



Langerhans Cell Histiocytosis Is Characterized by Periodontitis Oral Health Behavior Intervention in A 10-year-old Child

Yanli Li, Qiuju Zhai, Mei He, Jiqing Liu*

Affiliated Stomatological Hospital of Kunming Medical University, Kunming 650106, Yunnan, China.

How to cite this paper: Yanli Li, Qiuju Zhai, Mei He, Jiqing Liu. (2025). Langerhans Cell Histiocytosis Is Characterized by Periodontitis Oral Health Behavior Intervention in A 10-year-old Child. *International Journal of Systems Biology and Bioinformatics*, 1(1), 9-12.
DOI: 10.26855/ijssbb.2025.12.003

Received: September 22, 2025
Accepted: October 16, 2025
Published: November 26, 2025

***Corresponding author:** Jiqing Liu, Affiliated Stomatological Hospital of Kunming Medical University, Kunming 650106, Yunnan, China.

Abstract

Objective: To investigate the manifestation of Langerhans cell histiocytosis as periodontitis, and to provide continuous oral health guidance for patients with systemic treatment combined with periodontal treatment, to observe the effect of plaque control in children, and to provide plaque control methods for the same patients to achieve the purpose of periodontitis control. **Methods** the hazards and control methods of dental plaque were repeatedly emphasized through clinical field guidance, telephone and wechat. **Results** after 10 months of systemic and periodontal treatment, the children were followed up under the oral health guidance of medical staff, and the oral health maintenance was in good condition.

Keywords

Langerhans Cell Histiocytosis; Periodontitis; Oral Health Guidance

Langerhans cell histiocytosis (LCH) is a group of diseases caused by the proliferation of Langerhans cells and their precursor cells, either systemically or locally. These include chronic localized type with simple intraosseous eosinophilic granulomatous lesions as the main manifestation, chronic disseminated type involving multiple bone and extraosseous tissues (also known as Hand-Schiüller-Christian disease), and acute disseminated type involving multiple organs and systems with obvious systemic symptoms (also known as Letter-Siwe disease) [1]. The etiology of Langerhans cell histiocytosis is still unclear. Although its genetic characteristics are not yet clear, it has a certain familial tendency. The incidence of Langerhans cell histiocytosis in siblings is much higher than in ordinary children. It is also believed that this disease has the nature of a tumor. Clinical manifestations: The onset of this disease varies and the symptoms are diverse. LCH (Langerhans cell histiocytosis) presents with limited skin, single or multiple bone lesions, with or without diabetes insipidus; damage to organs such as the liver, spleen, lungs, and hematopoietic system, or with extensive bone and skin lesions. Patients involve multiple systems and organs, constituting extensive LCH. This article uses a 10-year-old child with Langerhans cell histiocytosis presenting with periodontitis symptoms as the subject of observation, studying the clinical effects of oral health behavior intervention.

1. Materials and Methods

1.1 General Information

The patient is a 10 - year-old boy. Two months ago, his parents noticed that his gums were red, swollen, bleeding, and painful, making it difficult for him to eat. After taking CT scans at a local hospital, no diagnosis was made and no treatment was given. So they came to our hospital for further treatment.

The child first visited our hospital on August 9, 2021. The child denied any systemic diseases or family history of

genetic diseases and was able to answer relevant questions clearly and logically. The parents lacked knowledge of oral health. Oral examination revealed poor hygiene, with plaque covering all teeth. The gingival papillae were bright red, thin, brittle, and eroded, with extensive pseudomembrane coverage. A small amount of subdental calculus was detected. Bleeding was observed at 90 % of the gingival probing sites, with probing depths generally ranging from 2 to 12 mm. The child experienced pain during probing. CBCT scans showed alveolar bone resorption down to the middle third to the apical third of the entire mouth. The diagnosis was extensive aggressive periodontitis. One week after the oral treatment, the patient returned for a follow-up visit. Oral hygiene had improved, but there was no significant improvement in the color, texture, or consistency of the gums. Bleeding on probing had improved. The patient's overall condition was inquired about in detail again. The child's parents reported that the child had excessive thirst and urination. The attending physician at our hospital contacted the Department of Pediatric Endocrinology at the local Children's Hospital, and the child was transferred to the Children's Hospital for a full-body examination. The local Children's Hospital sent tissue samples for examination, and the histopathological examination confirmed the diagnosis of Langerhans cell histiocytosis.

1.2 Methods

(1) After full-mouth supragingival scaling and subgingival scaling, the nurses provided oral health guidance to the children and explained the dangers of dental plaque biofilm to the children and their parents using pictures, brochures and other promotional materials. Dental plaque is the main initiating factor of periodontitis [2]. However, the biological characteristics of dental plaque determine that dental plaque can be slowed down by self-oral care behavior, which builds the confidence of the children and their parents that they can control their own plaque, thereby developing good oral health habits. (2) Using dental arch models to demonstrate self-plaque control methods: Bass brushing method, brush teeth 3 times a day, each brushing time is not less than 3 minutes; proper use of dental floss and interdental brush, use at least once a day, and rinse mouth with water after each meal. (3) On the day the child finishes their first periodontal treatment, contact them by phone to inquire about their condition after treatment. Send videos of the Bass brushing technique, dental floss, and interdental brush usage via WeChat to reinforce the child's and parents' understanding of self-plaque control methods. Encourage the child to persist with correct self-plaque control even if brushing causes gum pain, as periodontitis control depends on the effectiveness of the child's self-plaque control [3]. (4) Instruct the child to have a follow-up appointment one week later, bringing a toothbrush, dental floss, and interdental brush. Apply plaque disclosing agent to each tooth surface during the follow-up appointment. Instruct the child to rinse their mouth with water and then, under the doctor's guidance, use a mirror to check the location of plaque discoloration. This allows the child and parents to visually see the effectiveness of self-plaque control. Darker plaque indicates missed areas or insufficient brushing time. Based on the plaque discoloration results, the child uses their own oral hygiene tools in front of a mirror. The nurse observes the child's use of the toothbrush, dental floss, and interdental brush, promptly correcting any missed areas or insufficient brushing time to achieve long-term, effective, and correct self-plaque control. (5) During the child's hospital treatment, maintain contact with the child's parents, inquire about the child's treatment progress, and guide the child and parents to assist the child in oral hygiene. (6) Psychological guidance and care: Due to the long treatment period for periodontitis and the special location and function of the oral cavity, children may experience many unpleasant experiences. Therefore, it is necessary to soothe the child's negative emotions, express care, and make the child feel the care and warmth from the nursing staff. Guiding the child to develop hobbies can help shift their attention and reduce their psychological burden. For negative emotions such as anxiety, panic, and fear that arise after the child's illness, nursing staff should use appropriate methods to guide and counsel them. This can include explaining case studies, publicizing successful treatment examples, and providing health education to ensure the child fully understands the causes of the disease, the treatment process, daily care knowledge, and preventive measures. This strengthens the child's cooperation with treatment, effectively improves the doctor-patient relationship, and increases the child's compliance. (7) Lifestyle guidance and care: Guide the child to pay attention to oral hygiene, as an unhygienic oral environment creates conditions for the growth and reproduction of bacteria or fungi, which can easily promote the formation and development of cancer; encourage smoking cessation and a long-term preference for tobacco and alcohol; reduce the intake of fried and greasy foods, and avoid chewing spicy foods; encourage the child to eat a balanced diet high in protein, high in vitamins, and easily digestible; and appropriately increase physical exercise. (8) Oral cleaning and care: Clean with saline solution or clean cotton balls after meals, every 3-47 days, to avoid infection and prevent bacterial growth. Maintain correct brushing techniques, change toothbrushes promptly, conduct regular oral hygiene checkups, perform

oral secretion culture tests, and promptly address any abnormalities to prevent infection. Observe the color of the skin flap to assess the repair progress; avoid damaging the skin flap during oral cleaning, and immediately re-examine if any abnormalities are found. Pay attention to the child's respiratory management, noting any swallowing difficulties, and guide the child to expectorate phlegm promptly to avoid affecting disease recovery. (9) Rehabilitation guidance and nursing care: guide the child to strengthen the functional exercises of the temporomandibular joint and tongue, prevent functional impairment, encourage the child to talk more, swallow more, do more mouth-opening exercises, massage the temporomandibular joint, prevent fibrosis of the masticatory muscles and surrounding tissues, promote the recovery of oral physiological functions, thereby helping the child reduce pain, improve quality of life, and promote early rehabilitation.

2. Summary

10 months of treatment at the Children's Hospital, the child underwent a follow-up examination at our hospital. The examination revealed good oral hygiene, no bleeding on probing, slight redness at the gum line, and a firm texture. The CT scan showed no further resorption of the alveolar bone. We repeatedly emphasized the dangers of plaque and methods for plaque control, which helped build the determination of the child and parents to control periodontitis. This encouraged the child and parents to have regular check-ups and to consistently maintain good oral plaque control to preserve a healthy oral environment in the long term.

3. Discussion

In the clinical presentation of Langerhans cell histiocytosis (LCH), mild cases present with isolated, painless bone lesions, while severe cases involve extensive organ infiltration accompanied by fever and weight loss. Skin lesions are usually the primary symptom for diagnosis. The rash is an acute infantile condition with various onset patterns. The rash is mainly distributed on the trunk, scalp, hairline, and behind the ears. It begins as a maculopapular rash, quickly oozing (similar to seborrheic dermatitis), possibly accompanied by bleeding, followed by crusting and desquamation, and finally, pigmented leukoplakia. The leukoplakia is not easily resolved during growth. Bone lesions and osteopathies are seen in almost all LCH patients. Solitary bone lesions are more common, while multiple bone lesions are more common, primarily presenting as osteolytic lesions. Skull lesions are most common, followed by lower extremity bones, ribs, pelvis, and spine; jawbone lesions are also common. Plain X-rays often show bone resorption with irregular margins. Skull lesions change from worm-like to large defects or chisel-shaped changes, with irregular shapes, round or oval defects, and serrated edges. Initial or progressive lesions often have indistinct borders, frequently accompanied by increased intracranial pressure, suture fractures, or communicating hydrocephalus, which may be accompanied by headaches. However, during the recovery phase, bone margins gradually become clearer, sclerotic bands appear, bone density becomes uneven, bone defects gradually shrink, and eventually complete repair without leaving any trace. Other radiographic changes in flattened bones include: swollen and thickened ribs, thinning or cystic changes in thiol bone, followed by bone resorption, atrophy, and thinning. Due to the persistence of the disease, patients often cannot adhere to strictly designed treatment plans, thus potentially leading to symptoms of multi-organ involvement (Table 137-2). Patients in groups 0 – II, especially those with single-system disease, rarely require systemic treatment. Meanwhile, there is almost no disability or mortality. Some patients in group II and most in group III (i.e., those with multiple systemic diseases) require systemic treatment, but it is usually effective. In group IV, the disability and mortality rates in younger patients with multi-system involvement can reach 20%. Although relapse is common, almost all patients with good outcomes eventually discontinue treatment. In adult patients, it can also show a fluctuating course of chronic disease.

Because the onset and treatment cycle of Langerhans cell histiocytosis is long and the repair time is long, it will affect normal eating and swallowing functions, reduce oral saliva secretion, reduce self-cleaning ability, and easily lead to oral infection [4]. Therefore, in addition to surgery and drug treatment, effective nursing guidance is also needed for the treatment of Langerhans cell histiocytosis, which is helpful for the patient's recovery. Traditional education content is too one-sided and simple, the educational goals are not clear enough, and the form is mostly oral education, which is difficult to achieve the ideal intervention effect. In the process of oral health behavior intervention, it is emphasized that the patient is the center. Through the implementation of health education, medical staff provide comprehensive nursing care and gradual rehabilitation guidance for patients with Langerhans cell histiocytosis, and conduct health education nursing for patients and their families [5]. By understanding the treatment and nursing plan,

patients' self-management awareness is improved, health education awareness is improved, the effectiveness of health education is ensured, the recovery of the disease is promoted, patients' trust and dependence on nurses are enhanced, the needs of patients and their families are met, and a harmonious nurse-patient relationship is established. In addition, children's oral health behavior is closely related to parents' oral health knowledge and attitudes. To establish good oral health behavior, parents need to cooperate and assist closely [6]. In this case, the child was 10 years old. Although the child had self-management ability and a certain degree of acceptance of professional issues, considering that the child was too young, it would be difficult to maintain oral self-plaque control without the cooperation of parents. Therefore, in this case, oral behavior intervention requires parents to participate continuously. Parents need to monitor the child's oral self-plaque behavior in real time, urge the child to develop oral health behavior habits, and maintain good oral hygiene in the long term. From the perspective of oral specialists, repeatedly emphasizing the harm of plaque and the methods of plaque control can increase the oral professional knowledge of children and parents, so that children and parents pay attention to oral hygiene, do a good job in self-oral health management, reduce plaque accumulation, avoid plaque stimulation, and have a positive effect on the oral lesions of children with LGH [7].

References

- [1] Neves-Silva R, Fernandes DT, Fonseca FP. Oral manifestations of Langerhans cell histiocytosis: a case series. *Spec Care Dentist*. 2018;38(6):426-33.
- [2] Zhong XF, Li MD, Shi CM. Effects of systematic oral care intervention on plaque control and oral health behaviors in children with periodontal disease. *Guangxi Med J*. 2016;38(10):1465-6.
- [3] Zhong XF, Li MD, Shi CM. A survey and analysis of health behaviors of children with periodontal disease before and after oral health education. *J Nurses Train*. 2013;28(7):621-2.
- [4] Shi XL, Cheng HG, Wang P. A study on the effect of oral health knowledge and behavior intervention on parents of preschool children based on the "knowledge-belief-practice" theory. *J Nurses Train*. 2018;33(15):1400-7.
- [5] Li XC, Chen D, Chen TX. A case of Langerhans cell histiocytosis presenting with periodontal disease as the initial manifestation. *Chin J Stomatol*. 2018;53(3):187-90.
- [6] Zhou YB. Two cases of adult Langerhans cell histiocytosis presenting with periodontitis as the initial symptom. *Chin Clin Case Database*. 2022;4(1):01040.
- [7] Ling C, Zhang QG. A case report and literature review of adult monosystemic Langerhans cell histiocytosis presenting with solitary colonic polyps. *Leuk Lymphoma*. 2020;29(11).