

A Rare Case of Human Residual Root Myiasis Caused by *Clogmia Albipunctata* Larvae (Diptera: Psychodidae)

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Case Report

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Abstract

Background: *Clogmia albipunctata* is cosmopolitan in distribution. The adult flies can survive and spread outdoors during the temperate seasons while continuously breeding in buildings during the winter months. Because they are non-biting, tiny and quite, most of people do not pay special attention to them. It is the first case reported that *Clogmia albipunctata* larvae cause human residual root myiasis.

Case presentation: In December 2020, a 26-year-old woman was referred from Kaifeng New District Maternal and Child Health Care Hospital to the Department of Pathogenic Biology, Medical College of Henan University with chief complaint that two active alive larvae were found in the mouth while brushing her teeth in the morning. The intraoral examination revealed nice oral hygiene and no larvae was found directly. The right second mandibular molar was a residual root and the mucosa above it was mild erythematous and edematous and no bleeding on probing was present. While some 50°C normal saline was injected in the residual root with syringe, four larvae swarmed out from the residual root. The larvae were observed by naked eyes and light microscope and the larvae were reared. One adult fly was got 11 days later. They were identified as *Clogmia albipunctata* larvae. Because the patient was in lactation, medication was not recommended. Treatment included the removal of all visible larvae followed by debridement. The patient was followed-up for 1 month and healed. The patient's residual root myiasis was associated with sleeping with the mouth open and the smell of rotten food in the residual root attracted *Clogmia albipunctatus* to lay eggs in the residual root.

Conclusions: This report implies that even if the oral hygiene is nice in general, the existence of residual roots maybe results in oral myiasis. The myiasis caused by *Clogmia albipunctata* larvae should be paid attention to. It is necessary to treat residual roots in time.

Background

Dental caries result from the chemical dissolution of dental tissues, resulting from the production of acids generated by bacteria that metabolize carbohydrates from the diet, especially sucrose[1]. Currently tooth decay is described as a complex sugar dependent biofilm dysbiosis[2, 3].

Dental caries and residual roots are commonly known as 'worm tooth' in China though worms do not cause them. However we did find 'worms' in a residual root recently. It belongs to the category of myiasis.

Myiasis is defined as an invasion of live human and vertebrate animals with dipterous larvae, which feed on the host's living or dead tissue, ingested food or liquid body substances[4]. Myiasis is regarded as a disease associated with unhygienic conditions and poor socioeconomic environment[5]. Of note, the case we present has the following special features. First, the patient is healthy with nice hygienic conditions. Secend, Myiasis occurs in a residual root which caused by *Clogmia albipunctata* larvae which was never reported.

Case Presentation

On 26 December 2020, a 26-year-old woman was referred from Kaifeng New District Maternal and Child Health Care Hospital to the Department of Pathogenic Biology, Medical College of Henan University with chief complaint that two active alive larvae were found in the mouth while brushing her teeth in the morning.

The woman was a civil servant living in the suburb of Kaifeng, Henan Province, China. She did not report suffering from fever, pain or other oral uncomfortable feeling. However, she looked anxious and frightened. The intraoral examination revealed nice oral hygiene. No larvae was found directly. The right second mandibular molar was residual root. The mucosa above it showed mild erythematous and edematous and no bleeding on probing was present (Fig. 1).

While some about 50°C normal saline was injected in the residual root and on the erythematous and edematous mucosa with syringe, a total of four larvae swarmed out from the residual root.

The larvae were grasped and removed quickly and gently. They wriggled around actively in water and crawled quickly on the surface of solid (Fig. 2).

Because the patient was in lactation, medication was not recommended. Treatment included the removal of all visible larvae followed by debridement. She was advised to irrigate the residual root with approximately 500ml 50°C normal saline three times a day before brushing her teeth to remove the potential eggs and larvae in the residual root. And we advised her to refer to dentist to treat the residual root as soon as possible.

After careful history taking from the patient, we learned she had the habit of sleeping with the mouth open. Because she was in lactation, there were many fruits and snacks in the bedroom which attracted some small flies. It was deduced that while the patient sleeping with mouth open, the flies laid eggs in the residual root. We advised her to clean the room to eliminate the breeding environment of the flies and spray with insecticides to exterminate the flies. And we advised her to sleep without the mouth open as far as possible to avoid the flies laying eggs in the residual root again. The patient was followed for one month. No more larvae was found again and the erythematous and edematous mucosa was healed.

The larvae were observed by naked eyes and light microscope (Motic BA210, MOTIC CHINA GROUP CO., LTD.). The larva is about 7–8 mm long and 1 mm wide. The body is cylindrical. The body of the larva consists of a head segment, 3 thoracic segments and 8 abdominal segments.

It is grayish dorsally and white ventrally while its head and tail are dark brown (Fig. 3A). Dorsal aspects of the body segments were covered with 26 saddles shaped dark chitinous plates. The body is densely covered with long black back-warding setae dorsally and laterally (Fig. 3B). Caudally, the siphon is cone-shape. There are two dorsal anal processes and two ventral anal processes with a tuft of hairs at the end (Fig. 3C). Its head is triangular. The mouthparts are of chewing type. Two breathing tubes appear extending along the length of the body starting with a pair of anterior spiracles at the prothorax and end by a pair of posterior spiracles, at the tip of the terminal segment (Fig. 3D).

Adult morphological identification is considered the 'gold standard' for the identification of Diptera species[6]. The four alive larvae were reared at 25°C. One *Clogmia albipunctata* was got 11 days later.

The grayish brown body is about 4mm long. Its antennae has 13 nodes. Its wings are covered with gray brown minute hairs. Its wings have two black spots each side and there are some white spots on the wings. (Fig. 4)

From previous morphological characters and comparing all the morphological characters to several literatures[7–9], it was indentified as the fourth instar larval stage larva of *Clogmia albipunctata*.

Discussion

Oral myiasis occurs mainly in the tropics and associated with inadequate public and personal hygiene, senility, alcoholism, mental debility, mouth breathing[10], incompetent lip, cerebral palsy[11], suppurating lesions, severe halitosis, gingival disease, trauma[12] and so on.

Of note, in this case the patient lived in a decent house with nice surrounding environment and personal hygiene. However, the food blocked in the residual root is difficult to clean. The patient had the habit of sleeping with the mouth open. The smell of the rotten food in the residual root attracted *Clogmia albipunctatus* to lay eggs in the residual roots. And the rotten food in the residual root provided an ideal media for the larvae to settle.

The treatments of myiasis included manual removal of larvae and debridement, application of antibiotic therapy, asphyxiating substances and ivermectin. Because the patient was in lactation, we used the treatment of manual removal of larvae and debridement.

The main species reported to cause oral myiasis are *Cochliomyia hominivorax*, *Chrysomya bezziana*, *Musca domestica*, *Sarcophaga*, *Lucilia sericata*, *Lucilia cuprina*, *Musca nebulo*, *Oestrus ovis*, *Calliphoridae*, *Dermatobia hominis*, *Hypoderma bovis*, *Hypoderma tarandi* and *Wohlfahrtia magnifica*[13].

Clogmia albipunctata is a primitive Nematocera of the family Psychodidae, subfamily Psychodinae. It is cosmopolitan in distribution. The adult flies can survive and spread outdoors during the temperate seasons while continuously breeding in buildings during the winter months. Their larvae are coprophagous and saprophagous. They feed on decaying organic matter and the feces of the vertebrate. They are present in moist places such as bathrooms, toilets, hotels and hospitals[14]. They are all around us all the year round. Because they are non-biting, tiny and quite, most of people do not pay special attention to them. *Clogmia albipunctata* can elicit inhalant allergy as a result of inhaling fragments of their disintegrated body parts and play a significant role as a potential mechanical vector of pathogens[15]. The larvae of *Clogmia albipunctata* can cause myiasis.

Larvae of *Clogmia albipunctata* had been reported to cause human nasopharyngeal myiasis[16], intestinal myiasis[7, 9] and urinary myiasis[8]. The case of human residual root myiasis caused by *Clogmia albipunctata* larvae had not been reported before.

Conclusions

Poor hygiene is the most important risk factor and is present in almost all myiasis cases. Therefore, some people with nice hygiene feel that it is impossible for them to suffer from myiasis. However, we can learn from this case a healthy person with better hygiene maybe suffers from myiasis under some conditions.

In addition, some people do not pay enough attention to dental hygiene in China. If they have not symptoms, they will not treat the residual roots in time. Residual root may become the focus of systemic infection and then cause systemic diseases. Moreover myiasis can occur in residual roots. Therefore, it is necessary to treat the residual root in time. In the mean time, the human residual root myiasis caused by *Clogmia albipunctata* larvae should be paid attention to prevent.

Abbreviations

Not applicable.

Declarations

Ethical Approval and consent to participate

This study was approved by the Human Research Ethics Committee of the Henan University in China and the committee's reference number is [HUSOM2021-003]. The patient received an explanation about the scope of the study, such as objectives, procedures, and potential risks, and signed an informed consent for the use of the patient's clinical samples.

Consent for publication

Written informed consent was obtained from the patient for publication of this case study. A copy of the written consent is available for review by the editor of this journal.

Availability of data and materials

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Ying-jie Liu conceived and designed the experiments and drafted the manuscript. Juan Chen participated in the case collection and revised the manuscript. Jin-rui Liu and Yun Liu participated in the microscopic examination of the larvae and raised the larvae. All authors read and approved the final manuscript.

Acknowledgements

Not applicable.

Footnotes

Not applicable.

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Figures



Figure 1

The residual root (blue arrow) and the mild erythematous and edematous mucosa (black arrow).

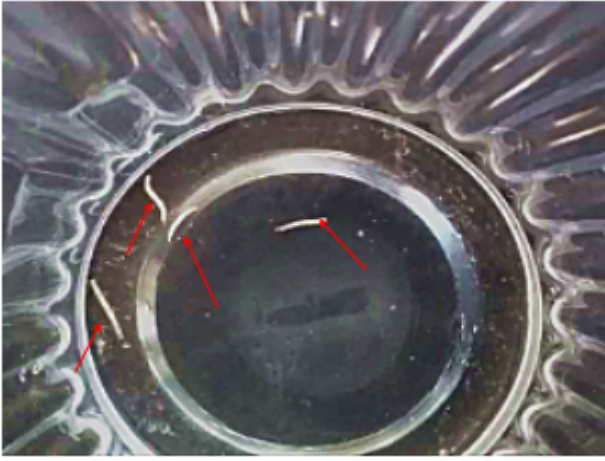


Figure 2

The four larvae wriggled around actively in a plastic cup with water (red arrows).

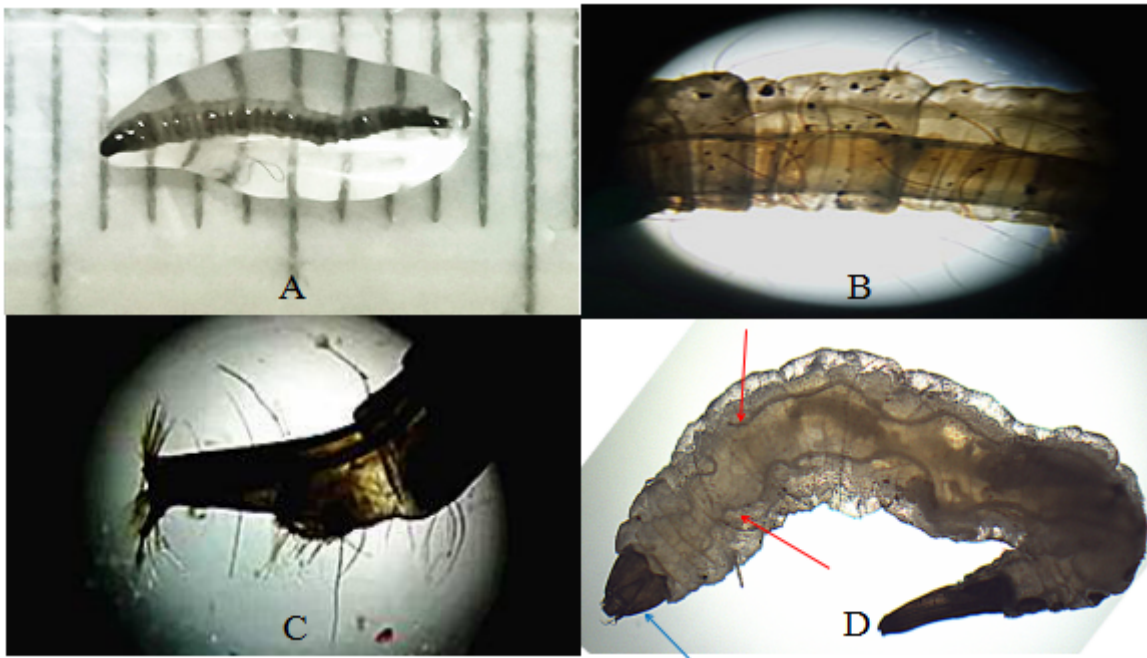


Figure 3

The body of the alive *Clogmia albipunctata* fourth instar larvae A: Full-larva; B: Middle segments showing dorsal plates and dorsal and lateral setae($\times 40$); C: Caudal part showing siphon and end processes and anus in lateral view($\times 40$); D: The triangular head (blue arrow) and 2 breathing tubes extending along the length of the body (red arrows) ($\times 40$)

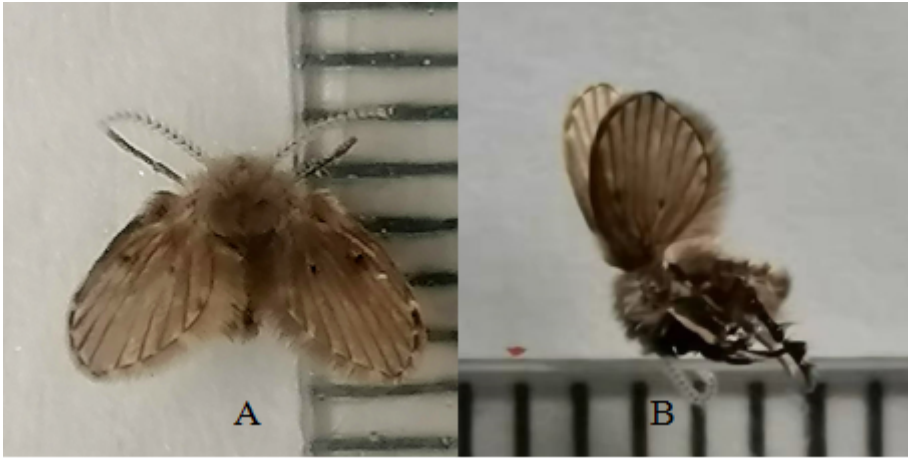


Figure 4

One *Clogmia albipunctata* was got 11 days later. A: The *Clogmia albipunctata* (alive) in vertical view B: The *Clogmia albipunctata* (dead) in lateral view