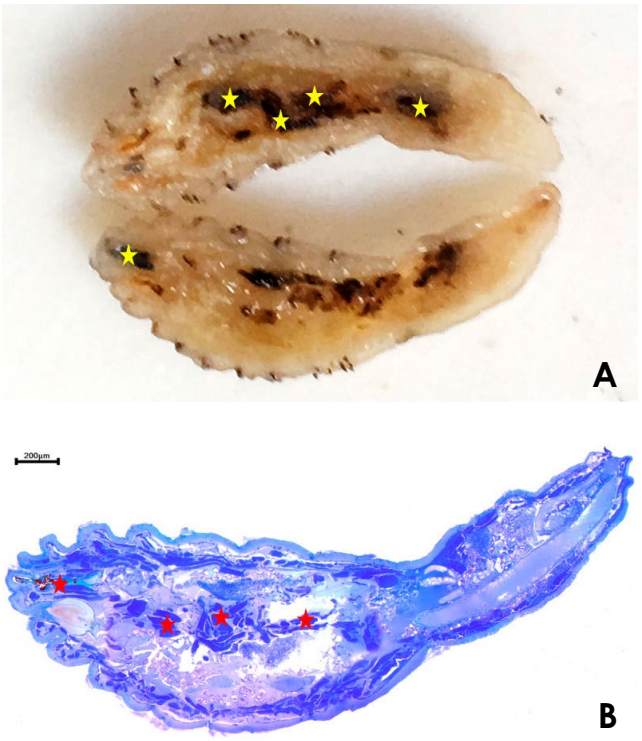

Fig. 4. Macroscopic (A) and microscopic (B) images reveal distinct features of the larva. At the thinner, posterior end, the respiratory spiracles are visible, while the more rounded, anterior end displays the mouthparts that embed into the tissue. Additionally, several rows of backward-facing spines along the larva's body are evident, which hinder its escape. The areas marked with asterisks in Figure 4 indicate the larva's intestine, which is likely responsible for the radiopaque/hyperdense images observed in imaging exams.

Fig. 5. Follow-up panoramic radiograph 2 months after the surgical removal of the larva, shows no radiopaque areas.

Discussion

Many clinicians are unaware of live maggot infestation in the orofacial region, a distressing condition typically affecting individuals who are debilitated, mentally challenged, or physically unable to care for themselves due to impaired psychomotor coordination.[2] Preventive measures include controlling the fly population through basic sanitation, eradicating breeding sites for adult flies, using ultraviolet light to attract and electrocute flies, and applying boric acid for domestic pest elimination. The social nature of this disease underscores the need for a collaborative effort involving local communities, state authorities, and the healthcare network, as systemic issues should not be overlooked.[8-10]

Diagnosing nasal myiasis is straightforward once maggots are discovered in the nasal cavity or nasopharynx. The presence and activity of these larvae typically cause symptoms such as nasal and/or facial pain, bloody or mucopurulent nasal discharge, epistaxis, a foul odor, and anosmia. The bacteria carried on the surface of the maggots can also lead to infections in the nasal cavity and nasopharynx. Given the proximity of the nasal cavity to the sinuses, eyeballs, meninges, and skull, migration and invasion of maggots into these areas can result in purulent meningitis and potentially fatal outcomes.

To the authors' knowledge, this is the first reported case of nasal myiasis mimicking toothache in the anterior region of the maxilla in a healthy immunocompetent patient. The initial clue leading to the diagnosis was provided by panoramic radiography and CBCT, highlighting the critical role of imaging exams in diagnostic processes. Although the patient reported symptoms suggestive of odontogenic pain, the imaging studies indicated a potential non-odontogenic source. A previous study emphasized the importance of nasal and sinus CT scans in determining the extent of the infestation but did not detail the imaging characteristics of such a condition.[7] To the best of the authors' knowledge, no prior study has described the radiographic appearance of nasal myiasis, which presents as multiple punctiform radiopaque/hyperdense images. Differential diagnosis should consider the possibility of a foreign body. This appearance might be attributed to the larva's intestines or spines wrapped around the thorax and cephalic region.

The present case report is unique compared to previous cases of myiasis reported in the literature, which described patients with systemic involvement.[7,11,14,18] In contrast, the patient in this report was immunocompetent and had only a single maggot. Previous studies have described various systemic symptoms associated with myiasis, including blindness, hearing loss, salivary gland involvement, development of an oroantral communication, and significant bone and soft tissue loss.[10,19]

The lack of a standardized protocol for myiasis treatment often leads to the use of empirical therapies. However, the preferred treatment involves the mechanical removal of larvae and surgical debridement, supplemented by oral ivermectin.[11] Additionally, it is important to monitor for larvae that may be hidden in deeper tissues.[2]

In conclusion, nasal myiasis can present with symptoms that mimic a toothache in the anterior region of the maxilla. This condition can also affect immunocompetent patients, and complementary imaging examinations may be crucial for diagnosis. In this instance, the radiographic appearance of the larva is characterized by multiple punctiform radiopaque/hyperdense images.

Conflicts of Interest: None

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