Systemic Diseases and Syndromes that Affect the Periodontium

This chart includes medical conditions known to impact periodontal health and that may be included in a differential diagnosis when periodontitis is detected in pediatric patients. Individualized at-home and professional preventive oral care interventions must be emphasized for these patients. A multidisciplinary approach may be indicated for safe and effective oral health care.

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<td>Chédiak-Higashi syndrome&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>- Rare autosomal recessive disorder of the immune system&lt;br&gt;- Mild ‘atypical’ phenotype: 10-15% of cases; ‘classic’ phenotype: 80-90%, progresses to accelerated phase (fatal without bone marrow transplant)&lt;br&gt;- Characterized by reduced pigmentation, neurological deficits, fever, lymphadenopathy, anemia, neutropenia, hepatosplenomegaly thrombocytopenia.</td>
<td>- Microscopic analysis of WBCs&lt;br&gt;- Genetic testing identifies mutations in the lysosomal trafficking regulator gene (LYST/CHS1)</td>
<td>- Severe gingival inflammation, swelling, and recession&lt;br&gt;- Early onset periodontitis in primary and permanent dentitions&lt;br&gt;- Premature tooth loss&lt;br&gt;- Oral ulcerations may be present</td>
<td>Alveolar bone loss (localized or generalized)&lt;br&gt;- Immune status and transplantation dictate timing and precautions (e.g., antibiotics)&lt;br&gt;- Supportive management of complications (e.g., antibiotics to treat bacterial infections)&lt;br&gt;- Aggressive recurrent periodontitis may not respond to SRP or antibiotic treatment&lt;br&gt;- For extractions/surgeries, consider adjunctive measures for hemostasis and avoid NSAIDs due to platelet dysfunction&lt;br&gt;- Prosthetic therapy for lost teeth may be considered depending on patient’s medical status</td>
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<td>Diabetes mellitus&lt;sup&gt;3,4&lt;/sup&gt;</td>
<td>- Metabolic disorder&lt;br&gt;- Type 1: autoimmune reaction causes lack of insulin production; usually diagnosed in children and young adults&lt;br&gt;- Type 2: insulin resistance; usually diagnosed in adults&lt;br&gt;- Gestational: insulin resistance during pregnancy&lt;br&gt;- Associated with increased inflammation, impaired immunologic response and wound healing, CV disease, retinopathy, nephropathy, neuropathy</td>
<td>- Glycated hemoglobin (A1C)&lt;br&gt;- Other tests include: oral glucose tolerance tests, fasting plasma glucose test, random plasma glucose test</td>
<td>- Enlarged, erythematous attached gingiva&lt;br&gt;- Dental/periodontal abscesses&lt;br&gt;- Increased clinical attachment loss and pathologic periodontal pockets&lt;br&gt;- Severe periodontitis</td>
<td>Alveolar bone loss&lt;br&gt;- Assess level of disease control (e.g., compliance with diet and medications)&lt;br&gt;- With uncontrolled diabetes, consider antibiotic prophylaxis for invasive oral procedures&lt;br&gt;- Nonsurgical periodontal therapy (e.g., SRP and antimicrobial agents [chlorhexidine, antibiotics]) shows modest glycemic control improvement&lt;br&gt;- Monitor for delayed healing</td>
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<td>Haim-Munk syndrome&lt;sup&gt;5,6&lt;/sup&gt;</td>
<td>- Rare autosomal recessive syndrome; a phenotypic variant of PLS with mutation to chromosome 11q14-q21 and loss of function of the cathepsin C gene&lt;br&gt;- Milder periodontal disease and more severe dermatologic manifestations than PLS&lt;br&gt;- Clinical manifestations&lt;br&gt;- Dermatologic: palmo-plantar hyperkeratosis; scaly patches on eyelids, lips, cheeks; skin infections&lt;br&gt;- Skeletal: arachnodactyly, onychogryphosis, acroosteolysis, pes planus, muscle contractures, and destructive arthritis</td>
<td>Genetic testing for mutation of cathepsin C gene</td>
<td>- Rapidly advancing gingival inflammation and bleeding, deep periodontal pockets, gingival abscesses, periodontal destruction&lt;br&gt;- Premature loss of all primary teeth by age 4-5; loss of permanent teeth by age 16&lt;br&gt;- After tooth loss, gingiva returns to healthy state</td>
<td>Generalized extensive alveolar bone loss with migration of teeth&lt;br&gt;- Treatment of oral manifestations depends on patient’s age, psychological state, and tooth mobility&lt;br&gt;- May include nonsurgical therapy (e.g., monthly SRP, systemic antibiotics) and/or extraction of hopeless teeth&lt;br&gt;- Alveolar loss renders prosthetic rehabilitation challenging</td>
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Abbreviations in table: BMI: Body mass index; CDC: Centers for Disease Control and Prevention; CV: cardiovascular; NSAIDs: nonsteroidal anti-inflammatory drugs; PLS: Papillon Lefèvre syndrome; SRP: Scaling and root planing; WBCs: White blood cells.
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| Hypophosphatasia67             | - Rare genetic metabolic bone disorder characterized by impaired mineralization of bones and/or teeth  
- Mutations in the ALPL gene leading to low alkaline phosphatase activity  
- Wide-ranging severity (involving skeletal, renal, neurological, muscular, respiratory complications); six types based on severity and age of onset  
- Disturbed cementum formation; tooth loss is one of the first signs of the condition | - Serum alkaline phosphatase (ALP) levels  
- ALPL gene testing | - Premature exfoliation of primary teeth with little or no root resorption  
- Clinical inflammation milder than in other systemic diseases associated with periodontitis  
- Permanent dentition may be clinically normal in mild subtypes or prone to periodontitis and early tooth loss in severe cases | - Enzyme replacement therapy; a new disease-modifying treatment, has shown periodontal, tooth, and bone improvements  
- Caution with orthodontic management due to cementum dysplasia and impaired periodontal attachment  
- Prosthodontic therapy may include removable prostheses and possible implants to stabilize prossthesis in the permanent dentition for those skeletally mature |
| Langerhans cell histiocytosis6  | - Rare cancer-like condition (inflammatory myeloid neoplasia) characterized by excessive proliferation/infiltration of histiocytes (Langerhans cells); form categorized as a single-system (single organ affected) or multisystem (several organs affected)  
- Mortality rate: <10% in single-system vs. 30-50% in multisystem  
- Average age of onset: 1-3 years; male predilection  
- Oral manifestations and pain can be the first signs of the condition | Clinical, microscopic, hematologic, and imaging examinations | - Gingivitis, bleeding, recession, mucosal swelling, periodontitis, ulceration  
- Excessive mobility of teeth, premature exfoliation  
- Oral pain | - Management of periodontal disease is not the first-line of treatment  
- Treatment of oral lesions depends on the type/extent of disease and may vary from observation to pharmacotherapy, surgical excision/curettage, and/or radiation therapy  
- Treatment should include basic periodontal therapy and extractions of hopeless teeth depending on immune status |
| Leukocyte adhesion deficiency syndromes13 | - Rare autosomal recessive disorders  
- Primary immunodeficiency disorder involving both B and T cells  
- Impaired migration of WBCs to infection sites  
- Recurrent nonpyogenic bacterial and fungal mucosal infections  
- Compromised wound healing  
- Hematopoietic stem cell transplantation is the only curative treatment; high mortality rate | - Elevated WBCs (leukocytosis)  
- Genetic testing to identify mutations  
- Flow cytometry analysis to evaluate neutrophil expressions  
- Key clinical finding: absence of pus at site of infection | - Aggressive and severe gingivitis and rapidly progressive periodontitis  
- Persistent oral ulcers (gingivostomatitis)  
- Absence of pus  
- Premature exfoliation of primary dentition and early loss of permanent teeth | - Periodontal disease may be refractory to nonsurgical periodontal treatment and rigorous home care regimens  
- Prompt targeted antibiotic therapy  
- Adjunctive treatment may include granulocyte/thrombocyte transfusions, recombinant factor VIIa, and intravenous immunoglobulins  
- Prophylactic antibiotics prior to dental procedures |
| Obesity16                       | - Chronic complex multifactorial metabolic disorder presenting as excessive accumulation of fat  
- Etiologies: genetic, neuroendocrine, drug-induced, behavioral (diet and activity)  
- Comorbidities: diabetes, hypertension, CV disease, obstructive sleep apnea, systemic inflammation, some cancers | - Measured BMI  
- Ages 2-19: >95th percentile or >30 kg/m², whichever is lower based on age and gender using CDC growth charts  
- Adult: >30 kg/m²  
- Other measures include: waist/hip circumferences, waist to hip ratios | - Increased plaque index, bleeding on probing, periodontal pocket depth, clinical attachment loss  
- Mouth breathing | - Comorbidities may influence management  
- Dietary weight loss may reduce systemic inflammation and, in turn, enhance response to periodontal therapy |

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<td><strong>Papillon Lefèvre syndrome (PLS)</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>- Autosomal recessive disorder&lt;br&gt;- Palmoplantar hyperkeratosis&lt;br&gt;- Nail dystrophy, pyogenic skin and other infections, intra-cranial calcification&lt;br&gt;- Rapidly progressing periodontal manifestations: beginning shortly after tooth eruption; occurs in primary and permanent dentitions&lt;br&gt;- Etiology: alterations in the CTSC gene and, likely, neutrophil defects</td>
<td>- Urinalysis for cathepsin C activity&lt;br&gt;- Genetic testing for mutation of cathepsin C gene&lt;br&gt;- Key clinical finding: periodontal degeneration</td>
<td>- Rapidly advancing gingival inflammation and bleeding, deep periodontal pockets, gingival abscesses, periodontal destruction&lt;br&gt;- Premature loss of all primary teeth by ages 4-5; loss of permanent teeth by age 16&lt;br&gt;- After tooth loss, gingiva returns to healthy state</td>
<td>Generalized extensive alveolar bone loss with migration of teeth&lt;br&gt;- Treatment of oral manifestations depends on patient’s age, psychological state, and tooth mobility&lt;br&gt;- May include nonsurgical therapy (e.g., monthly SRP, systemic antibiotics) and/or extraction of hopeless teeth&lt;br&gt;- Alveolar loss renders prosthetic rehabilitation challenging</td>
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<td><strong>Periodontal Ehlers-Danlos syndrome</strong>&lt;sup&gt;2,4&lt;/sup&gt; (Gynonyms: Ehlers-Danlos syndrome VIII; pEDS)</td>
<td>- One of a group of hereditary connective tissue disorders; autosomal dominant&lt;br&gt;- Characterized by varying features including tissue fragility with easy bruising, vascular complications, joint hypermobility and/or pain, pretilial discoloration/plaques, increased infection rate, hoarse voice&lt;br&gt;- Predominant feature is severe early-onset periodontitis (mean age 14)</td>
<td>- Clinical examination and molecular genetic testing (variant in the genes C1R and C1S which play a role in innate immune system)&lt;br&gt;- Complete lack of gingival attachment is considered pathognomonic&lt;br&gt;- Most children identified through family history</td>
<td>- Severe gingival inflammation, loss of attached gingiva, and gingival thinning and recession&lt;br&gt;- Rapid alveolar bone loss&lt;br&gt;- Premature tooth loss</td>
<td>Alveolar bone loss&lt;br&gt;- May include nonsurgical therapy (e.g., monthly SRP, systemic antibiotics) and/or extraction of hopeless teeth&lt;br&gt;- Alveolar loss renders prosthetic rehabilitation challenging&lt;br&gt;- Implants at high risk of peri-implantitis</td>
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- **PLS**: Papillon Lefèvre syndrome
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- **WBCs**: White blood cells

### References