Content available at: https://www.ipinnovative.com/open-access-journals

Journal of Dental Specialities

Journal homepage: https://www.jdsits.in/

Case Report

Papillon Lefevre syndrome-A series of two cases involving siblings with a review of literature

Basudev Mahato[1], Snehanjan Sarangi[1]*, Abhishek Ghosh[1], Anjana Mazumdar[1]

[1]Dept. of Oral Pathology, Dr R Ahmed Dental College and Hospital, Kolkata, West Bengal, India

Abstract

Papillon-Lefevre syndrome (PLS), a rare autosomal recessive disorder, was initially elucidated by Papillon and Lefevre in 1924. It is classically characterized by a combination of cutaneous and oral anomalies; cuateneous manifestations like gradual palmo-plantar keratosis and oral changes like variably progressive periodontitis, involving both deciduous and permanent dentitions are the hallmarks. Also, neurologic manifestations like falx cerebri calcifications and mental retardation occasionally have been reported. Mutation of Cathepsin C gene is held responsible for PLS. The dermatologic lesions are managed with retinoids, along with corticosteroids and/or topical antibiotics. The oral lesions are controlled thorough optimal oral hygiene measures, prophylaxis, antibiotic usage, and extraction of the affected mobile teeth in severe instances. Herein, we describe a case series comprising of two cases of PLS involving siblings- a brother and an elder sister, with an emphasis regarding their relevant diagnostic aspects.

Keywords: Cathepsin C, Papillon-Lefevre syndrome, Palmo-plantar keratosis, Periodontitis

Received: 08-02-2025; **Accepted:** 10-09-2025; **Available Online**: 29-09-2025

1. Introduction

PLS, first elucidated by Papillon and Lefevre, is an autosomal recessive disorder, possessing dermatological and oral manifestations. Palmo-plantar keratosis involving the palms of the hands and soles of feet, along with aggressive and destructive periodontitis, are the defining features.[1] PLS usually becomes clinically evident during early childhood. The exact etiopathogenesis is not clearly known, but immunological, genetic and bacterial factors might play a role, along with parental consanguinity.[1,2] Cathepsin C gene is responsible for maintaining structural growth and development of the skin along with immune surveillance functions pertaining to myeloid and lymphoid lineages.[1] Mutation of Cathepsin C causes perturbed structural integrity, of the oral mucosa, as well as the dermis. Characteristic oral features like gingival bleeding, attachment loss, formation of periodontal pockets, alveolar bone destruction, mobility and displacement of teeth, involving both deciduous and permanent dentition will be evident.[1,3] Dermatologically, by three years of age, pronounced transgredient (initially involving the palms and soles which gradually progresses towards dorsum of the hands and feet) palmo-plantar keratosis becomes evident, sometimes accompanied by follicular hyperkeratosis, nail dystrophy, hyperhidrosis. Other manifestations might include increased susceptibility towards infections, due to altered immune status, neurological alterations like intracranial calcifications and mental disturbances.[1,2,4] Herein, we describe two cases of PLS pertaining to siblings- a brother and her sister, with relevant clinical and radiological diagnostic aspects.

2. Case Presentation

2.1. Case 1

A 16 years old male patient, hailing from a rural village of Midnapore, West Bengal, reported to the Oral Pathology department with the chief complaint of mobility and spontaneous exfoliation of multiple teeth along with yellowish patches involving palms and soles. The patient did

*Corresponding author: Snehanjan Sarangi
Email: babi.sarangi@gmail.com

https://doi.org/10.18231/j.jds.10033.1485746081

not have any deleterious oral habits and the results of the hematological assays were within normal limits. However, the family history revealed that his elder sister is seemingly suffering from similar problems. A thorough physical examination of the boy revealed presence of markedly diffuse and radiating yellowish keratotic plaques and papular zones, involving the plantar and palmar aspects of both feet (**Figure 1**) and the hands, interspersed with regions of crustation, fissuring and desquamations of skin.(**Figure 2**) Keratoderma was noted involving the elbows. (**Figure 2**) According to the parents, all the deciduous teeth had erupted normally, but began to exhibit mobility by 3 years, and spontaneous exfoliation of all the teeth was evident by 4 years of age. Intraorally, 13, 15, 16, 17, 23, 26 were present on the upper arch and 33, 34,35,36,37, 43, 44, 45, 46 were evident involving mandibular arch. Amongst these, 15, 17, 26, 35, 44 exhibited grade I mobility.(**Figure 3**) Rest of the permanent teeth had undergone gradual mobility and spontaneous exfoliation by 12 years of age. Generalized plaque and calculi accumulation were observed along with prominent periodontal pockets, which were apparent on radiographs, along with marked alveolar bone loss. (**Figure 4a** and **b**) Based on clinical and radiological features, a diagnosis of PLS was made. The treatment plan included optimal oral hygiene maintenance, nonsurgical periodontal therapy, extraction of the remaining mobile teeth, and fabrication of upper and lower arch dentures. Dental implants were not considered owing to the patient's financial condition.

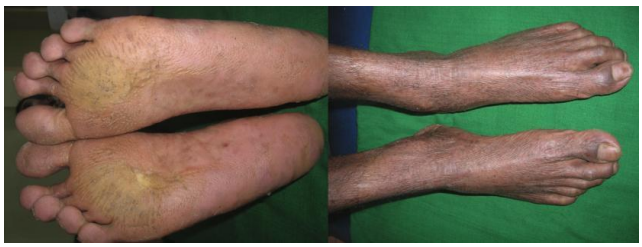

Figure 1: Diffuse and radiating yellowish keratotic plaques and papular zones, interspersed with regions of crustation, desquamation and fissuring involving the feet

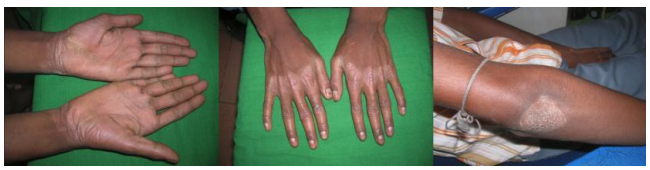

Figure 2: Regions of crustation, desquamation and fissuring involving the hands with hyperkeratosis of elbows

2.2. Case 2

A 17 years old female patient, who was the elder sister of the boy mentioned above, reported to the Oral Pathology department with the complaint of completely edentulous jaws with only a single remaining tooth, along with keratotic patches involving palms and soles. . The patient did not have any deleterious oral habits and the results of the hematological assays were within normal limits. Physical examination revealed yellowish white palmo-plantar hyperkeratotic plaques interspersed with crustations, fissuring and skin desquamation. (**Figure 5**) All the deciduous teeth had erupted normally, but had undergone spontaneous mobility and exfoliation by 4 years of age. She was edentulous, excepting the presence of grade 2 mobile 25. (**Figure 6**) Radiograph showed alveolar bone loss and PDL pocket surrounding 25. Based on clinical and radiological features, a diagnosis of PLS was made. The treatment plan included optimal oral hygiene maintenance, nonsurgical periodontal therapy, extraction of the remaining mobile teeth, and fabrication of upper and lower arch dentures.

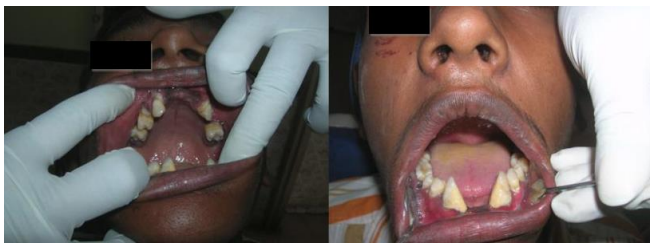

Figure 3: Intraorally, 13, 15, 16, 17, 23, 26 were present on the upper arch and 33, 34,35,36,37, 43, 44, 45, 46 were evident involving mandibular arch

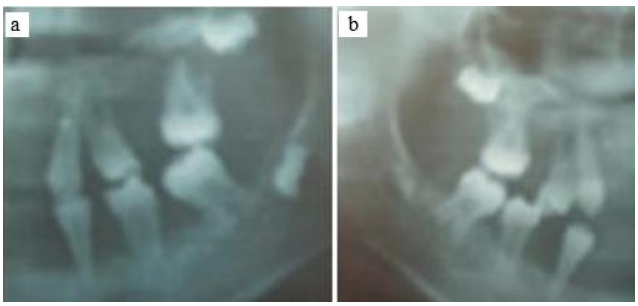

Figure 4: a,b: Radiograph shows prominent alveolar bone loss surrounding the teeth, which leads to spaced-out appearance

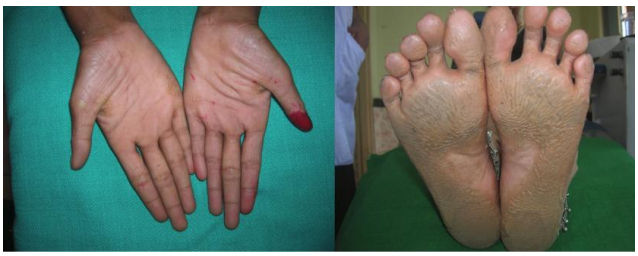

Figure 5: Yellowish white palmo-plantar hyperkeratotic plaques interspersed with crustations, fissuring

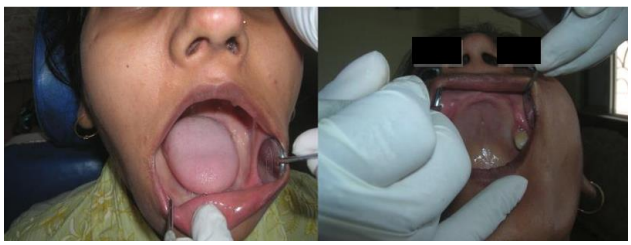

Figure 6: Intraorally edentulous jaws, barring the presence of 25

3. Discussion

PLS is an infrequent genodermatoses, which becomes clinically apparent during childhood, by 1-4 years of age. It affects both genders equally and has a prevalence of one to four cases per million.[2] The French Physicians, Papillon and Lefevre, in 1924, first described the entity.[1,4] It involved a brother and a sister within a family, who exhibited the classical palmo-plantar keratosis and periodontitis observed in a very early childhood, comprising both the deciduous and permanent dentition, causing premature teeth loss.

Later on, in 1964, Gorlin added another criteria-dural calcification, to the diagnostic algorithm.[4] PLS follows an autosomal recessive pattern, and can be grouped amongst a category of clinically and genotypically unique palmoplantar keratodermas or keratoses (PPKs).[1,2,4,5] A myriad of nomenclature have been utilized to connote PLS throughout the literature and these include- palmar-plantar hyperkeratosis with severe periodontal destruction involving primary and permanent dentition, hyperkeratosis palmoplantaris with periodontitis, keratosis palmoplantaris with periodontopathia.[6]

Clinically, classic features include intense trans-gradient palmo-plantar hyperkeratosis and aggressive prepubertal periodontitis. The skin lesions are sharply demarcated and can spread to the lateral side of the palms and soles and dorsal side of the fingers and toes (i.e., transgredient). The lesions may also involve the knees and elbows. The cutaneous lesions might be light yellowish, brownish or red plaques that might exhibit crusts, cracks or fissures. Though palms and soles are usually involved, less common sites of involvement include the legs, thighs, and the trunk. Additionally follicular hyperkeratosis, nail dystrophy or hyperhidrosis might be seen.[1,2]

The oral manifestations consist of progressively advanced periodontitis that is seen in both the deciduous and the permanent dentitions. The oral manifestations of primary teeth are represented by plaque accumulation, severe gingivitis, periodontitis, and multiple caries.[1,3] Upon eruption of the deciduous teeth, diffuse hyperplastic gingivitis develops in conjunction with rapid periodontal attachment loss. The extensive loss of osseous support often is radiographically evident, without root involvement. At 4–5 years of age, all primary teeth typically have been lost or extracted. Once edentulous, the gingiva returns to a normal state of health until eruption of the permanent dentition restarts the cycle of rapidly progressive periodontal disease.[1,3] By age 15, all the permanent teeth have been lost in most affected individuals.

Similar dermatologic changes without oral involvement might be evident in certain syndromes, viz. Unna-Thost syndrome, Howell-Evans syndrome, Vohwinkel syndrome, Gamborg Nielsen syndrome.[7]

Almuneef et al, observed pyogenic herpatic abscess, as a somewhat common complication of PLS.[8] Recurrent pyogenic skin infections might also be seen.[3]

The PLS in our instances involved the brother and his elder sister, aged 16 and 17 years respectively, within the family. They showed pronounced yellowish white palmo-plantar hyperkeratotic plaques interspersed with crustations, fissuring and skin desquamation. Nail dystrophy was noted in the boy. Prominent periodontitis, mobility and premature exfoliation of deciduous and permanent teeth, formation of PDL pockets, and alveolar bone loss were also evident. Of interest, is that in both the cases the premature mobility and shedding of the deciduous teeth began as early as 3 years.

Consanguineous marriage, an ethnic practice in many parts of world, such as Arabia, can be attributable to the occurrence of PLS in about one third of all cases. Subsequently, Arabs and Caucasians have the highest propensity of PLS.[9] However, consanguinity was not noted in our case among parents.

Loss of function mutations pertaining to Cathepsin C (CTSC) gene on chromosome 11q14.1-q14.3 lead to PLS. CTSC is abundantly present in immune competent cells and epithelial tissues such as skin of the palms and soles and gingival tissues. CTSC gene encodes for Cathepsin C enzyme, a lysosomal cysteine protease, necessary for activation of serine proteases, a la neutrophil elastase, proteinase 3, and cathepsin G, leading to degranulation from immune competent, inflammatory cells- such as myeloid and lymphoid precursors, pertaining to bone marrow derived cells. Serine proteinases are involved in many immune regulatory and inflammatory processes, phagocytic elimination of microbes and accordingly CTSC gene mutation leads to altered immune functions and increased susceptibility towards infection and dermatological and periodontal disorder.[10,11] Also the structural growth or development of skin and gingival junctional epithelial tissues is hindered leading to characteristic lesions of periodontitis, palmoplantar keratosis, along with more susceptibility towards infections like pneumonia, hepatic abscess, pyoderma etc.[1,10,11]

Numerous pathogenic microbes have been isolated from periodontal affected tissues and pockets with PLS and the most significant amongst them is *Aggregatibacter actinomycetemcomitans*. Others include *Fusobacterium, Eiknella corrodens, Capnocytophaga gingivalis, Bacteroides sp.* Viri like Epstein Barr and cytomegalovirus have been isolated. These microbes are similar to those observed in chronic periodontitis. Studies have shown high IgG titers obtained against *Aggregatibacter actinomycetemcomitans* in PLS cases.[1,12,13]

PLS needs to be differentiated from disorders like Acrodynia, hypophosphatasia, Haim munk synderome, and cyclic neutropenia, Greither's syndrome, keratosis

punctata.[14] The management of PLS is geared towards detection of the disease at an early age, and a multidisciplinary approach to improve the quality of life. Through periodontal status check by the dental surgeon serves as an initial diagnostic clue.[15]

Dermatological problems can be managed through emollients, salicylic acid and urea, corticosteroids, antibiotic ointments, retinoids like etretinate, acitretin, and isotretinoin. In our cases, topical antibiotic formulation of bacitracin, neomycin and polymyxin B along with mometasone furoate 0.1% had been instituted with good results.

Effective management of periododontal disease includes prompt institution of antibiotics with nonsurgical therapy, oral prophylaxis, the modification of the patient's oral hygiene, extraction of remaining primary or mobile teeth, and periodontal maintenance therapies. An antibiotic combination comprising of amoxicillin and metronidazole is competent to fight against major PDL pathogen of PLS-*Aggregatibacter actinomycetemcomitans.* Chlohexidine gluconate mouthrinse is effective.[4] In our cases, the both brothers and sisters were advised oral prophylaxis, extraction of the remaining teeth, thorough oral hygiene maintenance, along with institution of chlorhexidine mouthwash.

4. Conclusion

Papillon–Lefevre syndrome, characterised by mutation of Cathepsic C gene, is a rare autosomal recessive disorder marked by early-onset, aggressive periodontitis and transgredient palmo-plantar keratosis. This case series of affected siblings highlights the rapid progression of periodontal destruction, with tooth loss commencing in early childhood, even in the absence of parental consanguinity. Early recognition and a multidisciplinary approach—combining antimicrobial therapy, periodontal care, prosthetic rehabilitation, and genetic counselling—are crucial for improving outcomes. Further research into genotype–phenotype correlations and targeted therapies may enhance future management strategies.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. Neville BW, Damn DD, Allen CM, Chi AC. Periodontal Diseases. Oral and Maxillofacial Pathology. 5th Ed. St Louis, Elsevier; 2024:167–70.
2. Zhao Yu-Lei, Feng Zhao, Hu Bin, Chen Liu-Qing. Papillon-Lefèvre Syndrome: A Case Report. *Int J Dermatol Venereol*. 2021;4(2):97–9.
3. Giannetti L, Apponi R, Dello Diago AM, Jafferany M, Goldust M, Sadoughifar R. Papillon-Lefèvre syndrome: Oral aspects and treatment. *Dermatol Ther*. 2020;33(3):e13336.
4. Fageeh HN. Papillon–Lefèvre Syndrome: A Rare Case Report of Two Brothers and Review of the Literature. *Int J Clin Pediatr Dent*. 2018;11(4):352–5.
5. Raja Rajeswari K, Almansour R, Alrajhi F, Fahad Binmeqren A, Shayan Albaqami M, Abdullah Albarrak R. Papillon-Lefèvre syndrome in dental pediatric patient: A comprehensive review. *Saudi Dent J*. 2024;36(5):682–7.
6. Kola MZ. Prosthodontic management of Papillon–Lefèvre syndrome with special focus on its characterization and diagnosis: a clinical report. *J Adv Med Dent Sci Res*. 2014;2(4):97–104.
7. Upadhyaya JD, Pfundheller D, Islam MN, Bhattacharyya I. Papillon-Lefèvre syndrome: A series of three cases in the same family and a literature review. *Quintessence Int*. 2017;48(9):695–700.
8. Sachdeva S, Kalra N, Kapoor P. Papillon–Lefèvre syndrome: report of a case and its management. *J Clin Exp Dent*. 2012;4(1):e77–e81
9. Mangal S, Ganapathy D. Awareness of Papillon-Lefevre Syndrome among dental students. *J Surv Fisheries Sci*. 2023;10(1S):3891–9.
10. Ketterer S, Gomez-Auli A, Hillebrand LE, Petrera A, Ketscher A, Reinheckel T. Inherited diseases caused by mutations in cathepsin protease genes. *FEBS J*. 2017;284(10):1437–54.
11. Castori M, Madonna S, Giannetti L. Novel CTSC mutations in a patient with Papillon–Lefèvre syndrome with recurrent pyoderma and minimal oral and palmoplantar involvement. *Br J Dermatol*. 2009;160(4):881–3.
12. Adamski Z, Burchardt D, Pawlaczyk-Kamienska T, Borysewicz-Lewicka M, Wyganowska-Swiątkowska M. Diagnosis of Papillon-Lefevre syndrome: Review of the literature and a case report. *Adv. Dermatol Allergol*. 2020;37(5):671–6.
13. Albandar JM, Khattab R, Monem F, Barbuto SM, Paster BJ. The subgingival microbiota of Papillon-Lefevre syndrome. *J Periodontol.* 2012;83(7):902–8
14. Sreeramulu B, Haragopal S, Shalini K, Sudha MD, Kiran G. The prosthodontic management of a young edentulous patient with the papillon lefevre syndrome-A rare case report. *J Clin Diagn Res*. 2012;6(10):1808–11.
15. Tariq M, Maknojia M, Saurabh S, Amarnath Rajbhoj S, Arya S. Papillon-Lefevre syndrome with arachnodactyly and associated aggressive periodontitis. *Int J Health Sci.* 2022;6(S3):1984–94.

Cite this article: Mahato B, Sarangi S, Ghosh A, Mazumdar A. Papillon Lefevre syndrome-A series of two cases involving siblings with a review of literature. *J Dent Spec*. 2025;13(2):295-298