



the Child Dental Patient with

Liver Transplant



Background

- The liver has an important role in all metabolic processes.
- Liver transplantation offers the opportunity for a long healthy life for children with end-stage liver disease.
- After a patient has received a liver transplant, the patient must use lifelong immunosuppressive medication to prevent graft rejection.
- The outcomes of liver transplant have improved since the introduction of cyclosporine-based immunosuppression (1980's).

Etiology

Paediatric liver disorders needing liver transplantation:

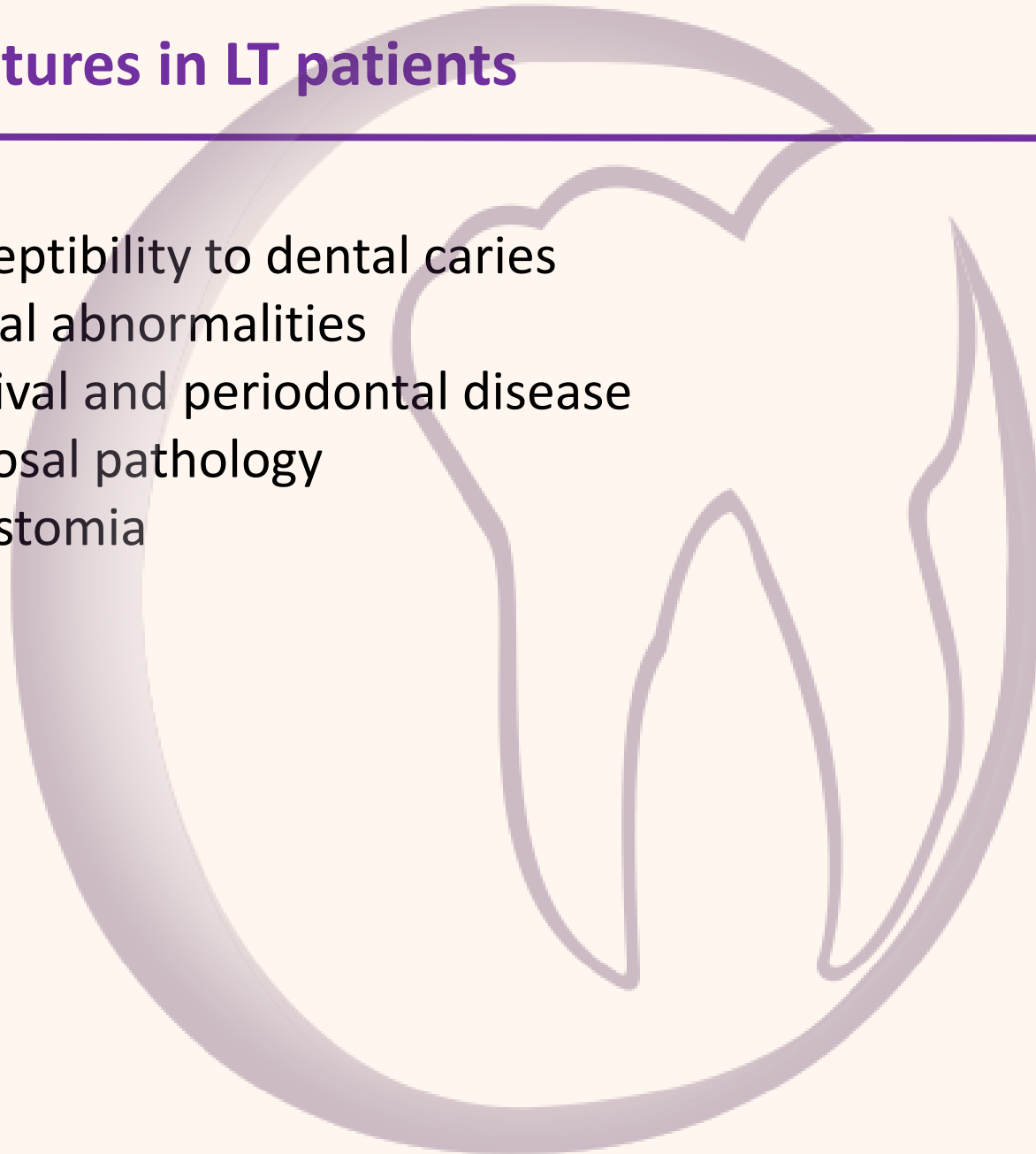
- Congenital biliary atresia
- Biliary hypoplasia (alagille syndrome)
- Metabolic disorders:
 - A-1 antitrypsin deficiency
 - Cystic fibrosis
 - Wilson's disease
 - Crigler-najjar syndrome
- Acute liver failure: paracetamol overdose, viral hepatitis, halothane toxicity
- Malignant tumours of the liver without extrahepatic metastases
- Chronic liver disease leading to decompensated cirrhosis (autoimmune hepatitis)

Clinical consequences of LT

- Various degrees of delayed skeletal/dental development
- Jaundice, failure to thrive, pruritus
- Hepato-splenomegaly, cirrhosis, cholestasis, ascites
- Encephalopathy
- Portal hypertension and oesophageal varices
- Anaemia and coagulopathy (impaired synthesis of vitamin K, thrombocytopenia, fibrinolysis, reduced or defective synthesis of clotting factors II, VII, IX, X)
- Dysfunction of other organs/systems → cardiovascular, respiratory, renal, neurological symptoms
- Altered drug metabolism
- Vitamin D malabsorption, rickets, osteopenia
- Bacterial peritonitis and recurrent cholangitis
- Psychological and social problems

Oral features in LT patients

1. Susceptibility to dental caries
2. Dental abnormalities
3. Gingival and periodontal disease
4. Mucosal pathology
5. Xerostomia



1. Dental caries

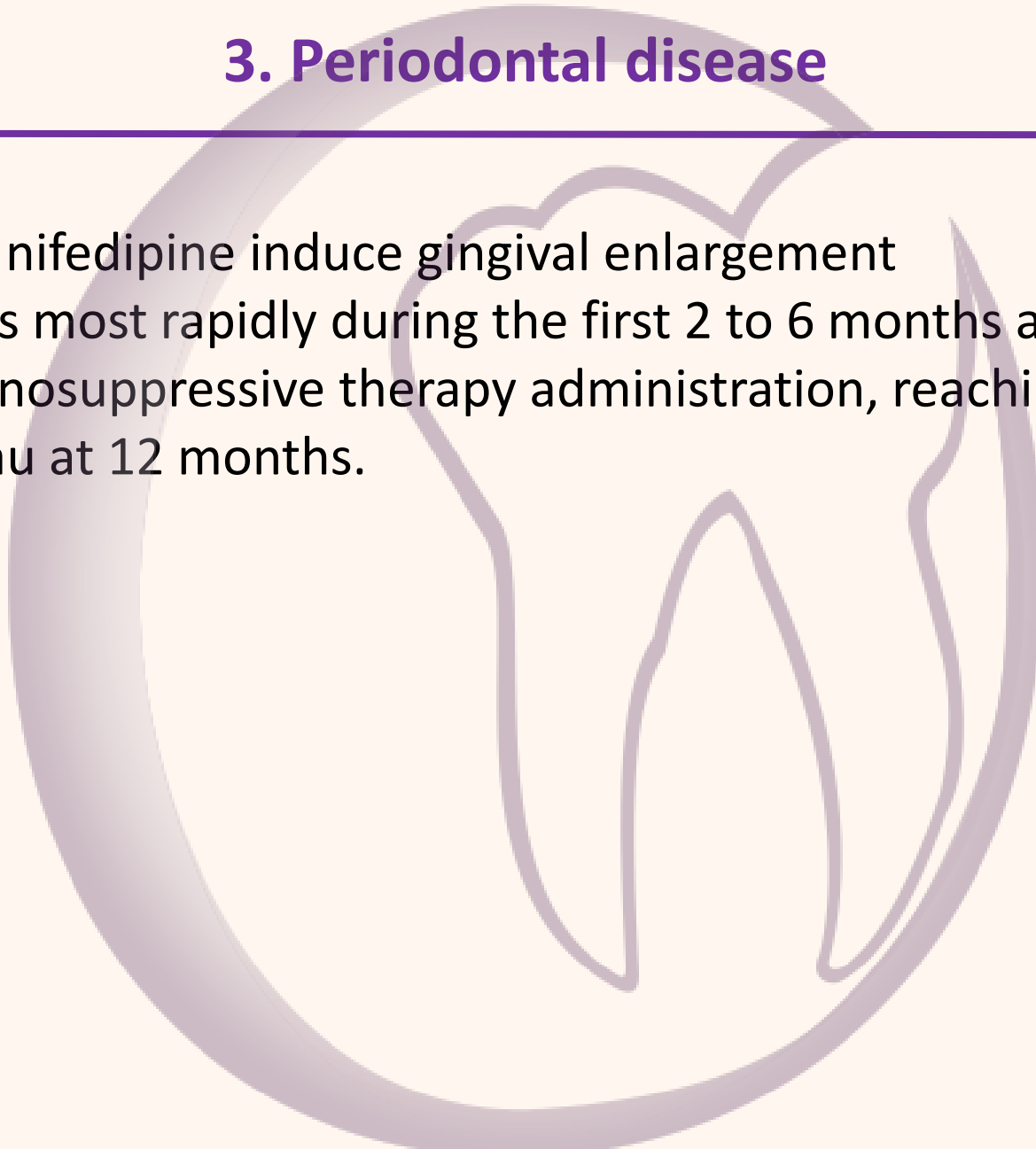
- Controversial results regarding dental caries prevalence
- Liver transplantation itself does not act as a systemic cause for a higher rate of dental caries, although there is evidence of higher incidence of caries in post-transplant patients.
- Rampant caries are reported in children with biliary atresia , because of frequent and prolonged bottle feeding and use of numerous sugar-containing oral medications.
- If dental enamel defects are present, carious lesions progress faster

2. Dental abnormalities

- Intrinsic green discoloration of the teeth (due to elevated serum levels of conjugated bilirubin)
- Green discoloration of oral soft tissues: gingiva, tongue, floor of the mouth, buccal mucosa
- Enamel hypoplasia (metabolic disturbances) and opacities
- Delayed tooth eruption
- Enlarged pulp chambers and root canals (vitamin D deficiency)
- Pulp stones
- Taurodontism
- Retained teeth

3. Periodontal disease

- CSA ± nifedipine induce gingival enlargement
- Occurs most rapidly during the first 2 to 6 months after immunosuppressive therapy administration, reaching a plateau at 12 months.



4. Mucosal pathology

- Oral candidiasis
- Mucosal ulceration
- Herpetic lesions
- Esophagitis associated with cytomegalovirus
- Hairy leukoplakia
- Oral malignancy: lymphomas, squamous cell carcinoma, Kaposi's sarcoma.
- Numbness or tingling, especially around the mouth
- Stomatitis
- Poor wound healing

Medication considerations

- Immunosuppressive therapy: cyclosporine A, tacrolimus, azathioprine, mammalian target of rapamycin inhibitor, sirolimus, everolimus, mycophenolate mofetil;
- Corticosteroids
- Anticoagulants
- Beta blockers
- Calcium channel blockers
- Diuretics

! ***Side effects of medication:***

- Gingival enlargement
- Xerostomia
- Orthostatic hypotension
- Hyperglycaemia
- Interactions with drugs the dentist might prescribe

Attention! LTx patients are prone to :

1. **Infection**: systemic bacterial infection, bronchopneumonia, spontaneous bacterial peritonitis (mortality rate 37-77%) → prophylactic antibiotic coverage
2. **Bleeding** → fresh frozen plasma or cryoprecipitate, platelet replacement, transfusion
 - Single-visit procedures, as atraumatic as possible
 - Resorbable sutures, haemostatic agents (microfibrillar collagen or topically sprayed thrombin)
 - Strict suction techniques: to prevent blood swallowing
 - Avoid: aspirin and non-steroidal anti-inflammatory drugs
 - Contraindicated: block anaesthesia and intraligamental injections

Attention! LTx patients are prone to

3. Altered drug metabolism:

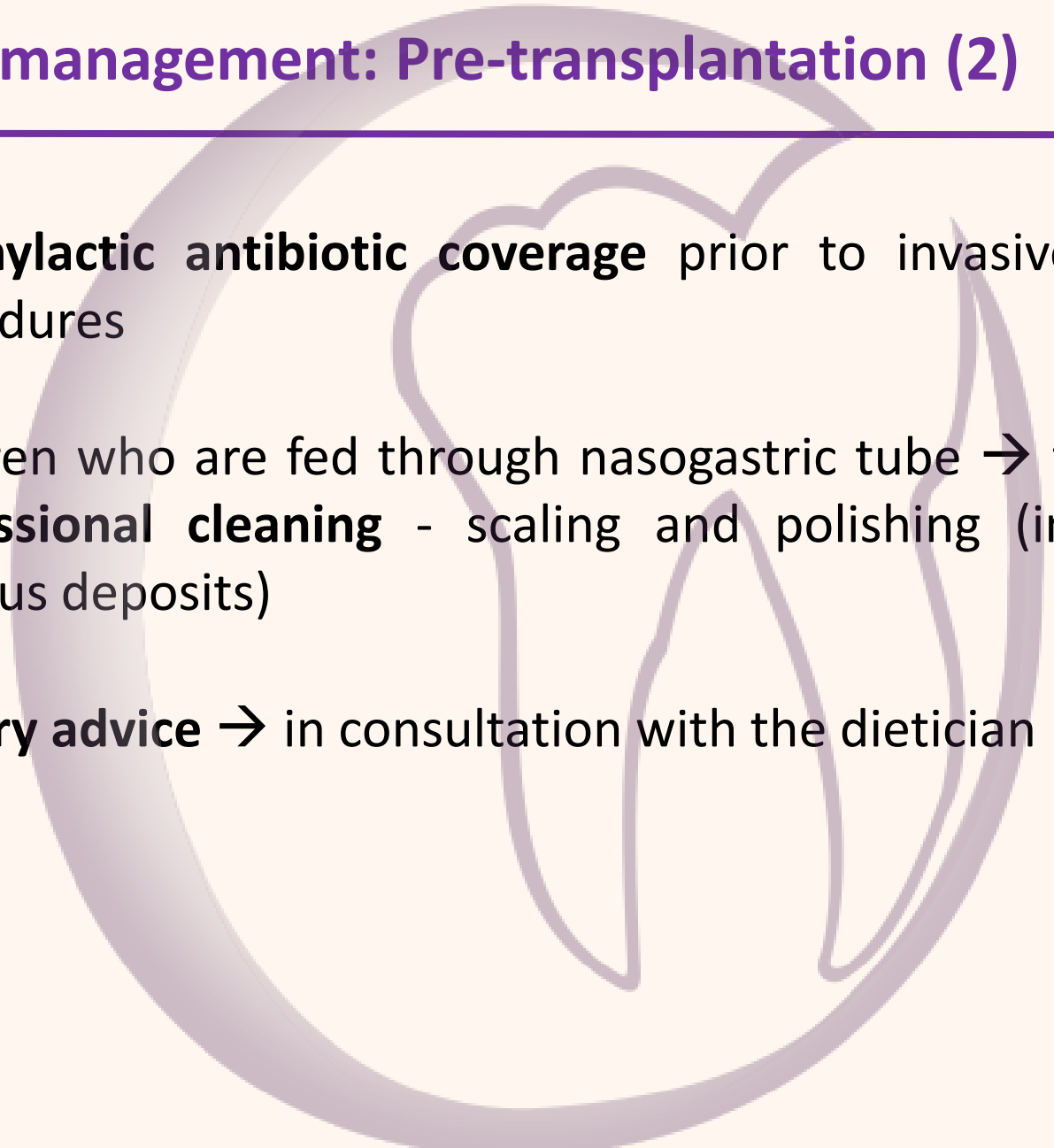
- Avoid: Erythromycin estolate, Tetracycline, Flucloxacillin, Ketoconazole, Aspirin, NSAIDs, Opioid analgesic, Suxamethonium, Antihistamines, sedatives and hypnotics, cabenoxolone sodium, prednisone (may use prednisolone), halothane (use isoflurane)
- Reduce dose: clindamycin, metronidazole, paracetamol (dose related toxicity), lignocaine, methohexitone sodium (or avoid), thiopentone sodium (or avoid)
- Prolonged half-life of lignocaine
- General anaesthesia: only at a specialist centre with support from all team members.

4. Poor wound healing

Dental management: Pre-transplantation (1)

- **Team approach** is compulsory: hepatologist, transplant surgeon, general medical practitioner, nursing staff, including clinical nurse specialists, dietician, general dentist, dental hygienist, psychologist, social worker, haematologist
- Primary objective: **elimination of dental disease** prior to liver transplantation → reduce the risk of systemic infections
- **Radical** approach :
 - pulp therapy (pulpotomies and pulpectomies) is contraindicated in primary teeth Stainless steel crowns for the restoration of primary teeth with extensive caries
 - extract non-restorable teeth

Dental management: Pre-transplantation (2)

- **Prophylactic antibiotic coverage** prior to invasive dental procedures
 - Children who are fed through nasogastric tube → frequent **professional cleaning** - scaling and polishing (increased calculus deposits)
 - **Dietary advice** → in consultation with the dietician
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Preventive approach

- Children should be evaluated between 6-12 months of age
- Oral hygiene and dietary instructions to **parents** (e.g. eliminate the night bottle habit as early as possible before liver transplantation)
- Routine dental care and **caries prevention programmes** → pre- or post-liver transplantation → reduce the risk of systemic infection arising from the oral cavity.
- **Sugar-free oral medications**
- **Fluoride** and **chlorhexidine**:
 - home use - mouthwash/gel;
 - professional applications
- Fissure sealants

Dental management: Post- transplantation (1)

- Particularly prone to bacterial and fungal infections in the immediate post-transplant period → considerable morbidity and mortality.
- Oral opportunistic infections (candidiasis and herpetic lesions) → must be treated vigorously
- Intensive mouth care; topical application of chlorhexidine
- Invasive dental treatment:
 - Immediate post-transplantation period: contraindicated
 - 2 to 6 months post-transplantation: to be avoided

Dental management: Post- transplantation (2)

- Gingival enlargement → oral hygiene, surgery for severe cases; switch from Cyclosporine A to Tacrolimus.
- Stressful situations should be avoided: local anaesthesia when necessary and supplementary corticosteroids prescribed beforehand
- Routine check-ups every 4 to 6 months: clinical and radiological
- Careful examinations of head and neck region: lymphadenopathy, oral malignancies, oral candidiasis, herpetic lesions, hairy leukoplakia