

## ORAL CAVITY MYIASIS IN CHILDREN: FIRST DEMONSTRATION IN EGYPT WITH GENERAL REVIEW

By

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### Abstract

Myiasis is a problem of medical veterinary and real economic importance which affects the human welfare worldwide particularly in animal raising countries. Myiasis of man and animals is a real welfare problem of worldwide distribution. The most important insects from medical point of view are the blood suckers or the insect-borne diseases. Still others, almost non-blood suckers, but may attack man and animal to deposit their eggs or larvae causing pathogenic conditions in skin, nose, eye, lung, ear, anus, and vagina but oral manifestation is exceptional.

This study focused on the clinical pictures and pathogenesis of human oral cavity myiasis. Thirteen cases were demonstrated for the first time in Egypt, ten children and the parents of three children. The extracted larvae were *Lucilia sericata* (four cases), *Wohlfahrtia magnifica* (three cases), *Oestrus ovis* (three children and their parents) and *Musca domestica vicina* (one case). The presence of *O. ovis* in three children and their parents recommended zoonotic myiasis. The predisposing factors were mouth breathing, incompetent lips, low socioeconomic condition, malnutrition, and inability of a child to perform daily activities due to the neurodegenerative disease.

**Key words:** Egypt, Children, Myiasis, Oral cavity, dipterous larvae, Treatment.

### Introduction

Myiasis, a term introduced by William Hope in 1840, referred to the invasion of tissues and organs of animals and human wounds and certain body cavities by the dipteran larvae, which manifests as subcutaneous furunculoid or boil-like lesions. Myiasis is the infestation of live human and vertebrate animal with larvae of Diptera flies which feed on the host dead or living tissue and producing clinical illness (Zumpt, 1965). Children are among the

most predisposed to myiasis due to their playing habits particularly in rural areas. Fly larvae may be present on the dead and decaying organic matter and domestic animals like dog and cats which are naturally infested with fly larvae and can be source for infection in children (Bilal *et al*, 2012). Literature Reviewing revealed that most of the cases involved the anterior part of the oral cavity of male patients living in developing or underdeveloped countries and also that predisposing factors

invariably accompanied the infestation. Guimaraes *et al.* (1963) perhaps was the first to use thiabendazole® in treating a hospitalized patient with oral myiasis. Josef (1972) reported myiasis in the oral cavity. Bakker (1977) reported a child with oral myiasis. Terra and de Siqueira (1980) in Portugal reported intra-oral myiasis. Erfan (1980) reported gingival myiasis caused by *Sarco-phaga* sp.

In Egypt, many authors about 65 or more dealt with human and animal myiasis. Hilmy (1954) perhaps was the first to report urinary myiasis. Ghawaby and Morsy (1976) in Ain-Shams University's Hospitals reported human traumatic myiasis caused by *Wohlfahrtia magnifica*. El-Boulaqi *et al.* (1983) reported human aural myiasis. Antonios and Galal (1988) reported intestinal myiasis. Morsy and Farrag (1991) detected ophthalmo-myiasis. Fawzy (1991) found otitis media and aural myiasis. Saleh and El Sibae (1993) reported urino-genital myiasis by *Piophilala casei*. Fekry *et al.* (1993) found *Oestrus ovis* infesting the eyes and the nose of a camel keeper family.

Morsy *et al.* (1999) developed and evaluated an ELISA-Kit hypodermosis for diagnosis of *Przhevalskiana silenus* in goats and *Cephalopenia titillator* in camels. Mazyad and Rifaat (2005) found intestinal myiasis caused by *Megaselia scalaris*. Ahmad *et al.* (2011) reported gastrointestinal myiasis by larvae of *Sarcophaga* sp. and *Oestrus* sp. On the other hand, Hilali and Fahmy (1993) reported trypanosome-like epimastigotes in the *Cephalopina titillator* larvae infesting Egyptian camels infe-

cted with *Trypanosoma evansi* and Haridy *et al.* (2011) reported Egyptian zoonotic *T. evansi*. Tantawi *et al.* (2010) used *Lucilia cuprina* in maggot debridement therapy in Alexandria.

This study aimed at the demonstration for the first time oral myiasis in out and inpatients Egyptian children.

### Subjects, Materials and Methods

Thirteen cases of oral myiasis were demonstrated in a group of patients over six months. They were eleven children and a mother and a father of one patient. The commonest presentations were swelling on the hard palate accompanied by intense pain and a fetid odor. The myiasis producing dipterous larvae caused itching and irritation by their crawling movements and can destroy vital tissues, inducing serious or even life-threatening hemorrhage. Also, in one case intra orally, buccal mucosa and a pocket under the palatal mucosa contained maggots and extra orally indurated erythematous swelling was seen near the commissure of the mouth. The myiasis producing larvae were identified by the posterior spiracles (Morsy *et al.*, 1991).

### Results

The recovered dipterous larvae were *Lucilia sericata* of family Calliphoridae (four cases), *Wohlfahrtia magnifica* of family Sarcophagidae (three cases), *Oestrus ovis* of family Oestridae (three children their father and mother) and *Musca domestica vicina* of family Muscidae (one case).

The poor oral hygiene, lip incompetence, open bite, and residence in a rural area were considered to be predis-

posing factors for larval infestation in these patients. Treatment consisted of manual larval removal and systemic therapy with oral anti-microbial, sometimes systemic antibiotics was indicated in feverish patients. But, sometimes there was a painful complication by manual extraction that mild anesthesia was indicated

### Discussion

Myiasis is common phenomenon in the skin, nose, eye, ear, lung, intestine anus, and vagina but oral manifestation is exceptional. Oral cavity is rarely affected, often associated with very poor dental and oral hygiene, or secondary to medical as facial traumatism or anatomic conditions, as *Cancerum oris*, neglected mandibular fracture, cerebral palsy, mouth breathing, anterior open bite, incompetent lips, and use of mechanical ventilation.

In the present study, eleven children and the father and mother of one child suffered from oral cavity myiasis. The recovered dipterous producers were *Lucilia sericata* or the green fly (four cases), *Wohlfahrtia magnifica* or the flesh fly (three cases), *Oestrus ovis* or the sheep bot fly (three children their father and mother) and *Musca domestica vicina* or the house fly (one case). Of interest was two young 6 & 8-year-old male children with neurological deficit, and a third one 3-year old normal female and their father and mother (farmers) with chief complains of swelling of upper lip and jaw, discomfort with upper front teeth region since 3 days. Children were moderately built

with waddling gait. Oral examination revealed incompetent lips, a solitary, large, diffuse, swelling of size approximately 4×3 in size associated with upper lip with overlying skin tense, and shiny. Swelling was tender to palpation, soft, and edematous- us. There was mutilated labial gingiva in the region of the maxillary incisors with multiple fenestrations. The anterior labial gingiva showed a poorly defined swelling measuring 3×1 cm with detachment and exposure of underlying bone, and deep burrowing, with multiple cavitations. Multiple larvae were noted crawling within the gingival lesion. The surrounding mucosa was inflamed and tender to palpation with neither bleeding nor discharge. The extracted larvae were *O. ovis*. According to the last Egyptian Governmental survey for the myiasis producing larvae 190 species were encountered (Steyskal and El-Bialy, 1967).

Henry (1996) reported myiasis infesting the maxillary hard and soft tissues after a chronic suppurating infection of the dental origin in an Afro-Caribbean man. Asbakk *et al.* (2005) examined sera from 25 reindeer (*Rangifer tarandus tarandus*) for antibody against hyaluronidase C (HyC) using an ELISA, over four months (calves born in 2001) or 27 months (adults and calves born in 1998 & 1999), the latter encompassing three *Hypoderma tarandi* infestation seasons. The calves received antibodies against HyC from their mothers, either by placental transfer or through the ingestion of colostrum. The low level at 3 h postpartum compared to the high level 3 days after birth in one calf sug-

gests that the antibodies are transferred through colostrum. The antibody levels of maternal origin decreased rapidly to low levels by mid-July, which coincides with the onset of the major *Hy-poderma* ovi-positioning season in this region. Calves were not be protected by antibody against HyC when exposed to *H. tarandi* infestation for the first time. Antibody levels increased following infestation to a maximum during November or December, which coincided with the larvae stopped migration under the skin of the host's back. Levels then declined to reach a nadir in next summer. After subsequent re-infestation, increase in levels occurred at least a month earlier than with the first infestation. Levels remained elevated all the year after repeated infestations. This implied that the antibodies persist after the annual exit of mature larvae from the animal, and after larvae have been killed by application of Ivermectin®. Levels in adults declined significantly with age in 4-11 years old animals than in 1-year-old ones and functional capacity of immune system gradually declined with age. The HyC was potentially useful for sero-diagnosis of hypodermosis. Chan *et al.* (2005) in Hong Kong reported nosocomial myiasis in eight nursing home residents with an average age of 81.8 years.

Faber and Hendriks (2006) described a case of human oral myiasis by a first-stage larva of the reindeer warble fly, *H. tarandi* (Diptera: Oestridae) in a 12-year-old girl who was on summer vacation in Norway. She suffered from erythema, swelling and conjunctivitis of right eyelid that subsided spontaneous-

ly after a month but re-occurred with acute swelling of the right corner of the mouth. Later that day living larvae protruded from this swelling.

Droma *et al.* (2007) described a case of oral myiasis within the gingiva of a healthy young man caused by the larvae of *W. magnifica* in which infection might be due to ingestion of infested flesh.

Mohammadzadeh *et al.* (2008) in Iran reported a boy with gingival myiasis caused by *W. magnifica*. De Souza *et al.* (2008) reported infantile cases of oral dipterous myiasis and stated the prevention of human myiasis should involve control of fly populations and general cleanliness, such as reducing decomposition odors and cleaning and covering wounds. They added that health care authorities should keep in mind people living in locations without basic sanitation was more predisposed to myiasis. Sharma and Hedge (2010) treated oral myiasis due to *Chrysomya bezziana* by manual removal of maggots following irrigation and application of turpentine oil along with a single dose Ivermectin® 3mg given systemically. Complete healing of the lesion was occurred within 10 days without recurrence for one year follow up.

Ribeiro *et al.* (2011) reported two cases of oral myiasis, the first was a 9-year-old child with hypotonic cerebral palsy, and the second was a 52-year-old man, alcohol-dependent, both had infestation in the gingival sulcus. Both cases were successfully treated in a process that involved topical application of sulfuric ether, mechanical removal of larvae, and surgical debride-

ment. They concluded that a therapeutic alternative was a must, but still required experience to be implemented, in subjects with neurological disorders. Dutto and Bertero (2011) reported external cutaneous myiasis by larvae of *Sarcophaga* without skin ulcerations or necrosis in a geriatric patient with limited motor and neurological capacity that lived in a nursing home. *Sarcophaga* caused myiasis even in absence of cutaneous infections or significant stasis of fluids or secretions and that the larvae can cause damage in otherwise healthy tissue.

Sharma (2012) treated oral myiasis by manual removal of maggots after using chemical agents. Use of antibiotics reduces the duration of infection and hastens the recovery period. Reddy *et al.* (2012) reported myiasis in a 14 year-old boy with a neglected orofacial trauma in the maxillary dentoalveolar region, with maggots found a deep lacerated wound on the upper vestibule. Kumar and Singh (2012) presented oral myiasis in a mentally challenged patient. Pérez-Giraldo *et al.* (2012) in the Iberian Peninsula reported a hospitalized patient with surgical problems that suffered from nosocomial oral myiasis by larvae of *L. sericata*. Daltoé *et al.* (2012) described two children with severe oral myiasis that evolved to oral and maxilla-facial mutilations. Freitas *et al.* (2012) stated that people living in rural or remote Brazil were vulnerable to infections that would not normally occur in urban areas or wealthier nations. They reported clinical vulnerability of rural residents who are underserved by Brazil's 'universal' public

healthcare system, despite social and economic challenges that increase their risk for disease. They reported a rare case of oral myiasis in the upper lip of a rural male patient. Bhola *et al.* (2012) reported a case of gingival myiasis involving 14-16 larvae in a 12-year-old boy. Kumar and Srikumar (2012) reported oral myiasis caused by *M. nebulosa* (common house fly), in a 28-year-old patient, with recent maxillofacial trauma, whom was treated by manual removal of the larvae, after topical application of turpentine oil, followed by surgical debridement and oral therapy with Ivermectin<sup>®</sup>. On the other hand, Dharshiyani *et al.* (2012) reported a case of a 70-year-old man indigent, alcohol-dependent with an extensive necrotic wound in mandible and fetid odour associated with oral squamous cell carcinoma.

Singla (2013) reported a higher incidence of oral myiasis in rural areas, affecting the tropical and subtropical zones of Africa and America, particularly after tooth extraction. All these conditions more easily allow the infestation of human tissues. Myiasis rarely affected the orodental complex. He reported an oral myiasis in a 25-year-old male gardener patient. The lesion was treated with turpentine oil, which forced the larvae out, and irrigated with normal saline solution. Raffaldi *et al.* (2013) in Italy reported an oral cavity in a 5-year-old boy with a severe congenital heart defect, presented a gingival swelling and, after a few hours, some larvae moved through his oral cavity, which were re-moved manually and an oral antibiotic was given to

avoid a bacterial superinfection. Three days later, the patient showed a gradual decrease in gingival swelling; complete clinical resolution was achieved about two weeks later. The case was as a reminder to consider oral myiasis in the event of suspected gingival swelling in children, especially if they have predisposing factors or if they come from an endemic area. Arslan *et al.* (2013) reported a case of gingival myiasis in a 2-year-old healthy child, which was treated by mechanical removal of larvae, extraction of the adjacent devitalized teeth and debridement of necrotic tissues. Jang *et al.* (2013) reported a case of oral myiasis in the Republic of Korea, in a 37-year-old man with a 30-year history of Becker's muscular dystrophy. He was intubated due to dyspnea 8 days prior to admission to an intensive care unit (ICU). A few hours after the ICU admission, 43 *L. sericata* 3<sup>rd</sup> instar larvae were found during suction of the oral cavity.

Nowadays, there are many problems with the use of chemical insecticides as resistance, environmental pollution, residual toxicity to man and edible animal. In Egypt, Nagaty *et al.* (1960) in vitro evaluated the larvicidal efficacy of seven organic and inorganic compounds against *Musca d. vicina* and *Ch. albiceps*. Morsy *et al.* (1998) recommended the volatile oils of *Chenopodium ambrosioides* and *Thymus vulgaris* against myiasis by *Lucilia sericata*. Mazyad *et al.* (1999) recommended the essential oils of *Anethum graveolens*, *Conyza dioscoridis* and *Mentha microphylla* in myiasis control. Morsy and Mazyad (2000) found that *Bacillus thu-*

*ringiensis* var. *israelensis* completely killed *Lucilia sericata* larvae. Mazyad and Soliman (2001) found that oil of camphor at concentration 1:0 and 1:1 against *O. ovis* larvae gave 100% mortality rates. Khater *et al.* (2011) recommended the essential oils of lettuce (*Lactuca sativa*), chamomile (*Matricaria chamomilla*), anise (*Pimpinella anisum*), and rosemary (*Rosmarinus officinalis*) as new botanical insecticides to control myiasis. Generally speaking, these plants are widely used for human consumption and this may clarify the oral myiasis rarity.

### Conclusions

Oral myiasis is a rare condition in humans and associated with poor oral hygiene, severe halitosis, and mouth breathing during sleep, mental handicap, cerebral palsy, epilepsy, anterior open bite, incompetent lips, and other conditions. Treatment protocol has not yet been established for oral myiasis. The prevention of human myiasis must involve the control of fly populations and general cleanliness, such as reducing decomposition odors and cleaning and covering wounds as well as alcoholism, senility, suppurating lesion, severe halitosis, and other conditions. Besides addition, the public should be informed that persons living in locations without basic sanitation are more predisposed to infestation. The question is could it be nosocomial infestation?

Clinicians dealing with oral medicine should be aware of myiasis particularly in children. The medical personnel care of old/debilitated/unconscious patients must keep in mind the possibility of

myiasis infestation. Myiasis can lead to rapid tissue destruction and disfigurement requiring immediate treatment.

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