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## Oral Myiasis- A review.

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### Abstract

Myiasis is the infestation of tissues, organs of living vertebrate, animals and humans by certain dipterans fly larvae which feed on the host's tissues and body fluids, often causing extensive damage to the host tissues if left untreated. Oral Myiasis is a rare pathology and is associated with poor oral hygiene, alcoholism, senility, suppurating lesions, severe halitosis. It arises from invasion of body tissues or cavities of living animals by maggots or larvae of certain species of flies. It occurs in tropical areas with poor living conditions and insufficient public and personal hygiene. Mouth-breathing during sleep, alcoholism, mental handicap, cerebral palsy and hemiplegia may facilitate the development of myiasis. The commonest clinical manifestations of myiasis infestation include inflammatory and allergic reactions. Ear, eye and respiratory tract infestations are also frequently encountered. Human myiasis may affect the skin, bones, intestines and body cavities. Treatment consists of manual removal of maggots, broad spectrum antibiotics and oral therapy with Ivermectin.

**Key words:** Myiasis, larvae, treatment.

**Introduction**

The term myiasis is derived from Latin word ‘myia’ which means fly and ‘iasis’ means disease. It is defined as the infestation of live human and vertebrate animals by dipterous larva, which at least for certain period feed on host’s dead or living tissue, liquid body substances or ingested food (1). Oral myiasis was coined by Hope in 1840 (2) and was first described by Laurence in 1909 (3).

Myiasis is a worldwide phenomenon the prevalence of which is related to latitude and the lifecycle of various species of flies (4). The majority of the species are oviparous, but a few are viviparous. Oral myiasis is very rare in healthy persons (5).

Incidence of oral myiasis is less than that of cutaneous myiasis as oral tissues are not permanently exposed to the external environment. Flies causing myiasis belong to the order Diptera. *Chrysomya bezziana*, the old world screw worm fly belongs to genera Calliphoridae. It is an obligatory myiasis producer whose larvae develop in living tissue. The species was first found in animal wounds in Hong Kong in the year 2000. The first case in human was documented in 2003 in Hong Kong (6).

It frequently occurs in rural areas infecting livestock and pets such as dogs and cats (1). In humans, myiasis prevails in unhealthy individuals frequently found in third world countries. It is extremely rare in Europe and in the Northern hemisphere but not an uncommon parasitic infestation in the tropics and subtropics (1). The tropical climate of Brazil that favours the growth of larvae and flies (7).

In 2008, an urban epidemic of human myiasis was reported in French Guiana due to exceptional weather conditions. A high rainfall may have facilitated the maturation of pupae (8). Rise in global trade, immigration and global warming will also increase the likelihood of myiasis causing flies spreading to native areas or areas where they have been eradicated in the past. Early diagnosis and treatment are vital in preventing establishment of myiasis causing flies in these areas. Physicians could play an important role in active surveillance (9).

**Classification**

Clinically, myiasis can be classified as primary and secondary. They are based upon the degree of host dependence, mode of infestation and anatomic sites. (Table 1)

**Etiology**

Myiasis occurs in the patients with poor oral hygiene, ill fitting, uncleaned prosthesis, advanced periodontal disease, at tooth extraction sites, thumb sucking habits, seizures and incompetent lips (13). Alcoholism, senility, mental retardation, hemiplegia and mouth breathing during sleep may facilitate the development of oral myiasis (5).

Classification Criteria	Subtypes
I) Based on Substrate(10):	i) Primary Myiasis: caused by biophagous larvae which feed on living tissue. ii) Secondary Myiasis: caused by the necrobiophagous flies which feed on dead tissue.
II) Based on degree of the host dependence(11):	i) Obligatory Myiasis: are those where fly larvae are completely parasitic and depend upon the host for completion of their life cycle. ii) Facultative Myiasis: are those where the fly larvae are free living and only circumstantially adapt themselves to parasitic dependence to a host.
III) According to the mode of infestation(12):	i) Accidental Myiasis: larvae ingested accidentally with food produce infection. ii) Semi specific Myiasis: the larvae are laid on necrotic wound. iii) Obligatory Myiasis: larvae affect undamaged skin.
IV) Depending upon the anatomic sites(12):	i) Cutaneous Myiasis ii) Myiasis Of External Orifices includes oral, nasal, ocular, aural, anal, genital regions. iii) Myiasis Of Internal Organs includes intestinal, urinary region.

*Table 1. Classification*

Human myiasis is a rare condition that can occur in any part of globe but is more common in regions with warm and humid climate. Diabetes and peripheral vascular diseases can be predisposing factors for myiasis (7).

**Sites**

The most common sites for myiasis are the nose, eye, lung, ear, anus, vagina and more rarely the mouth (14). It is rarely found in the eyes, nose, paranasal sinuses, urogenital tract or rectum. Oral myiasis affects mainly the anterior mouth. The gingiva is a rare location for the disease (5).

**Clinical Presentation**

The clinical manifestations of myiasis infestation include inflammatory and allergic reactions. Ear, eye and respiratory tract infestations are also frequently encountered and the human botfly *Dermatobia hominis* is the most recognized causative organism. Human infestation by *Dermatobia hominis* is not usually asymptomatic. Failure to completely remove the maggot can lead to foreign body reactions. The acute phase is typically associated with a cellulitic response to secondary bacterial infection by *Staphylococcus aureus* (8). Complications of myiasis include cellulitis, abscess formation, osteomyelitis and tetanus (9). Myiasis of oral cavity usually caused by flies of the order Diptera. They normally develop in decaying tissues. Necrotic tissue present in exposed wounds are the favoured sites. Blood and body

fluids may also attract the common flies (12).

The flies lay over 500 eggs at a time directly over the diseased tissue. The eggs hatch in less than 1 week and the life cycle is completed in about 2 weeks. The larvae obtain their nutrition from the surrounding tissues and burrow deeper into the soft tissues by making tunnels, separating the gingival and mucoperiosteum from the bone (15).

Myiasis may be caused in human hosts by several species of exotic flies. Common exotic species of flies isolated from patients with a travel history include Tumbu fly, Lund's fly, human botfly. The Tumbu fly is the common blowfly of tropical Africa, south of the Sahara Desert. The Lund's fly is a blowfly rarely involved in human myiasis. It is found in rainforest areas of tropical Africa from Senegal to Central Africa and south to Angola and Zimbabwe (9).

The females *Cordylobia* species deposit their eggs on the surface of sandy soil and occasionally on clothing that has been tainted with traces of faeces, urine or soaked with perspiration. After hatching, the larvae can stay alive for 7-20 days in the soil or while attached to contaminated articles. On contact with the human skin or skin of other vertebrates they easily penetrate (9).

*Musca Nebulo* is the commonest Indian housefly. They are seen in abundance in human dwellings and are very active during summer and rainy season (1). Human myiasis may affect the skin, bones, intestines and body cavities. Infestation is most often subcutaneous and produces a boil-like lesion which would initially present as a pruritic papule of approximately 2-3 mm in diameter (9).

Wound myiasis also referred as traumatic or opportunistic myiasis occurs when flies deposit eggs in decomposing flesh or in a suppurating wound. Creeping/migratory myiasis may be caused by *Hypoderma bovis* and *Hypoderma lineatum* generally in persons coming in close contact with cattle. Accidental myiasis is usually caused by ingesting food contaminated with fly larvae. Patients may present with vomiting, diarrhoea, abdominal pain and anal pruritus (9).

According to Hadani et al. in 1971(16) myiasis has previously been reported in Israel from domestic animals particularly sheep and goats while reports from dogs, cats, camels and horses are rare or non-existent. In 2006, Diakakis et al (17) suggested that traumatic myiasis caused by *W. magnifica* has been reported in horses (18).

## Treatment

Various species of flies determine the different behavioral patterns of prevention. Prevention of human myiasis involves control of fly population and general cleanliness such as reducing decomposition odors, cleaning and covering wounds (7).

For the treatment of myiasis medication can be used

topically and orally. In 1998, Duque et al.(19) treated oral myiasis with subcutaneous Ivermectin (10). Ivermectin is a semi-synthetic macrolide antibiotic, isolated from *Streptomyces avermitilis*. It is safe for human use and has been indicated for the treatment of filaria, scabies and strongyloidosis in humans (10). Open wounds should always be covered and dressings should be changed daily (11). In the case of tumbu fly myiasis, drying clothes in bright sunlight, ironing them, or both will prevent clothes from acting as fomites (11).

Travelers entering into endemic areas like tropical Mexico, South America, Central America and Sub-Saharan Africa should wear tight woven cotton clothing, good quality insect repellents and nets for prevention of myiasis infestation (8).

Field control of flies including mosquitoes via aerial spraying, destruction of animal carcasses, removal of garbage from around living areas, practicing standard field hygiene and sanitation can significantly reduce fly populations (11).

## Conclusion

Myiasis is generally self-limiting and in many cases not dangerous to the host. However complications can arise. As the old saying goes "prevention is better than cure" the disease should be prevented by controlling fly population, maintaining good oral and personal hygiene. Special care needs to be taken in medically compromised dependent patients as they are unable to maintain their basic oral hygiene.

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